

# Total control

Why instrumentation & control technicians are vital for HVAC&R

# HVAC & R NEWS

 AIRAH | INDUSTRY JOURNAL

FEBRUARY–MARCH 2026 | ISSUE 168

## Recipe for success

The new ammonia refrigeration system at Arnott's Biscuits

## Skills workshop

Commissioning cooling towers



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\*With limitation system piping and outdoor unit installation space.

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# Size does(n't) matter

Did you know that Australia builds the world's biggest houses?

According to the Australian Bureau of Statistics, the average newly built house in 2008–09 had a floor size of 245.9m<sup>2</sup>, a measurement that has remained similar in the nearly two decades since. Finding the equivalent data for other countries is challenging, but some estimates show that our homes are 3.5 times bigger than the average home globally, which is around 70m<sup>2</sup>.

Growing up, I always thought this was normal. Australia has plenty of land, so it makes sense that we have big houses, right?

Then I spent most of my 20s living in European apartments of around 40m<sup>2</sup>. It's safe to say my views on housing have changed.

Big houses seem great on the surface. But the time, money and energy they take to furnish, clean, heat and cool isn't so appealing. And that's not even taking into account the extra building costs and embodied carbon of big houses – a factor that's often overlooked when we talk about sustainability.

As the housing affordability crisis worsens, politicians are looking for scapegoats. But I think their rhetoric misses the point. Of course there'll be an extra squeeze on land, materials and

labour if we keep building houses that are far bigger than they need to be. Those houses will be more expensive, meaning what could have been an affordable family home becomes an investment that only those at the top of the pile can buy. And the cycle continues.

Should we build luxury "McMansions" with underground carparks that go almost to the edge of the block and pave over any trace of green space? Or multi-story family houses that look good but are made from cheap materials that aren't appropriate for today's climate, let alone a much warmer climate 30 years from now? I'd argue that, not only does it not make sense to build houses like these, but the fact that they're approved shows that planning regulations are failing across multiple levels of government.

I realise that my experience as a 20-something living on their own in a European city was very different to that of a family of four in suburban Australia. But I do think that, with some clever design, the four-bedroom family home that pushes Australia's average floor size up so high could be comfortable at 150m<sup>2</sup> instead of 250m<sup>2</sup>.

Some of the money saved on the sheer volume of materials could be better spent

on the "hidden" aspects of the building, like higher-quality materials and better insulation. I'm sure HVAC&R professionals can appreciate the value of prioritising thermal performance and good workmanship.

Our cover feature in this issue of HVAC&R News explores a different "hidden" topic – the work of instrumentation and control technicians – or "instros" – who play a vital role in complex HVAC&R systems. We also explore a new ammonia refrigeration system at Arnott's Australia, dive into the cooling needs of data centres, and forecast the most important trends for small-medium HVAC&R businesses in 2026. Our skills workshop focuses on cooling towers, and Steve Smith is back with everyone's favourite page: the lighter side.

Australia's housing crisis is an extremely complex issue caused by any number of intertwining factors. Building smaller houses won't solve the problem on its own, but it might be a good place to start.

**Nick Johns-Wickberg**

EDITOR

✉ [nick.johnsw@airah.org.au](mailto:nick.johnsw@airah.org.au)



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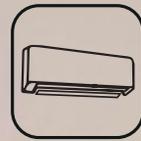
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Image of an unpressed >B< Press fitting with 360° Detect during pressure testing



## AIRAH Golf Days announced

AIRAH will hold 10 Golf Days across Australia in 2026 – four more than took place in 2025.

The 2026 season has been expanded after a hugely successful 2025, with new events in Albury, Cairns, South Australia (Adelaide) and Brisbane. Dates and locations below:

- **Tasmania:** Friday, March 6 – Claremont Golf Course
- **WA:** Wednesday, April 22 – Wembley Golf Course
- **Albury:** Friday, April 24 – Albury Commercial Golf Club
- **Cairns:** Friday, June 26 – Half Moon Bay Golf Club
- **Victoria:** Thursday, August 6 – Heidelberg Golf Course
- **Sydney:** Friday, August 21 – Strathfield Golf Club
- **SA:** Friday, August 28 – TBC
- **NT:** Wednesday, September 9 – TBC
- **Brisbane:** Friday, September 18 – Ashgrove Golf Club
- **ACT:** Friday, October 16 – Gungahlin Lakes Golf Course

[golfdays.airah.org.au](http://golfdays.airah.org.au)



## Daikin turns the key

Daikin has released its new DeVap series of evaporators, which it says completes its turnkey refrigeration solution.

The national launch brings evaporators into Daikin's existing condensing unit portfolio, completing what it describes as an all-inclusive refrigeration solution that has been developed to address Australian needs, with simplified installation, servicing and maintenance in mind.

DeVap integrates with Daikin's broader refrigeration portfolio and supports the transition to lower-GWP refrigerant alternatives, including R448A, R452A and R513A. Factory-fitted Carel EVD-ICE models are available, as is Blygold coil coating to enhance corrosion resistance and durability in demanding environments.

The company's full refrigeration solution is available nationally as of February 2026.

[daikin.com](http://daikin.com)



## Support for licence holders

The Australian Refrigeration Council (ARC) has launched a pilot program to provide practical education and on-site support for independent refrigerant handling licence (RHL) holders.

The pilot program introduces independent field engagement visits for Refrigerant Handling Licence (RHL) holders who are not affiliated with a Refrigerant Trading Authorisation (RTA).

During a field engagement visit, ARC field officers will meet directly with licence holders to answer questions about licence conditions, clarify refrigerant handling requirements, identify and resolve knowledge gaps, and share practical tips and best-practice guidance.

[arctick.org](http://arctick.org)



## Awards for MHIAA and Haier

Mitsubishi Heavy Industries Air-Conditioners Australia (MHIAA) has taken out two of ProductReview.com.au's customer awards in the split system air conditioner category, with Haier taking out the other spot.

The Haier Tempo series was one of the three winners named for 2026, with a maximum overall product rating of 5 stars. It performed particularly well in ease of use and value for money.

MHIAA products won the other two accolades in the split system category with its Bronte and Avanti series of air conditioners, both of which received overing ratings of 4.7 stars.

[mhiaa.com.au](http://mhiaa.com.au) and [haier.com.au](http://haier.com.au)



## Good start (in General)

Fujitsu General has officially changed its name to General Australia.

The company forecast the move late last year after it was acquired by Paloma Rheem Holdings through a public tender offer in August.

General's new logo and branding has been introduced, with the company expected to release new products and offerings in the coming months.

The new name seems to have got off to an auspicious start, with General Australia winning the 2026 Top Rated Appliance Brand award from ProductReview.com.au.

[fujitsugeneral.com.au](http://fujitsugeneral.com.au)



## Big moves at HydroChem

After six years at the helm, Mike Lenton, M.AIRAH, has retired from his role as CEO of Australian independent water specialist HydroChem.

Lenton, who guided the family-owned essential services business through the difficult COVID-19 lockdowns, has handed the reins back to owner Nick Duncan, M.AIRAH.

Shortly after the leadership change, HydroChem announced that it had acquired WA-based chemical manufacturer Environex, which manufactures for the mining, stonework, and food and beverage industries.

[hydrochem.com.au](http://hydrochem.com.au)



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# Share your views on Cert II training

A new survey is open to gather views on the Certificate II course in Split Air Conditioning and Heat Pump Systems.

The survey has been designed by Powering Skills Organisation (PSO), the Jobs and Skills Council responsible for maintaining the electrotechnology training package, which includes air conditioning and refrigeration qualifications. AIRAH, the ARC, and AMCA are supporting the initiative, the objective of which is to gather detailed feedback about the UEE20120 Certificate II in Split Air Conditioning and Heat Pump Systems.

A survey last year identified significant concerns about this qualification, including industry perceptions of inadequacy for safe and competent practice, scope limitations, and impacts on the broader trade.

This follow-up survey aims to understand:

- › Who is completing and delivering the Certificate II
- › Why individuals and employers choose this pathway
- › How the qualification is being used in practice
- › What specific gaps or concerns exist from the perspective of Certificate II holders, completers, trainers, and affected stakeholders.

The survey is aimed at those who hold or are in the process of obtaining the Certificate II qualification – including electricians and plumbers – as well as their employers. It also seeks views from those with a Certificate III in air conditioning and refrigeration,

and registered training organisations (RTOs).

Responses will directly inform potential reforms to training products and regulatory frameworks. The survey takes about 15–20 minutes to complete.

The survey is open until March 27, 2026.

**Have your say**

Complete the survey at the PSO website



# NCC 2025 comes into focus

The Australian Building Codes Board (ABCB) has published the NCC 2025 preview, providing early access to the next edition ahead of its May 1 publication date.

NCC 2025 reflects updates informed by public consultation and expert technical review. The preview gives practitioners the opportunity to understand the practical improvements across several areas before the code is published online on May 1, 2026. Jurisdictions can consider adoption of NCC 2025 from this date.

## Energy efficiency in commercial buildings

Changes to Volume One Section J (Energy efficiency) for buildings other than Class 2 introduce measures that reduce energy consumption, including:

- › Mandatory onsite solar photovoltaic systems
- › Higher requirements for building envelopes and services
- › Improved lighting control requirements.

## Condensation mitigation

Updates to condensation management provisions, such as reduced ventilation requirements for small roofs, are included in Volume One Part F8 (Condensation management), and NCC 2025 Housing Provisions Part 10.8 (Condensation management).

## What else has (and hasn't) changed?

NCC 2025 also contains updates in the areas of water management, carpark fire safety and structural reliability, and fire safety Performance Solutions.

Some changes proposed in the public comment draft are not included in NCC 2025, including residential energy efficiency.

Proposed changes to Volume Two Part H6 (Energy efficiency) and Housing Provisions Part 13 (Energy efficiency) will not go ahead.

Instead, NCC 2025 will reflect the existing requirements in NCC 2022 Amendment 2 for these parts.

For Class 2 buildings, the proposed amendments to Volume One Section J will not proceed. NCC 2022 Amendment 2 remains applicable for these buildings.



## Access the preview

The NCC 2025 preview can be accessed at the ABCB website via the QR code.



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# HVAC&R tops earnings among Australian trade businesses

A new report from Tradify has found that HVAC&R businesses bring in the most revenue among all major Australian trades.

According to the *Top-Earning Trades Report* – which analyses how Australian trade businesses perform in terms of revenue, quote win rates and admin approaches – the average Australian HVAC&R business earns around \$1.05 million in annual revenue.

In comparison, the average plumbing and gas business brings in \$801,654 in revenue annually, with electrical and AV businesses generating an average of \$735,562. Residential renovations are second to HVAC&R in terms of revenue, with businesses generating around \$964,000 annually.

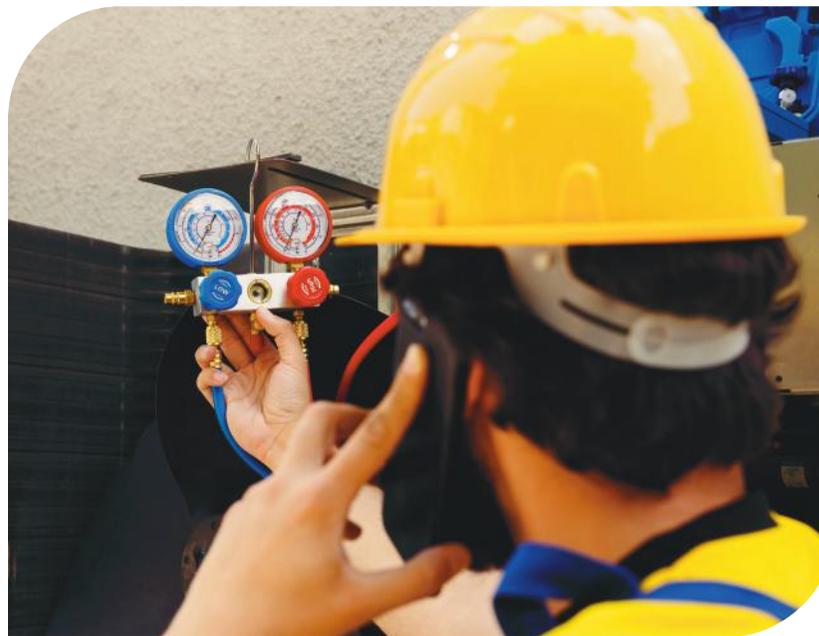
The report collated anonymised customer data from seven major trades. It found that HVAC&R businesses bring in the second most money of all trades (behind residential renovations) in three size categories, and the most among large businesses:

- › **Sole trader (1 person):**  
\$416,637 – second place
- › **Small business (2–4 people):**  
\$836,085 – second place
- › **Medium business (5–12 people):**  
\$1,973,100 – second place
- › **Large business (13+ people):**  
\$5,381,637 – first place

Averaged across all size categories, annual revenue for HVAC&R businesses is \$1,054,023.

Interestingly, despite leading all comers in total revenue, HVAC&R businesses were among the lowest in terms of average revenue per job.

For example, the report found that an HVAC&R sole trader earns \$3,057 per job on average, while sole trader carpenters earn more than \$10,000 per job, and residential renovation trades earn nearly \$20K per contract. This suggests that it's the quantity of jobs – not their size – where HVAC&R businesses thrive.



# Financial support extended

The Australian government has announced an extension to incentive payments for employers and apprentices in priority and clean energy occupations, including refrigeration and air conditioning.

The updates apply to the Key Apprenticeship Program (KAP), which has been implemented with the goal of encouraging the growth of the workforce and expanding the pipeline of workers training towards critical occupations supporting priority sectors.

The government has extended payments to December 2026, following strong uptake of the KAP since it commenced on July 1 last year. According to the government, more than 15,400 new energy apprentices have started training under the previous and current versions of the program.

Under the KAP, which encompasses New Energy Apprenticeships, employers can receive incentive payments of up to \$5,000, paid in two instalments during the first year of the apprenticeship.

Apprentices can receive up to \$10,000 (full-time) or \$5,000 (part-time) over the

course of their apprenticeship. For full-time apprentices, this consists of \$2,000 payments at 6, 12, 24, and 36 months and on completion. For part-time apprentices, it consists of \$1,000 at 6, 12, 24, and 36 months and on completion.

Eligible apprenticeships include both UEE and MEM courses in refrigeration and air conditioning at Certificate III and higher levels. The full list of eligible apprenticeships and courses is available at the Department of Employment and Workplace Relations website.

Australian apprentices who need to move away from home for their training are eligible to receive tax-free weekly payments of \$120 per week for their first year, \$90 per week for their second year, and \$45 per week in their third year.

Apprentices can also access support loans, and, for those with a disability, dedicated wage support.

The Group Training Organisation (GTO) Reimbursement Pilot Program started at the beginning of 2025. It enables small and medium enterprises (SMEs) to get reimbursed for apprentice places through GTOs. The pilot will close to new entrants on April 30, 2026, or once it reaches 400 caps, whichever occurs first.

More information about support options is available through Apprentice Connect Australia Providers.

## Are you eligible?

To check whether your apprenticeship or course is on the list, scan the QR code.



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# Digitising HVAC&R workflows: What SMEs should be prioritising in 2026

Lara Blake from Tenderfy looks at the key technological trends that will shape the Australian HVAC&R industry this year.



The HVAC&R industry is under more pressure than ever to do more with less.

With skills shortages, compliance requirements, rising costs and increasingly complex projects, small and medium enterprises are being asked to operate in the same way as large organisations, but with a fraction of the resources.

The businesses that will thrive in 2026 won't necessarily be the biggest; they'll be the most digital-savvy.

We're seeing a shift across the sector away from paper-based processes, disconnected spreadsheets and manual admin towards fully digitised, integrated workflows. For HVAC&R SMEs, this isn't just a "a nice to have" anymore – it's an everyday necessity.

## Focusing your digital investment

Every HVAC&R business runs on workflows such as quoting, scheduling, compliance, purchasing, job delivery, invoicing and reporting.

When these workflows are scattered across email, spreadsheets, notebooks and filing cabinets, work gets duplicated, data gets lost and mistakes often creep in.

Digitised workflows create a single source of truth. Everyone works from the same information, in real time, across the office, warehouse and on site.

For SMEs, that means faster turnaround times, fewer errors and rework, better compliance, higher profitability, and an improved customer experience. The result of all of this? A business that can actually scale and manage its growing workload efficiently and cost-effectively.

## Job management

In 2026, paper job cards and whiteboards should be a thing of the past. Modern HVAC&R operations need technicians accessing job details, drawings, safety documents, service history and parts lists on their mobile devices in real time.

A decent field service management system lets technicians receive and update job information on site, upload photos and compliance documentation, record time, materials and variations, and complete digital sign-offs. This removes delays between the field and the office, reduces disputes, and ensures accurate billing.

## Compliance and documentation

HVAC&R is one of the most compliance-heavy industries in construction. From refrigerant handling and commissioning records to WHS and environmental reporting, documentation is critical and mistakes are costly.

Digitising compliance means certificates are generated automatically, forms are completed once and reused, records are securely stored and easily accessible, and audit readiness becomes simple.

It also dramatically reduces risk when you're working on government or large commercial projects where documentation quality is essential.

## Quoting and estimating systems

Too many SMEs still build quotes in spreadsheets or Word documents, completely disconnected from their job costing and inventory. This makes it difficult to track profitability or improve accuracy over time.

Modern estimating tools let you build standardised quote templates, apply consistent pricing and margins, link quotes to job delivery and purchasing, and analyse which jobs are actually profitable. In a tight market, knowing your true costs is one of your biggest competitive advantages.

## Inventory and procurement

Digitised inventory systems let HVAC&R businesses track parts, equipment and consumables across vehicles, warehouses and job sites. This enables automatic reordering, fewer urgent supplier runs, reduced waste and over-ordering, and better forecasting for upcoming projects. When integrated with job management, it also means the right parts are there when technicians arrive on site.

## Financial integration

When job management, purchasing and invoicing systems talk directly to your accounting platform, you get faster invoicing, fewer errors, clearer cashflow visibility, and real-time profitability tracking. For SMEs, this level of financial clarity is often the difference between growth and stagnation.

## Data and reporting

Digitised workflows generate valuable data about job duration, technician productivity, callbacks and defects, project profitability, and customer trends. This data gives business owners the ability to make informed decisions instead of relying on gut feel.

## Final thoughts

Digitising your HVAC&R workflows isn't about replacing people – it's about empowering them.

The SMEs that will win in 2026 will be those that invest in systems that remove friction, reduce admin, and let their teams focus on delivering great work. Start small, integrate carefully, and build towards a connected digital operation that supports growth. Because in a market that's only getting more competitive, efficiency is the new advantage.



## About the author

**Lara Blake** is the Partnership Development Manager at Tenderfy, a provider of tender management software, where she drives strategic growth, fosters partnerships, and champions digital solutions. With extensive experience across tech, SaaS, and government sectors, Lara is passionate about simplifying complex processes and helping businesses accomplish more with smart technology.



# Commissioning cooling towers

MODULE 168

Proudly sponsored by:

**AIRAH's DA17:  
Cooling towers manual**

## WHAT'S IT ABOUT?

This skills workshop provides an overview of best practice for commissioning cooling towers.

## WHO'S IT FOR?

Relevant for HVAC&R professionals and commissioning technicians who work on cooling tower applications of all types.

This skills workshop, taken from AIRAH's recently updated *DA17: Cooling towers* manual, introduces technicians to best practice for commissioning cooling towers, including water balancing, air measurements, system cleaning, pre-treatment, passivation, documentation, analysis of results and fine-tuning. It includes a helpful commissioning checklist that technicians can use while on the job.

## Commissioning management

Commissioning marks the end of the construction phase and start of the operational phase of a project. Commissioning is the process whereby cooling water systems are documented, tested, tuned and calibrated to ensure that the installed performance of the system will meet the design brief and the designers' intent.

Commissioning data forms an essential part of the maintenance management program, and it is essential that the data collected during commissioning is accurate and complete.

Commissioning generally occurs at the end of the construction period when the building and system are substantially complete, although some pre-commissioning can occur prior to this. Commissioning procedures should aim to optimise the operation of the cooling tower/water system while meeting the required building performance.

The benefits and the importance of proper commissioning of cooling water systems cannot be overemphasised.

Benefits include:

- › Optimised system performance
- › Lower operating costs
- › Reduced risk
- › Reduced downtime
- › Better system knowledge by installer
- › Better knowledge transfer to operator and maintainer
- › Better data for maintenance management
- › Better data for optimised operation.

All cooling towers require correct commissioning so that they operate as intended. Small factory-assembled towers should require only basic survey and standard water, energy and airflow measurements. Larger field-erected towers may need to be site-tested to verify performance according to a recognised test standard.

The following minimum information is needed to properly commission a cooling tower:

- › Design specification and intent
- › Control specification and intent
- › Manufacturer specification
- › Rated performance data
- › Applicable regulations.

## Water balance

### General

Water balancing should be carried out on the system to ensure that the design intent is achieved and systems are set for optimum operation. AIRAH's *DA24 Hydronic System Balancing – in HVAC* manual provides detailed guidance on the procedures involved in preparing and commissioning a water system.

For any cooling tower, it is essential to ensure that the water flow rate through the tower and any bypass valve have been correctly set to ensure that the design flow rate is being achieved.

An orifice plate or other measuring device in the main circuit can be used to establish flow rate. A water flow meter should be used when filling or refilling a system so that an accurate estimate of the total system volume can be recorded.



PULLOUT



Where a two-way control valve has been installed in the bypass line, fit a clear plastic tube to the test point and set the balancing valve so that at full bypass, water is standing in the tube just below the highest point of the inlet pipe, but not actually spilling over into the tower. Lock the balancing valve.

In the case of linked butterfly valves, set the balancing valve to give a pressure drop at design flow equal to that through the spray nozzles. Lock the balancing valve.

## Setting the correct make-up level

To correctly set and commission a cooling tower make-up valve (commonly a ball/float valve), the following steps are required:

1. Ensure that the maximum design water and airflows are being achieved by the tower
2. Check make-up water pressure is between 150–200kPa
3. Shut off the system
4. Isolate the equaliser (balance) line for multiple towers
5. Fill the cooling tower to 20mm below the overflow point then shut off the make-up water
6. Turn the system back on to maximum design water and airflows and mark the drop in water level in the cold-water basin
7. Shut off the system
8. Drain the cold-water basin to the level marked
9. Open the make-up line and adjust the make-up valve to make up any drop in level from the marked level
10. Fill the cooling tower to 20mm below the overflow point
11. Open the balance line for multiple towers.

Use the same procedure for all towers in the system. Once set, operate all towers simultaneously and check for overflow. Stop the systems and check for overflow. If overflow occurs after the make-up level has been reset, this indicates that there is a system design or installation problem that requires rectification.

## Multi-cell and multiple towers

Incorrect balancing across multi-cell or multiple towers will result in the water starvation of one cell and the overflowing of another. This will affect the operating efficiency of both cells (or towers) and reduce the heat rejection capability of the cooling water system, resulting in greater energy use and greater water consumption.

Water flows should be balanced between all towers to achieve the correct design water distribution pattern.

## Individual internal tower distribution

The correct distribution of water within the cooling tower or cell is also essential to achieving the full performance potential of the equipment. Towers need to be installed or constructed so that they are level and true, and internal components also need to be installed level and true and with the correct tolerances as stated by the manufacturer's published installation instructions.

Proper water distribution should be visually checked as part of the tower commissioning process. Water flow rates and pressures also need to be verified to be within allowable design limits and manufacturer specifications.

## Air measurements

For factory-assembled cooling towers located outside or in an amply sized enclosure, there is usually no need for measurement of airflow except to prove that the system design requirements and the manufacturer's specified rating have been achieved. However, for towers enclosed in plantrooms, for towers that have attenuators or discharge ductwork fitted, or for site-constructed towers, it will be necessary to take airflow and air temperature measurements to ensure that design airflow is being achieved and that there is little or no recirculation.

Airflow is generally measured with a vane anemometer or velometer. For induced draft towers, airflow measurements are taken at the air intake louvres and for forced draft towers, at the air discharge.

The fan assembly should be statically and dynamically balanced at all appropriate fan operation speeds.

Variable speed drives should be operated across the range of their speed capabilities. Any resonant frequency ranges that may affect the cooling tower or the cooling water system and any fan-critical speed should be locked out during commissioning.

## Testing

Cooling towers will reject the entire heat load applied to them. However, an undersized cooling tower will cause the delivered water temperature to rise above the designed limits, as the tower is unable to achieve the performance required. This will invariably influence the refrigeration or other system applying the load to the detriment of that system. Systems operating outside of their design conditions rarely operate efficiently, generally provide poor control and are less likely to meet their design requirements. In particular, the efficiency of the system served by the cooling tower will suffer.

Thermal performance testing can be conducted on cooling towers to ascertain whether or not the tower is operating to its design criteria.

A tower may not perform to its design requirements for a number of reasons, such as:

- › Poor siting of the tower causing excessive recirculation of the discharge plume, thus artificially raising the entering air wet bulb temperature
- › Inexpert erection of field-erected cooling towers, so that the final installation is not to the correct specification
- › Poor selection of equipment or components
- › Overly optimistic equipment ratings or a failure to properly derate cooling towers in particular applications.

Undersized cooling towers can cause:

- › **Increased running costs** – Undersized cooling towers will produce higher water temperatures than specified and thus contribute to a less efficient operation

of the total plant. A less efficient plant equates to a longer running time, causing higher energy costs

- › **Reduced performance** – Refrigeration plant capacity is reduced as head pressure is increased by higher condensing temperatures. This in turn leads to higher space temperatures or loss of production
- › **Reduced machinery life** – Higher water temperatures than design may cause additional stresses in the plant being cooled, which would reduce its effective life.

## System cleaning

Prior to operation, the cooling water system needs to be cleaned. Cleaning can include surface cleaning, chemical cleaning and degreasing. Cleaning is important to remove scale, corrosion, oil or swarf within the new pipes and components, as well as any dirt, dust, rainwater or building material that may have entered the system components during construction and installation.

The cleaned cooling water system needs to be flushed out to remove any debris or contamination generated during the manufacture and installation process. Large cooling systems may need to be progressively flushed.

After flushing and debris removal, the system should be chemically cleaned, passivated and then filled with treated system water of the appropriate quality.

For galvanised components, the choice and application of chemical cleaning agents is important. If the galvanising is damaged by cleaning agents, the successful passivation of the zinc may be prevented. The cooling tower may need to be bypassed during any pre-commissioning chemical flush of the pipework and associated equipment. Silt, sludge and debris must be removed, and basin surfaces kept clean. This is essential for successful system pre-treatment and system passivation.

## System pre-treatment

System management and in particular water quality management and treatment begins with the commissioning process. An essential part of the system commissioning process is the pre-treatment of the system for the purposes of corrosion protection and microbial control. System pre-treatment should be carried out after the system has been cleaned and flushed.

State regulations may require disinfection and cleaning before a cooling tower is circulated. Disinfection with chlorine or bromine along with pH adjustment may be mandated. Such oxidising agents are extremely aggressive to galvanised components, especially galvanised sheet. The water treatment provider should be consulted for specific advice on limiting the chemical attack on galvanising during disinfection and cleaning.

## System passivation

Galvanised cooling towers often need to be pre-treated and passivated in the field to help them form their protective coating. It is important to establish the correct passive surface layer on galvanising to

prevent a type of corrosion that forms on zinc-coated surfaces, commonly referred to as "white rust". Atmospheric passivation can take more than 12 months. During the system passivation period, harsh acidic or caustic cleaners should be avoided.

Manufacturers of galvanised cooling towers will often specify the passivation process for their products, which can in some cases take up to 12 weeks of continuous water circulation through the cooling tower without heat load. It is imperative that this is followed to ensure the passivation process is completed correctly. For example, a typical passivation process is that cooling towers should be pre-treated with inorganic phosphate and the chemical levels of Table 1 maintained in the cooling water for a period of 60 days.

Table 1 Passivation recommendations

Indicator	Recommended passivation level
pH	7.0–8.0
Halogen	0.5mg/L
Calcium	100–300mg/L
Alkalinity	100–300mg/L
Chloride	up to 450mg/L
Sulphate	up to 1,200mg/L

Continue to treat the system with inorganic phosphate during the passivation period. After the passivation period, galvanised cooling towers can be operated under the normal water treatment program.

### Seasonal commissioning

Depending on the system type and application, commissioning procedures may need to be carried out over multiple seasons to ensure that optimal settings for the system are defined. Seasonal commissioning is particularly relevant where free cooling provisions are incorporated into the design.

### Commissioning documentation

Commissioning procedures and results, including the identification and resolution of any non-conformances, should be fully documented. A full set of the commissioning documentation should be included in the operating and maintenance documentation – refer to AIRAH's DA19 HVAC&R Maintenance manual. The results and data from the system commissioning tests should be recorded as baseline data for the ongoing operation and management of the cooling water system.

### Analysis of results

Commissioning results form the basis of the ongoing system maintenance and management program. The results of the commissioning process should be analysed against design intention and actual building/process requirements. Systems may need to be fine-tuned to create optimum settings for the final application, which may not be the documented design settings.

### System fine-tuning

Cooling towers and cooling water systems need to be continually tuned to ensure that their operation and performance is optimal. Initial tuning begins at the commissioning stage where the system is set up to meet the design requirements. System tuning is the operation of adjusting the commissioned system to meet the actual needs of the building or process.

In many industrial applications, the tower must produce a precise leaving water temperature. This variable can play a pivotal role in the process or application and slight deviations from design specifications can have a significant operational impact. Systems may need to be fine-tuned after commissioning to ensure that the actual operational requirements are met.

Tracking performance trends against maintenance activities is an essential aspect of tuning building systems. Tuning is an iterative process and relies on accurate and complete maintenance records for optimum outcomes.

The results of any fine-tuning procedures and in particular any changes made during the process should be fully documented (and authorised) in the system operating and maintenance documentation.

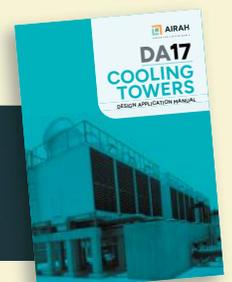
### Commissioning checklist

Manufacturers' commissioning and start-up instructions must be followed. Prior to testing or commissioning, the system must be cleaned to remove oil, grease, new pipe mill scale, silts, organic debris, rust or water. The system should then be passivated; since the system may also contain microbiological contamination, disinfection should be carried out prior to the generation of any aerosol emissions.

Typical commissioning routines for a cooling tower would include the following:

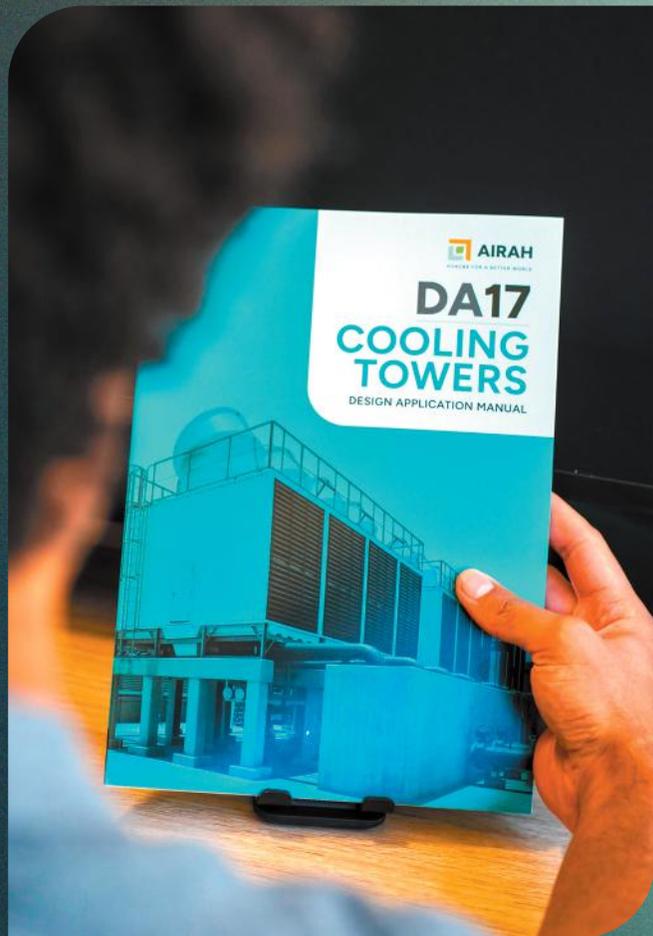
- Ensure distribution pipework has been cleaned, flushed and pressure tested
- Check adequate access for maintenance and service, verify against manufacturer recommendations
- Check warning labels and signs
- Verify that lockout/tag-out procedures are in place
- Clean tower and in-line strainers, replace construction strainer
- Check pump mounting, vibration isolators, pipework, valves, strainers, pressure gauges, thermometers and accessories are complete
- Check shaft/coupling alignment, lubricate all bearings
- Turn shaft by hand to ensure free turn and "bump" to prove correct rotation
- Check tower casing for any air leakage (access doors, supports, fixings)
- Check all tower components for signs of construction damage and to prove correct installation
- Check fill packs are correctly installed (level) with no interference between packs
- Ensure air intake path and fan discharge are clear of any obstructions
- Clean any air filters
- Clean all tower surfaces, flush and clean basin
- Clean tower basin/water distribution strainers
- Lubricate fan/motor shaft and bearings
- Test/adjust belt drives (tension and alignment) and gear drives (oil, alignment, play)
- Check fan blade tip clearance against manufacturer's data
- Turn shaft by hand to ensure free turn and "bump" to prove correct rotation
- Run fan at full design speed, check noise and vibration. Verify amps and volts
- Fill basin and piping
- Run pump at full design speed, check noise and vibration. Verify amps and volts
- Check tower water distribution system and fill packing for even flow. Balance distribution system
- Check basin water level correct. Check for vortexing
- Operate make-up controller manually to ensure proper operation
- Check system for leaks
- Measure airflow and verify against design and manufacturer's performance curve
- Ramp any variable speed drive from minimum to maximum speed and lock out any frequency ranges that may affect the cooling tower; any fan-critical speed should also be locked out
- Measure water flow rate and verify against design and manufacturer's performance curve
- Check water supply pressure and capacity
- Check ambient noise levels
- Calibrate all sensors and controls and confirm correct operation and setting
- Identify all control sequences and verify correct operation
- Commission/verify filtration system operation
- Commission/verify water treatment system operation
- Confirm all manufacturers' instructions followed
- Confirm all specified commissioning instructions followed
- Confirm all commissioning results documented and included in O&M manuals.

This month's skills workshop is taken from AIRAH's DA17: Cooling towers manual, which was updated in December 2025 and is now available for purchase via the AIRAH website.



PULL OUT

# The new edition of DA17 COOLING TOWERS is here!



**DA17** is the comprehensive guide to the design, installation and operation of cooling towers in Australia.

The 2025 version is particularly relevant for those working on data centre projects, many of which are now turning to cooling towers to manage heavy cooling loads.



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**AIRAH**

HVAC&R FOR A BETTER WORLD

# Total control



We examine the important role instrumentation and control technicians – or “instros” for short – play in optimising HVAC&R systems.

As automation and AI optimisation becomes more widespread in HVAC&R systems across Australia, the instrumentation that allows these systems to function smoothly is more important than ever. But who installs, maintains and repairs instrumentation and control (I&C) systems, and what does their career pathway look like?

In this feature, we’ll look at the vital Australian trade that is even more hidden than HVAC&R.

## What is I&C?

Modern industrial processes require complex and highly specialised machinery. For that machinery to function properly, it needs to be controlled using instrumentation that is correctly installed, commissioned, fine-tuned and maintained.

This is where I&C technicians come into the picture. These highly trained professionals have a deep understanding of both the theory underpinning mechanical operation and the specific processes they work with.

Glen McMurtrie is the Leading Vocational Teacher in TAFE Queensland’s Project Instrumentation department, where he runs the Certificate III in Instrumentation and Control (UEE31220) course. As he explains, working as an instro requires both broad and extremely specialised technical knowledge.

“A common trait amongst I&Cs is they know their process,” McMurtrie says. “If they work at a brewery, that doesn’t make them the brewer, but they know typical flow rates, temperatures, pressures, and pH associated with the process.

“Calibration for custody transfer and quality compliance is a large part of what we do. Add to that final control elements like control valves and drives, general troubleshooting and control optimisation, and you’ve got yourself a very multifaceted tech.”

For example, an I&C technician could work in energy production or mining, ensuring that multimillion dollar equipment is performing safely and efficiently as intended. In that role, they would be responsible for:

- › Installing and maintaining equipment
- › Calibrating and optimising the equipment once installed
- › Monitoring system performance and repairing faulty equipment where necessary
- › Keeping thorough and accurate documentation to ensure compliance.

It’s not just industrial processes where I&C technicians thrive; they also have a huge role to play in the built environment. As McMurtrie says: “BMS techs from the major vendors train with us and a lot of what we do directly correlates with HVAC&R.”

Nick Johns-Wickberg

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## Instros in HVAC&R

I&C is as important in an HVAC&R setting as it is in any other industry. One company that works at the intersection of the I&C and HVAC&R sectors is Reliable Controls, a global provider of smart building controls systems that is headquartered in Canada.

Levi Tully is the Executive Vice-President of Sales at Reliable Controls. He says I&C acts as the “nervous system for the built environment”.

“The role of instrumentation and controls in HVAC and building services is fundamental,” Tully says. “You cannot manage what you do not control. Even fundamental thermostatic control requires a degree of instrumentation and control. Optimisation of the built environment requires significantly more, and effective autonomous automation even more.”

Perhaps the most obvious example of this is a building management system (BMS), a highly complex network of sensors, instrumentation and high-tech software that controls and optimises HVAC performance in commercial buildings.

While RAC technicians take care of the physical HVAC infrastructure within the building, instros are responsible for the electronic side of things. Tully says their work – which includes installation, commissioning, maintenance, repair, and software and network

# Fully automated future?

It's clear just how important I&C will be in a built environment that is becoming increasingly automated. But are we destined for a future where humans have little to no role in operating and maintaining BMS and HVAC systems within buildings?

From everyone we've spoken to, the answer is a resounding "No".

"There will never be a point where human intervention in HVAC controls will be minimised to the point of zero," says Reliable Controls President Tom Zaban. "A human will always need to be involved in the design, implementation, validation, and maintenance of the systems that humans engineer.

"Anything that humans create will require humans to maintain, even if it means maintaining the robots that construct and manage the buildings for us."

Reliable Controls Training Manager Nathan Wilson points out that, even if a building's HVAC system were to be fully automated, the maintenance burden on technicians would be significant.

"The types of systems that could run buildings without human involvement have a short service life; either the hardware fails or there are security or performance issues that require human involvement," he says. "At this time, I believe it is even more critical that technicians and building operators have a strong understanding of how systems work."

*"Controls technicians provide a crucial and multidisciplinary insight into the optimisation of not just built environment systems, but also the human experience in the built environment."*

Reliable Controls  
Executive Vice-  
President of Sales  
Levi Tully



TAFE Queensland's Project Instrumentation department is based in a \$40 million facility in Eagle Farm



support – is vital in ensuring optimal system performance. After all, one malfunctioning component can throw an entire building into disarray, causing temperature fluctuations and excessive energy use.

"True sustainability in the built environment comes at the convergence, not divergence, of people and technology," Tully says. "Controls technicians provide a crucial and multidisciplinary insight into the optimisation of not just built environment systems, but also the human experience in the built environment."

I&C technicians have arguably an even more important role in refrigeration, where their work involves an additional safety component. For example, in industrial refrigeration systems that use ammonia as a refrigerant, any gas leak can be not only toxic, but potentially lethal. Ensuring that leak detectors and pressure relief systems operate as intended is part of the instror's remit, as is ensuring that temperature and energy use is accurately monitored.

So, what's involved in becoming an instror?

## Instrumental training

The Certificate III in Instrumentation and Control (UEE31220) consists of 12 weeks of training that can be done all at once, or spread over a year or two to cater to those who already have work commitments.

McMurtrie identifies measurement as one of the foundations of I&C both as a profession and as a training course.

"There's an old saying that 'if you can't measure it, you can't control it,'" McMurtrie says.

"The first eight weeks of the course cover all the basics of measurement, installation, calibration, and signal protocols. HVAC&R techs will be familiar with some of the process variables, including temperature, pressure, and flow. However, some may be foreign: level, density, weight, pH, conductivity, ORP, turbidity, O<sub>2</sub>, and gas composition.

"The final four weeks is all about control – proportional-integral-derivative (PID) control, to be exact."

This stage of the Certificate III in Instrumentation and Control (UEE31220) focuses heavily on practical skills and coming to grips with complicated control equipment. Being able to provide the right resources to students is crucial.

"We're fortunate here at TAFE Queensland to have just moved into a dedicated \$40 million facility located near the airport at Eagle Farm," McMurtrie says. "This has allowed us to have dedicated areas for classroom delivery, workshop calibration and repairs, and finally a wet area where 'live' process simulators are located. These simulators contain the various instruments and final control elements found across multiple industries.

"We're lucky to have a variety of industrial controllers here on campus – everything from relatively simple panel mount controllers through to Rockwell Compact Logix and Factory Talk SCADA. We're the only TAFE with a fully fledged distributed control system (DCS) on site too. The Yokogawa Centum VP allows the students to control real live working processes from a simulated control room environment."

## Converging knowledge

McMurtrie identifies the significant crossover between I&C and trades like HVAC&R and electrical. In fact, many of his students from Queensland, NSW and the NT come from this kind of background.

"BMS has always been a natural I&C transition for many HVAC&R techs over the years," he says. "Most of the people we train are industrial electricians, but we need more fridgies!

"HVAC&R is a process, so honestly, they're like ducks to water in this course. Not only do they understand temperature and pressure, but fridgies have an idea of energy/mass balance and inertia in systems – they know that some things can't just be switched on and off!"

And while there is plenty of crossover between the trades, McMurtrie points out that the I&C training is far more substantial than many might realise.

"We most definitely need to do more to promote awareness and understanding of this often-misunderstood trade," McMurtrie says.

"A lot of techs, whether they be electricians or HVAC&R professionals, see I&C as just an 'add on', another short course or accreditation. I can assure you it's a lot more than that!

"It wasn't until I worked at the huge Mount Isa Mines complex in northwestern Queensland that I was exposed to the extent of industrial process control. The sheer scale, amount and variety of instruments, PLCs and DCS was mindblowing."

## Workforce shortage

Like many trades across Australia, I&C is struggling to attract the next generation of talent. It's a concern given I&C's increasing importance as process automation becomes more widespread.

"I believe there is a shortage of technicians in general in Australia," says Reliable Controls Australasia Business Development Executive Vince Dunn, M.AIRAH.

"More focus on formal training by employers would be an improvement, with an understanding that this training is an investment rather than an overhead."

McMurtrie agrees that there is a significant shortfall in I&C tradespeople, highlighting several challenges in recruiting and retaining professionals.

"We most definitely face a shortage of I&Cs, mainly due to an ageing workforce, younger people's values and priorities when choosing a career, and competition within the STEM trades," he says.

"A common complaint among instrumentation vendors is the lack of dedicated, experienced I&C techs who are truly competent in their line of work – especially when dealing with warranty claims and service support for equipment that was incorrectly installed, commissioned, or specified."

He says increasing exposure among young people who are looking for an engaging and multifaceted career is one of the best ways to address the shortfall.

"I think TAFE is on a winner with 'try a trade' days that allow school leavers and the public to come along and see what a trade involves before committing to it," McMurtrie says. "It's very satisfying seeing their faces light up when they step into the instrumentation space, and even more so when they realise they've found a vocation worth pursuing."

## Decades of evolution

If you think I&C is a fledgling sector, think again. Reliable Controls is celebrating 40 years in business in 2026 – a good indication of just

how long this behind-the-scenes industry has been operating.

As you can imagine, plenty has changed in the I&C space over the past four decades – after all, the Ethernet standard was only established in 1983, an era when the internet as we know it today was unimaginable.

"40 years ago, an experienced controls technician would have interacted with pneumatics more than computer networks," Tully says. "Early controls networks moved technicians from gauges and centralised control panels in mechanical spaces to distributed control and graphical user interfaces on a workstation."

As technology has advanced, so too has the instro's role. Key milestones have included the advent of direct digital control, the adoption of open protocols including BACnet, the use of internet-connected systems, and the significantly increased need for cybersecurity awareness. As such, instros today have similar responsibilities and work using the same foundational principles as those who worked decades ago, but in very different ways.

"Automation technicians have evolved dramatically in the past 40 years, almost entirely related to the convergence of operational technology (OT) and information technology (IT)," Tully says. "A technician 40 years ago and one today must both understand how to harness complex

*"BMS has always been a natural I&C transition for many HVAC&R techs over the years. Most of the people we train are industrial electricians, but we need more fridges!"*

TAFE Queensland  
Leading Vocational  
Teacher – Project  
Instrumentation,  
Glen McMurtrie



mechanical and electrical systems to protect the welfare of people and property. But a technician 40 years ago would have been almost as likely to understand IP addressing and networking as a technician today would be to understand how to properly calibrate and maintain a pneumatic controller."

Given how quickly I&C technology is moving, only a fool would try claim to know what the industry will look like a further 40 years down the track. But one thing is for sure: I&C will continue to play a huge and largely unseen role in our lives.



The TAFE Queensland training facility gives students hands-on experience with a wide range of instrumentation and control equipment

## Global standards

As a global provider, Reliable Controls has a strong understanding of market variations across the world. One of the main differences between North America – where the company is headquartered – and Australasia is the connection between I&C and sustainability.

"Driven in part by the cost of energy, the focus on decarbonisation, energy and water conservation, prescriptive reporting and analytics legislation, strategies, and

technology are much more advanced in Australasia than they are in North America," Tully says. "This level of attention to power consumption and reduction would go a long way toward achieving decarbonisation and greenhouse gas emission reduction in the built environment."

Wilson adds that, while occupant comfort comes first in North America, Australia's willingness to reduce energy costs could lead it to adopt cutting-edge AI-powered approaches.

"Something that I expect will gain traction in Australia, but will not succeed in the long term, is centralised, AI-empowered

control," he says. "It has the promise of saving energy, which will be very enticing, but I believe it is critical that automation be distributed with intelligence pushed to the edges."

For Zaban, standardisation between jurisdictions would improve efficiency and results.

"It would be nice to see wireless communication frequencies become harmonised between North America and Australia," Zaban says. "It would be even better to see paper size, spelling, currency, decimal point notation, engineering units, and green building certification criteria become standardised."

# Recipe for success

Nick Johns-Wickberg  
✉ [nick.johnsw@airah.org.au](mailto:nick.johnsw@airah.org.au)



We look at how a clever upgrade has turned an outdated and inefficient system into a blueprint for environmentally friendly industrial refrigeration in Australia.

When it was time for iconic Australian brand Arnott's Biscuits to replace the refrigeration system at its Queensland facility, opting for

an innovative, all-natural, low-GWP system might have seemed like risking it for the biscuit. In reality, it was the safest investment the company could make.

The project involved constructing a new central plant room to supply cooling across the entire site. This meant providing refrigeration in the factory space, as well as air conditioning in the administrative areas within the building. AISMF replaced the ageing R22 chillers and other equipment that relies on synthetic refrigerant with a system that runs on ammonia – also known as R717 or  $\text{NO}_3$  – to increase overall cooling capacity and support future growth.

*“By moving from R22 to natural refrigerant, we've not only increased efficiency and reliability but delivered a safer, cleaner, and more sustainable cooling solution built for the next three decades.”*



AISMF Contracts  
Manager  
John Sexton

Here's how Arnott's moved from a system reliant on high-GWP, ozone-depleting refrigerants to a natural alternative that has minimal environmental impact.

## Going natural

Realising that its existing system was coming towards end of life, Arnott's engaged Brisbane-based refrigeration and insulation specialists Advanced Insulation & Fabrications (AISMF) to manage the whole upgrade process, from design and fabrication through to installation. Central to this was replacing the ageing chillers – which use R22 refrigerant – with a high-performance ammonia system.

Designed and built to FM Global requirements, the new system delivers 8,000kW of refrigeration across four independent systems, each connected to a common chilled water and glycol reticulation network. The installation features four vessels and more than two kilometres of pipework ranging in size from 20NB to 450NB (nominal bore).



Ammonia refrigerant is safely contained within the plant area, while chilled glycol and water are reticulated throughout the facility to meet all process and air conditioning loads.

“By moving from R22 to natural refrigerant, we’ve not only increased efficiency and reliability but delivered a safer, cleaner, and more sustainable cooling solution built for the next three decades” Sexton says.

### The problem with R22

After the hole in the ozone layer was discovered in the 1970s and 1980s, governments around the world saw the need to act. In 1987, all United Nations members ratified the Montreal Protocol, under which they agreed to phase out chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), two of the chemical groups that were found to cause ozone depletion.

R22 is an HCFC with a global warming potential (GWP) of around 1,700 and an ozone

depletion potential (ODP) of 0.05. Once common in air conditioning and industrial cooling systems, R22 is now coming towards the end of its phase-out around the world. In Australia, HCFCs such as R22 have been banned in new systems since 2020, and from January 1, 2030, they will no longer be imported into Australia at all.

By replacing the R22 chillers, AISMF says Arnott’s has moved well ahead of this national transition.

“This upgrade represents a significant step forward for large-scale manufacturing refrigeration in Australia,” says AISMF Contracts Manager John Sexton.

### Safely managing ammonia

While it’s often talked about among the new generation of natural refrigerants, ammonia has actually been used in refrigeration since the 19th century. It’s a relatively cheap, naturally occurring chemical compound that has both a GWP and ODP of zero, and it has optimal thermodynamic properties for

refrigeration, absorbing huge quantities of heat during evaporation. Indeed, industrial ammonia refrigeration systems can be up to 20% more efficient than similar systems using other refrigerants.

On paper, ammonia looks like the ideal refrigerant for industrial settings. So why was it shunned in favour of synthetic alternatives for the best part of a century?

The answer, of course, is safety. Ammonia is toxic to humans: exposure to 300ppm of ammonia in the air is immediately dangerous, while above 500ppm it becomes lethal. And while it’s not classified as a flammable refrigerant, it can be mildly flammable in certain circumstances.

When ammonia was first used as a refrigerant in the 19<sup>th</sup> century, it was next to impossible to manage these safety risks. Nowadays, clever design, strict regulation and improved technology – including leak detectors and extraction fans – make ammonia a safe and environmentally friendly option in the right settings.



For safety reasons, ammonia is restricted to the plant room, with cooling distributed throughout the facility by a glycol/water reticulation system.



In the Arnott's facility, AISMF used glycol/water reticulation to distribute cooling throughout the building, meaning the only area of the facility where ammonia is physically present is the central plant room. This greatly reduces the likelihood of human exposure to ammonia in the unlikely event of a fault occurring.

### Future-proofed factory

Although ammonia once seemed like a refrigerant of the past, technological and design advances have paved the way for it to become the first-choice refrigerant of the future in many industrial applications. Indeed, both Arnott's and AISMF see the system overhaul as an investment that will bear fruit over a generation.

"By moving from R22 to natural refrigerant, we've not only increased efficiency and reliability but delivered a safer, cleaner, and more sustainable cooling solution built for the next three decades" Sexton says.

However the cookie crumbles, it seems that this innovative investment will be worth the dough in the long run.

## Project at a glance

AISMF was engaged to replace ageing synthetic refrigerant chillers across the site. The new system serves both factory and administration process cooling and air conditioning loads.

The client's objectives were to:

- › Remove ageing plant, R22 and other synthetic refrigerants from the site
- › Increase overall cooling capacity to meet current and future growth
- › Use natural refrigerants to meet all cooling loads
- › Achieve high levels of system efficiency without impacting operational reliability
- › Ensure the safety of site and maintenance staff at all times
- › Deliver 30-year plant life expectancy.

This involved implementing a range of measures:

- › A new central plant room constructed to meet the full site's cooling requirements
- › 8,000kW of refrigeration across four separate systems connected to a common chilled water and common glycol reticulation system
- › The refrigeration plant and components designed to FM Global requirements
- › Four vessels, with well over 2km of pipework ranging from 20NB to 450NB
- › Ammonia refrigerant limited to the plant area with chilled glycol/water reticulated to all cooling loads throughout the facility
- › All internal areas metal sheathed with 304 grade stainless steel and foam injected
- › All external areas metal sheathed with galvanize and foam injected.



AIRAH ————— 2026  
**INDUSTRY  
NIGHTS**

**In 2026, AIRAH will host  
Industry Nights across Australia.**

**All events are free to attend  
and run from 4–7pm local time.**

**HOBART**

**Thursday, March 5**  
Wrest Point Hotel

**ALBURY**

**Thursday, April 23**  
Commercial Club Albury

**PERTH**

**Thursday, May 21**  
Perth Convention and Exhibition Centre

**TOWNSVILLE**

**Tuesday, June 23**  
The Ville Resort-Casino

**CAIRNS**

**Thursday, June 25**  
Pullman Reef Hotel Casino

**WOLLONGONG**

**Thursday, July 30**  
University of Wollongong

**MELBOURNE**

**Wednesday, August 5**  
Melbourne Showgrounds

**SYDNEY**

**Thursday, August 20**  
Royal Randwick Racecourse

**DARWIN**

**Thursday, September 10**  
Mindil Beach Casino Resort

**BRISBANE**

**Thursday, September 17**  
Royal International Convention Centre

**CANBERRA**

**Thursday, October 15**  
EPIC (Fitzroy Pavilion)

**ADELAIDE**

**Thursday, October 22**  
Adelaide Entertainment Centre



Scan the  
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Industry Night.



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# Connection point

As AIRAH's Industry Nights expand to 13 locations in 2026, we speak to a regular exhibitor about what they've gained from these events.

AIRAH Industry Nights are annual events where local HVAC&R professionals gather, network, and showcase their latest offerings. These trade shows – which are free to attend – attract technicians, contractors, mechanical engineers, business managers, and sales specialists from all walks of HVAC&R and adjacent industries.

Exhibitors can showcase their latest products and services, meet potential new clients, and deliver sponsored Tech Showcase sessions that demonstrate their technology in action.

"After seeing record numbers of exhibitors and attendees last year, we've expanded our Industry Nights to cover 13 locations across Australia in 2026," says AIRAH Events Officer Julia Bassal. "The new locations for 2026 are Albury, Townsville and Wollongong, where we're excited to give local HVAC&R professionals the chance to connect and network."

"We've had positive feedback from both new and returning exhibitors, and we're confident that our 2026 Industry Nights will be bigger and better than ever."

One such company is Tridium, a US-headquartered provider of software and hardware solutions for diverse applications, including HVAC&R. Tridium started exhibiting at Industry Nights in 2024 and was instantly impressed by the quality and relevance of contacts and potential clients they met.

HVAC&R News spoke to Tridium's Oceania Regional Channel Sales Manager, Ying Hao Au, about the company's experience of Industry Nights and what they hope to achieve in 2026.

## HVAC&R News: What attracted Tridium to start exhibiting at AIRAH's Industry Nights?

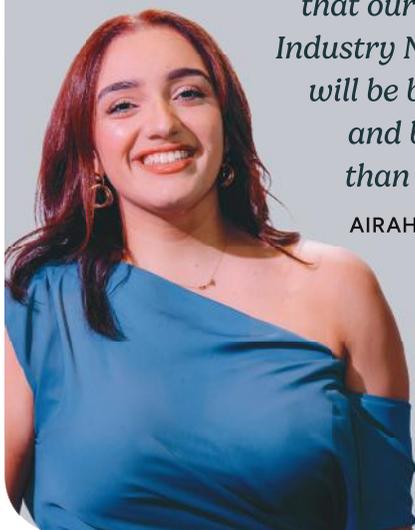
**Ying Hao Au:** Tridium was attracted to AIRAH's Industry Nights because AIRAH brings together a highly engaged community of HVAC, controls and building technology professionals in a practical, accessible environment. For us, it was an opportunity to meet consultants, contractors, integrators and facility owners in an environment focused on real-world solutions rather than aggressive sales approaches. We expected meaningful conversations, valuable industry feedback and the chance to showcase how the Niagara Framework supports open and interoperable building systems. AIRAH offered exactly the platform where innovation and industry needs meet face-to-face.

## Could you describe the company's experience at your first Industry Night?

Our first Industry Night exceeded expectations. The atmosphere was engaging and the attendees were genuinely curious about emerging technologies and open protocol solutions. One of the biggest highlights was the quality of conversations – not just people browsing. They were

*"We've had positive feedback from both new and returning exhibitors, and we're confident that our 2026 Industry Nights will be bigger and better than ever."*

AIRAH Events  
Officer  
Julia  
Bassal



asking detailed questions about integration, cybersecurity, cloud and future-proof BMS. From a return on investment perspective, the value was clear. We built new relationships, reconnected with long-standing partners and gained visibility with organisations that may not attend larger national conferences. The event delivered both immediate engagement and long-term brand benefits, making it a valuable investment for Tridium.

### How have these events helped Tridium grow its brand within the industry?

AIRAH's Industry Nights have made a significant contribution to strengthening Tridium's presence across Australia. By consistently showing up, we have demonstrated our commitment to the local HVAC and controls community. These events have helped us:

- › Increase awareness of the Niagara Framework and its capabilities
- › Connect with new integrators and consultants entering the market
- › Support existing partners with visibility and technical conversations
- › Reinforce Tridium's position as a leader in open, vendor-neutral BMS.

The informal format allows us to engage directly with the people designing, installing and maintaining building systems, which is invaluable for brand trust and industry relevance.

### What are your hopes and plans for exhibiting at Industry Nights in 2026?

In 2026, Tridium plans to expand our presence and continue to showcase our Niagara Framework, evolving to meet industry needs

*“The informal format allows us to engage directly with the people designing, installing and maintaining building systems, which is invaluable for brand trust and industry relevance”*



Tridium Regional Channel Sales Manager – Oceania, Ying Hao Au



from cybersecurity and data integration to energy optimisation and cloud connectivity.

Our goals include:

- › Bringing more hands-on demonstrations of Niagara's latest solutions, particularly the Niagara Cloud Suite (NCS)
- › Supporting our partners by highlighting their solutions built on Niagara
- › Engaging with emerging professionals and students entering the HVAC&R field
- › Strengthening collaboration with consultants and contractors across all regions.

Moving forward, we hope to continue contributing to AIRAH's commitment to advancing the industry, while strengthening our relationships and helping the market move toward smarter and more connected buildings.

## Your local Industry Night

In 2026, AIRAH will host 13 Industry Nights across Australia. All events are free to attend and run from 4–7pm local time.

**Western Sydney –**  
Thursday, February 26,  
Rosehill Gardens Racecourse

**Hobart –**  
Thursday, March 5,  
Wrest Point Hotel

**Albury –**  
Thursday, April 23,  
Commercial Club Albury

**Perth –**  
Thursday, May 21,  
Perth Convention and  
Exhibition Centre

**Townsville –**  
Tuesday, June 23,  
The Ville Resort-Casino

**Cairns –**  
Thursday, June 25,  
Pullman Reef Hotel Casino

**Wollongong –**  
Thursday, July 30,  
University of Wollongong

**Melbourne –**  
Wednesday, August 5,  
Melbourne Showgrounds

**Sydney –**  
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**Darwin –**  
Thursday, September 10,  
Mindil Beach Casino Resort

**Brisbane –**  
Thursday, September 17,  
Royal International Convention  
Centre

**Canberra –**  
Thursday, October 15,  
EPIC (Fitzroy Pavilion)

**Adelaide –**  
Thursday, October 22,  
Adelaide Entertainment Centre

Attendees can register for free in advance or on arrival. If you're interested in exhibiting at an Industry Night, scan the QR code.



# What data centre growth means for HVAC&R



We look at the role HVAC&R is likely to have in the booming Australian data centre industry over the next decade.

A report authored by Baringa and commissioned by the Clean Energy Finance Corporation (CEFC) has found that data centres could use as much as 11% of Australia's energy by 2035.

The report, titled *Getting the balance right: data centre growth and the energy transition*, compares the current baseline against four possible future scenarios for data centre use. It analyses how each scenario would affect the Australian energy market in terms of consumption, emissions, and energy prices.

Given that cooling can constitute up to 40% of a data centre's energy usage, the continued growth of the data centre market in Australia is sure to present opportunities and challenges for HVAC&R businesses and professionals.

Here are some of the key insights from the report.

## A rapidly growing sector

At present, Australia sits second in the world for hyperscale data centre investment, behind only the USA. It's the third-largest market in the Asia-Pacific region – after China and Japan – representing 10% of the region's data centre capacity. And while Australia's mix of developed infrastructure, renewable

energy growth and abundant available land make it an attractive destination for future developments, three-quarters of planned data centres are expected to be built in Sydney and Melbourne.

According to the report, Australia's current operational data centre capacity is 0.3GW and consumes around 3TWh of electricity, representing around 1% of the nation's energy usage.

This is expected to grow exponentially over the coming decade, with the report forecasting an increase from 0.3GW of operational capacity to 2.2–3.2GW. This would lead to up to 24TWh of annual electricity consumption by 2035, representing 8–11% of Australia's total energy consumption.

## More energy required

Of course, this significant increase in national energy consumption brings with it the need for more clean energy production. According to the report, projections using Australia's baseline renewable energy production targets show that, by 2035, data centres could increase national emissions by 14%, while also driving up electricity prices by as much as 26% in NSW and 23% in Victoria.

Nick Johns-Wickberg

✉ [nick.johnsw@airah.org.au](mailto:nick.johnsw@airah.org.au)

To negate this, the report recommends building an additional 3.2GW of renewable energy capacity – supported by an additional 1.9GW of large-scale battery storage – over the next 10 years. It suggests that private investment supported by government incentives and regulations could be the most effective way to raise the funds required to build this additional capacity.

Overall, the report forecasts investment in data centres of between \$85–135 billion by 2035.

## The cost of cooling

From p38–41, the report examines the role of cooling in data centres and looks at how future technology advancements could improve both performance and energy efficiency.

One of the concepts raised in the report is power usage effectiveness (PUE), which measures the proportion of energy dedicated to data centre processes as opposed to support services like cooling and heating. A PUE of 1.0 – which is impossible to obtain in reality – would mean 100% of power is used for computing. The higher the PUE, the more energy is used for support services. For example, a PUE of 1.6 would mean that, for every 1kW used for computing, 0.6kW is used to power support services.



## Thirsty work

Data centres have become infamous for their water consumption, especially for cooling requirements. The recent *Thirst for Change* report by BSI Group and WaterWise has found that data centres are among the 10 industries that consume the most water worldwide. In hyperscale data centres that use evaporative cooling, this can add up to more than 25 million litres of water consumption annually.

To read the *Thirst for Change* report, scan the QR code.



According to the report, large hyperscale data centres have achieved PUEs as good as 1.19, while smaller, less efficient data centres can have a PUE as poor as 1.91. The average PUE in Australia in 2023 was 1.44, 0.01 above the global average. For future projections, the report assumed an average PUE of 1.3 to reflect improvements in energy efficiency.

## Improving efficiency

Two of the cooling methods the report touches upon are traditional air cooling and evaporative cooling. It finds that, while the latter is more efficient, it consumes significantly more water.

The report also projects that both of these methods are likely to be superseded by a mix of the following approaches:

- › **Liquid cooling:** where a chilled liquid in a closed coil is placed near or mounted directly on computing components to remove heat at the source
- › **Immersion cooling:** where whole servers or large components are submerged in an oil- or synthetic-based fluid that is non-conductive and thermally conductive. The liquid is cooled by heat exchangers in

either a single-phase system where the fluid remains liquid, or a two-phase system where heat is removed as vapour condenses

- › **AI-optimised management:** where sensors collect real-time data that is used to optimise system performance, potentially reducing energy use by up to 30%.

## 'Donating' waste heat

One innovative approach explored in the report is the reuse of waste heat for purposes outside of the data centre itself. With hyperscale data centres generating so much excess heat, "donating" the excess hot water free of charge to help power public heating services is one way for data centre owners to offset their environmental impact.

The report cites real-world examples of this, including Facebook's data centre in Denmark, which provides up to 100GWh of waste heat to help power the city of Odense's district heating system. Equinix is using its Paris data centre for similar purposes, providing 10GWh of free waste heat per year over 15 years to heat homes, public facilities, and even the swimming pool for the 2024 Olympic games.

With district heating networks being far less common in Australia than they are in Europe, waste heat from data centres would likely be used for other purposes locally. The report refers to an example in Tibet, where waste heat from data centres has been used for industrial processes such as aquaculture and agriculture. Suggestions for Australia include reusing waste heat for manufacturing and agricultural purposes in Sydney, as well as for residential heating services in Melbourne.

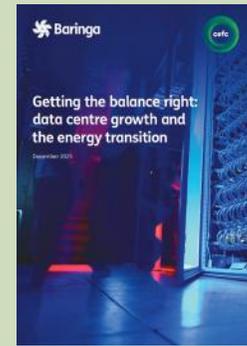
## Positive potential

While there's a lot of focus on the extremely high energy and water requirements for data centres at present, the report offers a more optimistic view of their role in the future.

It frames the data centre of the future not as a burden, but as a potential "dynamic energy and digital node" that generates low emissions, promotes clean energy usage, and can help stabilise the grid.

The report highlights the necessary roles of both policy action and market pressure to encourage data centre owners and operators to treat sustainability as an essential component of design, rather than an optional add-on.

## Read the CEFC report



You can access the full 73-page CEFC report for free by scanning the QR code.



## The need for clear policy

The report identifies potential gaps and opportunities in existing policy around data centres, highlighting ways in which governments at all levels can act to create a clearer pathway. It focuses on four areas:

- › **Coordinating locations:** policy should encourage data centre investment in strategic locations where the appropriate network capacity exists
- › **Clean energy:** governments should incentivise and enable data centres to invest in the clean electricity market to reduce their impact on electricity prices and emissions
- › **Visibility:** there should be increased transparency around data centres' expected electricity usage over time to facilitate planning and manage network capacity
- › **System security:** the appropriate system settings must be in place to understand and manage any technical impacts of connecting large loads, as well as incentivising demand flexibility.

The report highlights Singapore and the European Union, two jurisdictions where a combination of incentives (including direct funding and financial instruments such as tax breaks) and regulations (including standards, codes of conduct, and reporting requirements) have been put in place to improve efficiency and reduce environmental impacts from data centres. It goes on to discuss which policy levers could be appropriate in Australia and which would need to be significantly modified.

The report concludes with recommendations for investors, policymakers and industry to help ensure that this boom in data centres is beneficial to Australia's economy without being detrimental to its environment.

## Continuing the conversation

AIRAH's 2026 HVAC Innovation Conference (HVAC26) will include a presentation by the CEFC explaining the report in more detail.

You can register for HVAC26 – which will take place in Sydney from March 16–17 – by scanning the QR code.





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### 1. Tarred and feathered

"We had a complaint that this unit wasn't working properly," says Geoff, who was called out to deal with what can only be described as an avian crime scene. They say birds of a feather flock together ... but maybe it's time to start flocking somewhere else?



Now here's something you don't see too often these days. It reminds me of the old days and government "spec" installations. From the steel-encased concrete plinth to the galvanised steel pipe cover and the IP66 local isolator – very professional indeed! The establishment of a bird sanctuary, however, was possibly not the best choice ... but no doubt gained some environmental credits.



### 2. Making spaghetti

"The chiller influencers of NSW are at it again with cheap quotes and even cheaper workmanship," says Andrew, whose job it was to untangle this almighty mess of somebody else's creation. "I think making spaghetti was in their scope of work."



First thought: there must have been a sale on corrugated conduit, or numerous rolls fell off the back of a truck. A length of trunking up between the fans would have been much easier, cleaner, and cheaper! Second thought: where would we be without cable ties?!



### 3. Fast refrigeration

With so much waste in the world, we always appreciate creative design using recycled materials. "This is a photo of a 'body kit' on a Nissan Pulsar I came across ... made out of Aussie duct pipe cover," says Daniel, who doesn't sound quite as impressed as we are. Perhaps it'd go faster if the owner painted it red?



I must admit to being perplexed. I'm a fan of lateral thinking, of which this is a terrific example ... but I'm also a fan of professionalism. To the casual glance, it's a pretty trick, but on deeper inspection it lacks mechanical substance. Beware the superficial substitute!

### 4. What the truck?!

Sticking to the vehicular HVAC&R theme, we got this ripper entry from Mark, who spotted what he kindly describes as "some back-to-basics refrigerated transport while travelling through South America". Presumably airflow is no problem when they're going 100km/h down the freeway!



This is gaining in popularity, primarily because it's considerably cheaper than having a purpose-built transport refrigeration or air conditioning system. It's also much easier to do a self-install. The major drawback is keeping the lubricating oil in the compressor, which is partly why the "real ones" report to be so expensive! I imagine they wouldn't care too much about breakdowns in that part of the world, as they could probably buy a 5kW split system for a few hundred dollars (compared to around \$10,000 for the real thing), making the need to replace it every six months still a worthwhile proposition.



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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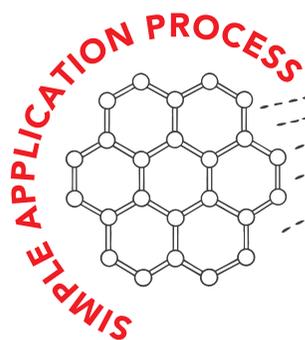
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