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Welcome to the June/July edition of *ACR Journal*.

The team greatly enjoyed connecting with so many of our readers at the ACR & Heat Pump Expo in Birmingham last month. Following the success of the event, our upcoming exhibitions in Leeds and Glasgow are approaching capacity, with exhibition stands nearly sold out. The seminar programmes for visitors will be announced shortly.

This issue features an extensive focus on data centres, including insightful articles on meeting operational uncertainty through modular cooling solutions, enhancing efficiency and resilience through compressor technology, and addressing the challenges of bridging legacy cooling infrastructure with the demands of the emerging AI-driven gigawatt era.

R.A.C.E.S. continues to build on its success, with the recent announcement of significant contractor support. Turn to page 6 for further details.

I hope you enjoy this edition and look forward to meeting many of you at the National ACR & Heat Pump Awards, taking place in Manchester on 11 June.

Finally, many thanks to David Crowson for his support in bringing this issue together.

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REGULARS

04. News

Key industry updates

05. Changing Faces

32. Women in the ACR Industry

Lizzy Holmes

33. Tools Talk – DiversiTech

38. The Innovation Zone

The latest products and launches

FEATURES

08. A look at the InstallerSHOW

2026 held on 23 - 25 June at NEC, Birmingham

11. Why the unpredictability of

the data centre sector must be matched by flexibility in design methodology

14. A discussion on why choices

made at the compressor level increasingly influence PUE optimisation, uptime resilience, and long-term regulatory compliance

16. Oliver Sanders, outlines why demand for data centres is rising and why it's vital to have the right products and support in place



20. How and why air conditioning is evolving into smarter, more efficient, and sustainable systems

22. Five questions to ask to expose the strategic blind spots the industry cannot afford to ignore

25. Bryan Redmond, offers guidance for operators navigating both safety compliance and sustainability goals

28. Climalife's technical event shedding light on the evolving regulatory landscape for refrigerants in Great Britain.

34. A phased pump upgrade at a major UK stadium shows how targeted retrofits can deliver rapid efficiency gains while improving long-term system resilience

36. A successful upgrade of the frozen storage refrigeration system at J D Wetherspoon and DHL's Daventry distribution centre

Beijer Ref UK launches Refrigerant Support Hub to guide customers through refrigerant transition

Beijer Ref UK has launched a new Refrigerant Support Hub to help customers navigate changing refrigerant legislation, market pressure and the transition towards natural and low-GWP alternatives.

The move comes as the refrigerant quota system continues to affect availability and pricing across the HVACR sector. With higher-GWP refrigerants under increasing pressure, contractors, consultants and end users are having to plan more carefully for both existing systems and future equipment choices.

A key part of the new hub is a free Expert Clinic service, giving customers the opportunity to book 30-minute telephone consultations through the Beijer Ref Academy website from next month.

The one-to-one sessions will provide direct support on refrigerant legislation, application advice, product selection



and wider planning around the transition to lower-GWP alternatives. Clinics are scheduled for Tuesday and Thursday mornings.

The service is supported by a programme of practical resources designed to help customers understand the changes taking place across the refrigerant market. This

includes short guidance documents explaining how refrigerant quotas work, why they are affecting supply, and which application-specific restrictions customers need to be aware of.

A series of five-minute videos will cover key topics including quotas, pricing and strategic refrigerant planning, while additional customer resources will include end-user guides, a technical white paper and guidance on the use of drop-in refrigerants.

To read the story in full visit: www.acrjournal.uk/news/beijer-ref-uk-launches-refrigerant-support-hub-to-guide-customers-thro/

Replay Golf, enhances customer experience with Panasonic PACi NX Solutions

Replay Golf, a specialist retailer of pre owned and new golf equipment, has upgraded comfort, air quality and energy efficiency at its flagship store following the installation of Panasonic PACi NX climate control systems.

The business required a modern solution to replace inefficient gas heaters that created uneven temperatures across the store.

The project was delivered with support from Panasonic distribution partner Dysk, led by sales representative **Warren Davies**, and installed by HVAC specialist Uber Cool, led by Neil Collins. Panasonic PACi NX units were selected for their reliability, energy efficiency and ease of installation, with a combination of ceiling mounted four way cassette and wall mounted systems providing consistent heating and cooling throughout the space.

In addition to improved temperature control, the systems incorporate Panasonic's nanoe™ X technology to help clean the air and reduce bacteria on surfaces – an important factor in a high traffic retail environment where customers frequently handle equipment.

The upgraded solution delivers year round benefits, offering a cool, comfortable environment during the summer and a warm alternative to unheated practice facilities in winter, enhancing the overall customer and staff experience.

To view the full video visit: www.youtube.com/watch?v=sTGfQPXI7vg

Adaptation 2027 international research conference to be hosted by the IOR

The Institute of Refrigeration (IOR) has announced that the UK has been selected to host the 2nd IIR International Conference in the series on Refrigeration: Adapting to Rising Temperatures (known as Adaptation 2027).

Following its successful launch in 2025, the second international conference will take place from 8 to 10 March 2027 at Austin Court, Birmingham.

As rising temperatures and intensifying heatwaves put unprecedented pressure on cooling systems, Adaptation 2027 will showcase the innovations, technologies, and strategies needed to ensure the global RACHP industry can be resilient.

The conference programme will explore in more depth the technical recommendations of a new Refrigeration Design Code for Changing Ambient which is due to be published this summer and has been jointly developed by the IOR and CIBSE with input from IMechE, FETA and CCF. The Design Code will provide clear recommendations on both managing refrigeration plant now and, in the years ahead, and improving design standards. It takes into account predicted increases in ambient temperature based on recently revised CIBSE weather data, and their impact on system performance and reliability. To find out more about Adaptation 2027 and to receive information on the programme, presenters and keynote speakers visit:

<https://tinyurl.com/3uad9x96>

To read the story in full visit: <https://tinyurl.com/4k74wn6y>

IOR president-elect joins BESA technical team

Incoming Institute of Refrigeration (IOR) President, **Stephen Gill** has joined the technical team at the Building Engineering Services Association (BESA).

Stephen brings more than 40 years' experience in refrigeration, air conditioning and heat pumps (RACHP) to the Association with a particular focus on supporting the industry's primary F-Gas register, REFCOM.

He will also contribute to BESA's work with government, international organisations and industry stakeholders, alongside supporting the development of technical guidance and industry best practice for RACHP contractors.

Later this year, he is due to begin a second non-consecutive term as IOR President. He is believed to be the first to have been elected twice in the Institute's modern history.

"We are delighted to welcome Steve to our team," said BESA technical director Kevin Morrissey. "He is well known across the sector for his technical knowledge, industry leadership and ability to help organisations navigate complex technical and regulatory challenges in a practical and commercially workable way.

"His appointment further strengthens BESA's support for the RACHP sector during a period of rapid technological and legislative change."

Alongside his technical and policy work, Stephen is recognised for his contribution to workforce development and professional awareness initiatives. He founded World Refrigeration Day in 2018, helping raise awareness of the industry and its role in modern society.

He is also a long-standing advocate for improving diversity and inclusion across engineering and has supported international initiatives focused on professional awareness, technical competence and standards development in more than 160 countries.

"I'm looking forward to supporting BESA and REFCOM at an important time for the RACHP sector," he said.

"The industry is facing rapid change in skills, refrigerants, heat pumps, energy efficiency and compliance, so there is real value in helping to translate technical and regulatory developments into practical guidance that supports contractors and end users alike.

"BESA has an important role to play in supporting standards, competence and collaboration across the sector, and I'm pleased to be joining a team that is committed to those goals," added Stephen.

He began his career as an engineering apprentice before progressing through senior technical and commercial leadership roles. He combines hands-on engineering experience with expertise in technical standards, environmental compliance, F-Gas regulation and sustainable cooling policy.

Stephen is founder and managing director of Derby-based Energy Efficient Solutions Ltd, an independent consultancy providing technical, regulatory and commercial advice across refrigeration and heat pump applications.

He previously served as head of sustainable cooling at the Carbon Trust, where he led national and international programmes focused on cooling innovation and refrigerant transition pathways.

www.thebesa.com

Incoming Institute of Refrigeration (IOR)
President, **Stephen Gill**



ARMSTRONG FLUID TECHNOLOGY APPOINTS DANILO ELEZ AS CEO

Armstrong Fluid Technology, has announced the appointment of **Daniilo Elez** as Chief Executive Officer. In this role, Danilo will lead the company's next phase of growth and innovation.

Daniilo brings extensive experience in the HVAC and building technologies industries, with senior leadership roles from Trane, KONE, and Johnson Controls. He has led global organisations and is known for driving sustainable growth, strengthening operational performance, and integrating engineered products with services, digital capabilities, and system-level solutions. His leadership approach and experience align closely with Armstrong's strategy and values.



www.armstrongfluidtechnology.com

CLIVET STRENGTHENS SERVICE DIVISION

Clivet Group UK have welcomed **Laith Al Baghdadi** to the company's growing service division.

A graduate of the University of Portsmouth with a background in Human Geography, alongside studies at the University of Malta, Laith brings valuable experience across engineering support, logistics coordination, and customer service.

Previous roles within major insurance organisations and public sector contractors have equipped him with strong organisational, communication, and problem-solving skills.

Investment into the service division reflects the importance Clivet places on supporting customers and installers throughout every stage of a project — from commissioning and technical assistance through to ongoing customer care.



clivet.com

ZEHNDER GROUP UK APPOINTS NEW BUSINESS DEVELOPMENT MANAGER

Zehnder Group UK, has announced the appointment of **Michael Page** as its new Business Development Manager (Light Commercial).

In his new position, Michael will play an integral role in supporting the continued expansion of Zehnder's light commercial offering across London and the South East. He will work closely with consultants, contractors and developers to deliver high-performance indoor climate solutions - focusing on air handling units and heat recovery.



www.zehnder.co.uk/en

RACES announces major contractor support

Graeme Fox CEng, Technical Director at Refrigeration and Air Conditioning Engineers Society (RACES), unveils the first major sponsorship package by a contractor.

The Jordon Group, based in Lancashire and known for their high standards of work and service delivery, have agreed a package that will see every one of their 54 engineers signing up as RACES members, giving them the full access to our technical library for field support as well as accessing the training packages being set up now to help upskill their engineers and prepare them for the transition to lower GWP refrigerants.

A Jordon Group spokesperson said in their recent social media announcement: “For us, this is about investing in capability. Backing our engineers with the knowledge, support and development the need to navigate change confidently and deliver consistently for our clients.

“Because in this industry, performance doesn’t come from theory. It comes from people who know what they’re doing, on site, when it matters.”

RACES are already engaging with the Government Building Safety Regulator’s work on competencies and will be attending the kick off session for the industry skills alliance hosted by Bitzer in late April – bringing real world practical experience and knowledge to the discussions and helping shape a fit for purpose training landscape and a workforce fit for the future.

First in-person event at Lincoln City FC

As a practical example of how RACES is backing and helping shape our industry moving forwards, we recently held our first in-person event – at Lincoln City FC with sponsorship from some of the industry’s biggest names, just over 100 engineers, contractors and suppliers made the night a huge success and ensured we’ll be repeating this format across the UK in the months and years to come.

Technical talks by Yellow Jacket, Green Point, Logicool Air Conditioning, Daikin, DSU, and TF Solutions alongside The F-Gas Register were largely of a particularly practical nature: compressor diagnostics and fault finding, the use of digital manifolds coupled with state-of-the-art apps, and stands showing practical electrical fault-finding training and access to OEM fridge and cold room door seals, amongst working systems on display.

The final message of the evening came from Managing Director **Michael Smart** who said: “RACES was formed because hundreds of RACHP engineers had complained for years that they “had no representation, nobody looking out for their interests” and we are setting out to deliver on that demand. The more engineers register with us, the better we can represent the sector meaningfully.

“The level of support we’ve had from some fantastic sponsors, as well as 100 people giving up their evening midweek to come to Lincoln, demonstrates that we are filling a gap that the industry had and we look forward to rolling these technical events out at other locations very soon.”



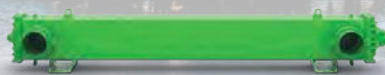
For more information

Events and training opportunities visit: www.races.org.uk
If you are interested in learning more about corporate sponsorship packages visit: www.races.org.uk/sponsors

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DAS HERZ DER FRISCHE

InstallerSHOW 2026:

A deep dive into the biggest and best show yet



**installer
SHOW**
23-25 June 26
NEC
Birmingham

InstallerSHOW 2026 arrives as a truly transformative event for the installation, trades and built environment sectors.

With 40,000+ visitors, more than 900 exhibitors, and 11 CPD-accredited live content streams across three action-packed days, this year's edition is shaping up to be the biggest yet – not just in size, but in breadth of subjects and practical value.

Visit the Renewable Energy Installer Magazine team on stand 5B70

More than a traditional trade show, InstallerSHOW 2026 combines hands-on demonstrations, future-focused discourse, international collaboration, and thousands of opportunities to strengthen skills, grow business and influence the future of heat, water, electrics and construction.

Here's a closer look at what some of the key themed zones and content areas have in store.

InstallerPLAZA

The InstallerPLAZA, found in hall 5, is unmissable for InstallerSHOW visitors.

Sponsored by Vaillant & Glow-worm, the PLAZA combines product launches, hot topics and debates, celebrity appearances, challenges, award winners, live entertainment and more.

Don't miss out on the buzz of the PLAZA, which captures the spirit of the event: collaborative, professional and always focused on the biggest topics affecting the heating and plumbing sector.

InstallerBUILD

InstallerBUILD has emerged as one of the show's most dynamic areas. This dedicated space for builders, roofers, carpenters, flooring installers, kitchen fitters and RMI professionals' doubles down on real-world issues like safety, sustainability, retrofitting and practical innovation.

InstallerBUILD is more than a collection of exhibitors – it's a live learning experience. At its centre is The HAUS, a full-scale, two-storey demonstration build designed by award-winning architects and assembled with regenerative materials that debuted at the show last year. It is back in 2026 showcasing circular material systems, resilient construction methods, and modern insulation and cladding solutions.

Visitors can expect:

- Expert demonstrations from top manufacturers and suppliers.
- Building Safety Forum tackling the latest safety regulations, materials compliance and industry best practice.
- NHIC Knowledge Hub, with a focus on building safety, competence and training for those trades delivering retrofit and home improvement to the UK.

- FITA flooring demos and competitions spotlighting craftsmanship and innovation.
- Brand Ambassador Hub – sponsored by ITS – is a bustling multitrade networking space featuring all your favourite tradespeople.
- Roofing demos from NFRC and SIG Roofing.
- Bricklaying competition Super Trowel hosting a regional heat LIVE at InstallerSHOW.
- A heritage trades showcase, with live demos from stonemasons and those working on preserving traditional buildings.
- The Kitchen Fitter Arena – sponsored by Howdens – with talks and demos for the installers delivering top notch kitchens.

This combination of hands-on learning and exciting showcases makes InstallerBUILD a must-see for any forward-thinking tradesperson focused on the latest products, solutions and building methods, and innovative ways to grow their businesses.

InstallerELECTRIC

Electrical trades, renewables and evolving smart-tech landscapes are a cornerstone of InstallerSHOW. Under the InstallerELECTRIC banner, this area brings:

- Electrical system manufacturers and suppliers showcasing the latest in wiring, distribution, automation, EV charging, smart home integration and renewable energy interfaces.
- Live product demos, giving sparky professionals the chance to see new tools and solutions in action.
- Expert talks on upcoming regulations, safety protocols and skill development – all critical as electricians become more integrated with energy and building-management systems.

This area isn't just about tools; it's where electrical professionals can prepare for future demands – from electrification to energy optimisation.

World Plumbing Conference

For the first time ever, the World Plumbing Conference will be hosted alongside InstallerSHOW, making 2026 a landmark event for the global plumbing community.

In collaboration with the World Plumbing Council and the Chartered Institute of Plumbing & Heating Engineering (CIPHE), the conference gathers global leaders,

innovators and policymakers to address the sector's biggest challenges under the theme Worldwide Problems – Global Solutions.

Key areas of focus include:

- Skills development to tackle workforce gaps and elevate professional standards.
- Supply chain resilience and conservation strategies for water and material sustainability.
- Sustainability in plumbing technologies and techniques.
- Public protection, including tackling risks like Legionnaires' disease and non-compliance hazards.

Kitchen Fitter Arena

Kitchen installation has become one of the most competitive and technically demanding areas in the trades. In response, InstallerSHOW 2026 includes an expanded Kitchen Fitter Arena, delivered in partnership with Howdens.

This arena focuses on hands-on workshops, live demonstrations and installer-led sessions designed for real-world kitchen projects. Sessions will cover installation best practices, practical solutions for site challenges, and business growth insights for kitchen installers.

A standout feature is the inclusion of the first-ever Kitchen Ambassador Hub, guided by an expert team of industry ambassadors including names like Gavin Tutton, Andy Snelson, Tom Easter, Emily Kitchen and Victoria Prirozolo. These ambassadors bring deep trade experience in kitchen design and installation, helping visitors explore:

- Tips and tricks for efficient workflow on site.

- Advice on choosing materials, fixtures and appliances.
- Guidance on business strategy, pricing and client engagement.

This arena promises to be one of the most content-rich areas for installers looking to sharpen their craft and grow their business acumen.

Brand Ambassador Hub

InstallerSHOW's Brand Ambassador Hub – in partnership with ITS – is a dynamic gathering point where influencers will connect with our visitors.

As well as grassroots conversations about the issues that matter most to tradespeople, this area will feature Top Picks for 2026, which as the name suggests, will highlight the products and solutions to watch out for this year.

Why InstallerSHOW 2026 Matters

InstallerSHOW 2026 isn't just another exhibition; it's a three-day extravaganza of trade disciplines, business growth opportunities, and future-focused thinking. The addition of co-located events like the Painting & Decorating Show and Professional Woodworking Expo, alongside the global platform of the World Plumbing Conference, means three days packed with learning, inspiration and new pathways for professional advancement.

If you're an installer, builder, carpenter, electrician, decorator or business owner connected to any aspect of installation or the built environment, InstallerSHOW 2026 promises to be the most practical, innovative and rewarding edition yet. 🏠

For more information and to get your free tickets, head to www.installershow.com.



Supporting a smarter approach to heating control at Resideo's

RESIDEO: STAND 5G22

Visit stand 5G22 at this year's InstallerSHOW to find out all you need to know about Resideo's well-known Honeywell Home connected heating control and zoning range. Visitors can discover the latest thinking on effective heating management including zoning and controls that work with heat pumps¹, plus sign up to the Pro Perks loyalty scheme and review the latest training – all at the same time as being able to grab a welcome refreshment.

The benefits of smart zoning will be at the heart of this year's stand. With Resideo's recent research showing that 43% of homeowners questioned were interested in heating individual occupied rooms rather than their whole home², Resideo's team of experts will be on hand to talk through how smart connected zoning products can deliver tailored room-by-room comfort as well as greater control of energy usage.

Source

1. Subject to the connected system, interface type, installer configuration and manufacturer requirements. Please refer to the current compatibility list before specification.
2. November 2025 UK Thermostat Survey (n=500+ UK homeowners aged 18+).



Vaillant unveils next gen heating innovations

VAILLANT STAND: 5D42

Following a stand-out show in 2025, Vaillant will once again be exhibiting at InstallerSHOW, offering visitors an exclusive preview of its next generation of heating technology.

With numerous innovative product launches on the cards in 2026, visitors to the stand can be among the first to get up close to the brand-new aroTHERM plus, while also getting a chance to see how this fits with Vaillant's full system solutions from its high recovery hot water cylinders to its latest controls.

InstallerSHOW marks the debut of brand-new, specially developed technology and products from Vaillant, which feature advanced software capabilities designed to make installations smarter, faster, and more efficient.

In addition to showcasing its latest product launches, Vaillant's team of technical experts will be present throughout the event, offering guidance on its MCS Partnership support, system design and specification, right through to installation and aftersales support. What's more, Vaillant's team of trainers will also be on hand to talk through the latest training courses and developments heating installers can sign up to.



Raise a pint with Glow-worm

GLOW-WORM STAND: 5D45

Glow-worm is bringing its unmistakable energy to InstallerSHOW, where it will be giving visitors a first look at its exciting new product launch that is set to get everyone talking!

Visitors can step away from the usual exhibition experience and head over to the Glow-worm stand, which has been completely transformed into a classic pub, The Glow-worm Arms. So, pull up a stool, take a well-earned break, and join us to celebrate Glow-worm's latest product additions.

But the action extends beyond the stand, as once again Glow-worm and Vaillant are joining forces to co-sponsor the InstallerSHOW plaza, which will be home to a fully packed schedule of engaging talks, expert panels, and lively industry debates.

Make sure to visit the Glow-worm stand to discover the future of domestic heating technology, chat with the team, and see exactly what the buzz is all about!




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We are excited to be exhibiting at InstallerSHOW!

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Meeting unpredictability with flexibility: The modular approach to data centre cooling

Jacob Wolfe, Global Key Account Manager, Data Centres, at Armstrong Fluid Technology, discusses why the unpredictability of the data centre sector must be matched by flexibility in design methodology.

The task of achieving maximum energy efficiency for mission-critical cooling applications is never straightforward. In data centres, in particular, extreme scrutiny of environmental performance is constant, in a situation which demands maximum reliability and zero downtime. With energy requirements increasing steeply, driven largely by AI, availability of power from the grid is a major issue with the potential to limit expansion, as is the need to secure the goodwill of stakeholders such as local planning authorities. These issues are magnified by commercial and technological factors, such as the need for adaptability and flexibility to address short equipment update cycles.

In this complex landscape, the best way of setting up for future expansion is to build a system designed specifically for incremental expansion from the start. Rather than making a large front-loaded investment in a plant room designed for a hypothetical full load, expanding in line with increasing demand for processing capacity provides more control over critical factors for efficiency, while achieving faster deployment, and futureproofing the development within an unpredictable sector.

More follows ...

Why not just design for 100% straight away?

The traditional approach of creating a cooling system capable of supplying 100% of demand from the outset is unsuitable for data centres for a number of reasons. Firstly, it involves unnecessary front-loading of investment in building services for the site, and does not provide the necessary flexibility to increase incrementally over time. Secondly, a cooling system designed



Jacob Wolfe, Global Key Account Manager, Data Centres, at Armstrong Fluid Technology

for 100% demand at the outset (when actual demand is far lower during the early phases) involves significant risks of energy wastage due to the operation of over-sized equipment. Although the cooling technologies themselves are highly reliable, technical issues are more likely in situations with over-sized equipment. Simply put, it risks disappointing energy efficiency levels from the start, whilst complicating future efforts to change or expand the system.

Aligning cooling systems with data centre business models

The keys to effective incremental expansion of cooling systems in alignment with increasing processing capacity include modularity, repeatability, scalability, demand-based control and Active Performance Management.

- **Modularity:** The best cooling systems for data centres are those that are designed on modular principles, specifically for incremental expansion. This ensures that additions to the system can be integrated quickly and seamlessly, without time-consuming and costly installation and commissioning, or additional development in-situ. In general, increasing ease and speed of expansion efforts while avoiding over-sizing at all times is a good strategy.
- **Repeatability:** To safeguard reliability and reduce risk, it is important that the modules have been carefully designed for the stringent demands of data centre applications, but are readily available as off-the-shelf products. Ad hoc equipment and customised systems are ineffective in these situations, as they introduce variables/unknowns that can impact reliability adversely due to unpredictability.

To create a cooling system which delivers in terms of both modularity and repeatability, it is helpful to think in terms of packaged plant or offsite-manufactured plantrooms. As the packaged cooling plant is fully assembled and tested before it leaves Armstrong's factory, many potential project risks (such as poor system integration) are eliminated. Solutions such as this, which are capable of 'bolting-on' additional cooling in line with expansion of IT processing capacity, can avoid the energy wastage of an over-sized plant, whilst assisting profitability by preventing front-loading of capital investment, and providing repeatability of performance. Increasingly we are finding that data centre operators with multiple sites are moving towards integrated offsite-manufactured plantrooms, which can replicate the same cooling systems at each site. This speeds introduction and expansion of new facilities in this highly-competitive industry sector, and assists with day-to-day operation. ➡

- **Scalability:** With proper forecasting, plant capacity can be expanded using repeatable designs in a scalable fashion as each data centre expands. As many of the companies establishing new data centres are international businesses, an equipment supply partner capable of manufacturing the same solution at multiple production facilities worldwide is also beneficial, as it helps to ensure continuity irrespective of the location of each data centre.
- **Demand-based control:** As data centre cooling systems need to be reliable and efficient over wider ranges of operating conditions as the site expands, it is crucial that system components and control technologies are designed for variable demand and ultra-efficient performance at part-load. This requires variable-speed components (such as chillers, pumps and fans) across the system, and a control strategy specific to the operating characteristics of variable-speed devices. There are no exceptions to this, because constant-speed devices cannot solve the challenges of applications such as data centre cooling. When a variable frequency drive (VFD) is added to a compressor, pump or fan to improve part-load efficiency, the energy saving potential is huge due to the pump fan laws which state that power is proportional to rotary speed cubed ($P \propto N^3$). This would equate to a potential 400% increase in operating efficiencies. This is only possible, however, if the pump fan law relationship between pressure and rotary speed, along the Natural Curve, is maintained at the decreased speed.


Traditional control practices often fail to optimise this potential. Pumps, for example, are often set to maintain a fixed or minimum differential pressure across the pump supply and return headers. This means the pump will not have the freedom to operate along its Natural Curve and will consume more energy. Best practice is to utilise advanced integrated control across the system. In the case of variable speed chillers, integrated control ensures operation along the chiller's Natural Curve for all operating scenarios, ensuring optimum efficiency at all loads.

Another important design principle is the employment of capacity-based (rather than demand-based) sequencing. With capacity-based sequencing, each pump would be taken up to 90% loading, for example, before the next pump was introduced. Demand-based sequencing, however, balances the load across the system as a whole, unlocking additional energy efficiencies which might otherwise remain under-exploited.

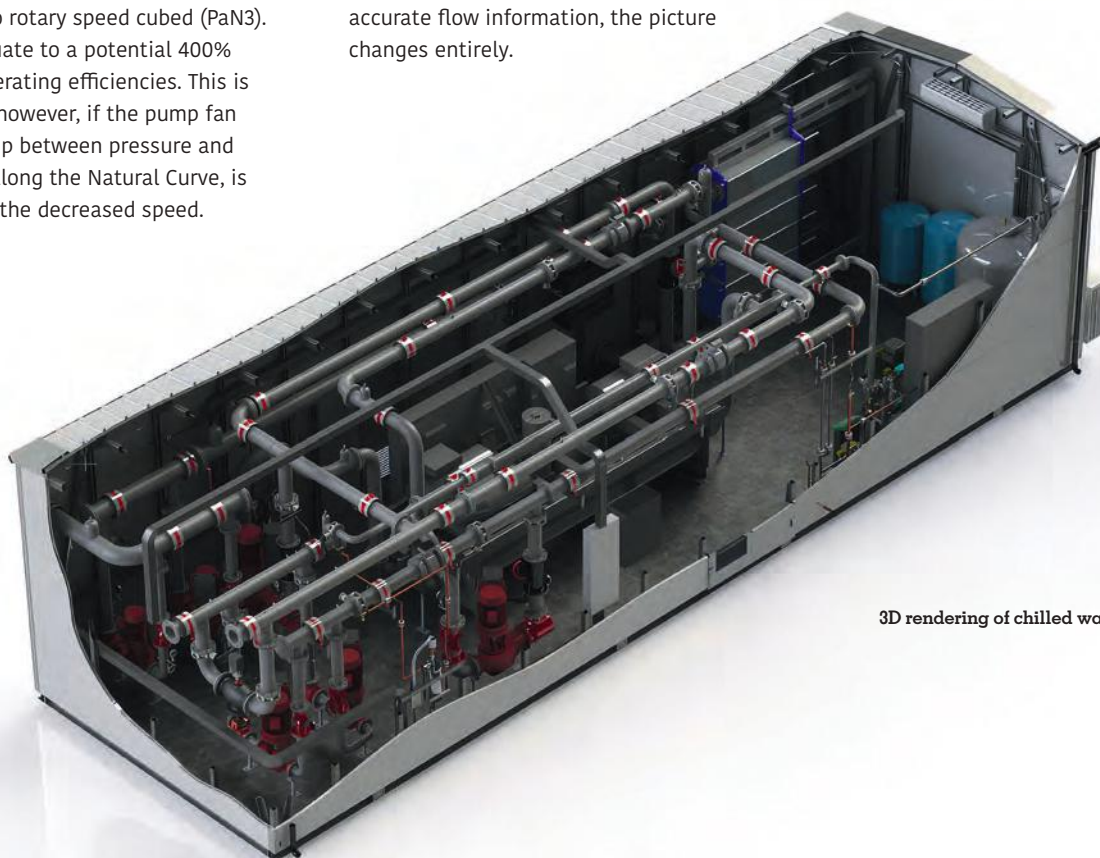
- **Active Performance Management:** Advanced connectivity and visibility of system performance are also important throughout the lifetime of ultra-efficient critical cooling systems for data centres. Without information on fluid flow, across the system, it's difficult to diagnose and optimise efficiency. With accurate flow information, the picture changes entirely.

The Active Performance Management developed by Armstrong Fluid Technology, for example, helps to optimise HVAC systems at any stage of a data centre's life-cycle, responding to changing cooling requirements. Online trending and analysis across multiple parameters on single pumps, or on an aggregated basis for multiple pumps, assists in identifying performance degradation and facilitates a predictive and proactive approach. It can, for example, report issues such as excessive vibration, pump in hand, risk of cavitation or a dead head should they start to occur, enabling preventative maintenance to address the issue and prevent downtime.

Conclusion

It's important not to copy and paste the kind of HVAC solutions common in other situations, including those suitable for other mission-critical situations such as hospitals or laboratories. With data centres, the unpredictability of the sector itself must be met by flexibility in design methodology. 

<https://armstrongfluidtechnology.com/>



3D rendering of chilled water plantroom

APJ Pack

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The compressor question: Unlocking efficiency and resilience in data centres

James Graham, Managing Director at BITZER UK, highlights that the choices made at the compressor level increasingly influence PUE optimisation, uptime resilience, and long-term regulatory compliance.



As hyperscale campuses expand and AI workloads push rack densities beyond 40 kW - and in some high-density deployments, past 80 kW per rack - cooling strategy is under renewed scrutiny¹. Liquid cooling, rear-door heat exchangers, and advanced airflow management dominate industry discussions.

Yet, behind these innovations, the mechanical plant remains the backbone of performance. James, said: “Having anticipated the rapid rise of high-density AI workloads and liquid-cooled deployments, BITZER prepared early, ensuring key compressor platforms were stocked and ready to meet evolving data centre demands,” he says. “This foresight has allowed operators to plan expansions and upgrades with confidence, without being constrained by supply chain delays.”

In a sector defined by uptime percentages and fractional efficiency gains, compression strategy is no longer background engineering – it’s an operational lever that can make the difference between efficiency targets being met or missed.

Part-load reality in a 24/7 environment

Data centres rarely operate at steady full load. Hyperscale and colocation facilities are typically designed with N+1 or 2N redundancy, meaning cooling plant

frequently runs at partial capacity². IT loads fluctuate, ambient conditions change, and expansion phases alter demand curves.

“For operators chasing even small reductions in PUE, part-load performance is critical,” James notes. Modern screw and reciprocating compressor platforms combine mechanical capacity control with inverter-driven speed regulation. This allows precise modulation in response to real-time cooling demand.

The impact is tangible:

- Reduced energy consumption during partial loading
 - Lower mechanical stress from excessive cycling
 - Improved temperature stability in white space environments
 - Extended equipment lifecycle
- Across multi-megawatt campuses, incremental efficiency gains can translate into significant operational savings.

Liquid cooling and the continued importance of mechanical plant

Direct-to-chip liquid cooling and CDU-based systems are expanding rapidly in response to AI-driven heat density. However, the rejection of heat still relies on chilled liquid systems or refrigerant-based cycles. Even immersion and hybrid setups ultimately depend on the performance of the underlying mechanical plant.

James observes, “Liquid cooling reshapes white space design, but plant room engineering remains central. Efficient, responsive compressors still determine system-wide energy efficiency, temperature stability and reliability in high-density deployments.”

Intelligent compression and uptime protection

In Tier III and Tier IV facilities, cooling failure can cascade rapidly. Early anomaly detection is essential.

Modern compressors increasingly incorporate embedded monitoring modules

with Modbus or similar communication capabilities, allowing integration into BMS and DCIM platforms³. This provides:

- Real-time operating data
- Oil and discharge temperature monitoring
- Application limit protection
- Fault trend visibility
- Remote diagnostics

“Moving intelligence closer to the component level allows operators to identify deviations before they escalate into critical events,” James explains. In mission-critical environments, this transparency materially reduces operational risk and supports SLA compliance.

Refrigerant strategy and long-term risk management

Cooling plant decisions today must remain viable for decades. With accelerated F-gas phase-down schedules across Europe⁴ and growing scrutiny of Scope 2 emissions, refrigerant selection is increasingly strategic.

Large chiller applications now commonly utilise lower-GWP blends such as R1234ze and R513A, while natural refrigerants - particularly CO₂ (R744) - are gaining traction in edge and urban deployments. These approaches allow operators to balance efficiency, regulatory compliance and sustainability objectives.

Heat reuse: From sustainability narrative to planning requirement

In parts of Northern Europe, planning consent for new data centres increasingly depends on credible heat reuse strategies⁵. Waste heat is no longer seen as a by-product but as a potential urban energy asset.

James notes, “Effective heat recovery depends on stable, high-pressure management within the compression cycle. Advanced compressor platforms enable elevated discharge temperatures that make district heating, commercial building integration, or industrial reuse feasible.”

As ESG-linked financing and carbon reporting intensify, these capabilities move from optional enhancement to commercial necessity.

Retrofitting legacy data centres

Europe hosts a substantial base of legacy cooling plants operating on older HFC systems. Full replacement is capital intensive.

Incremental upgrades, such as modern capacity control, inverter integration, or component-level intelligence, can improve efficiency and reliability without major redesign. James emphasises that even modest retrofits can help operators meet sustainability and PUE targets while extending equipment lifecycles.



Engineering decisions that outlast technology cycles

While AI acceleration, rising rack densities and sustainability pressures reshape data centre design, thermodynamic fundamentals remain unchanged. Cooling plant performance ultimately depends on how effectively mechanical energy is converted, controlled and protected at the compressor level.

Slide valve modulation, speed control, intelligent monitoring and refrigerant

adaptability underpin every megawatt of cooling delivered. “As digital demand grows, operators must look beyond architectural innovation alone,” James concludes. “Understanding the role of

the mechanical plant and compression strategy is increasingly central to achieving operational excellence.”

www.bitzer.de/gb/en/

Source

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The thermal wall: Bridging the gap between legacy cooling and the AI gigawatt era

Oliver Sanders, Data Centre Commercial Director UK&I at Carrier, outlines why demand for data centres is rising and why it's vital to have the right products and support in place before, during and after deployment.

We've all spent the last year talking about AI. Every campaign seems to have AI stamped across it, urging us to get excited about the next era. We hear plenty about the magic: generative models and the speed of their output. But I'm less interested in the magic and more interested in the cost of it.

Because strip away the software and the hype, AI is really just heat. It's electricity converted into calculations, with heat as the byproduct. And as we barrel along into this new era, the rules for managing that heat are changing fast.

The physics of densification

First, let's ask: why are we densifying? Why are we building data centres? Why are we packing 100 or 200 kilowatts into a rack? We're not just doing it to save on floor space and rent. We're doing it to maximise the speed of calculations. That means we need to move the data faster. The further apart the processors are, the higher the latency, so to achieve the performance AI demands, we must shrink the physical distance between the chips. But when you shrink the physical distance, when you shrink the volume, you concentrate a huge amount of power into a tiny box. And physics dictates that all that heat and energy must go somewhere.

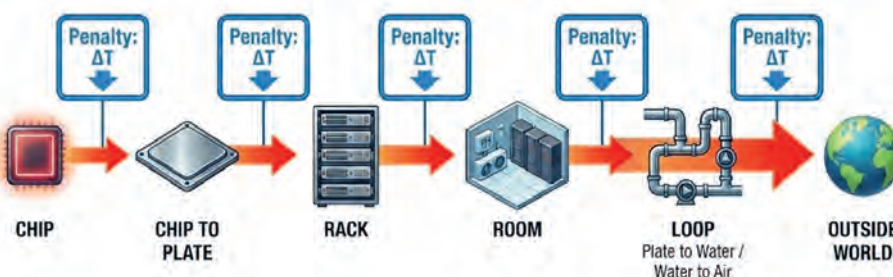
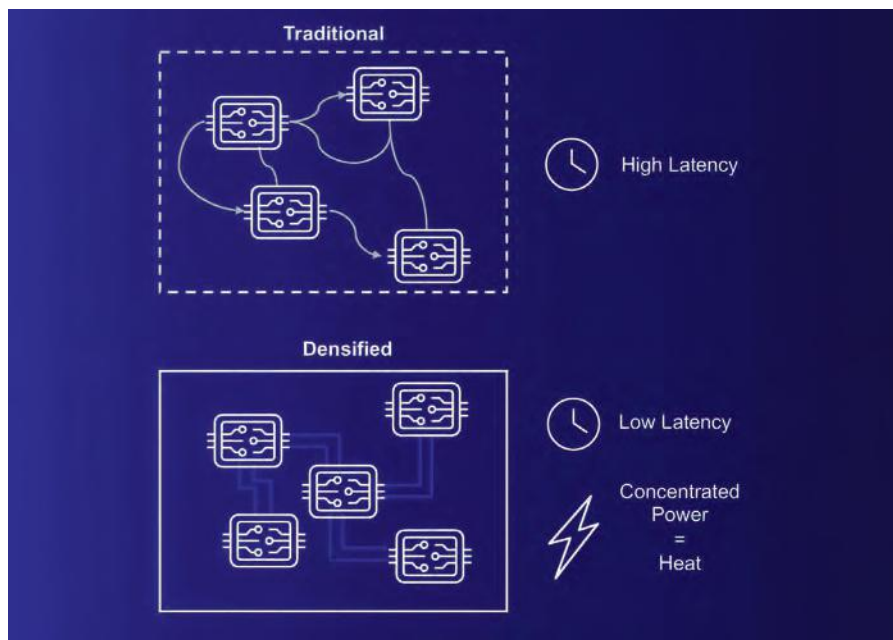
Therein lies the challenge. The data centre cooling industry tends to 'slice' this problem into pieces. IT buys the server. Contractors and data centre builders buy the chillers. Mechanical engineers and consultants size the pipes in cooling loads. But heat couldn't care less about job titles. No matter how we choose to slice it, heat flows in a chain. It flows from the chip to the rack, to the room, to the loop, and finally, to the outside world. But every time that heat is handed off, a penalty is introduced called a delta T (the difference

between two measured temperatures). And if a contractor or consultant only looks at their slice, inefficiencies compound across the whole system.

If you take away anything from reading this, remember the balance. To move heat, you need flow and a temperature difference. But as density goes up, and you try to pump more water and blow more air, you're going to hit a wall. Higher flow means massive pressure drops, which means huge pumps and enormous pipes. The result is that CapEx explodes, and no one can afford it. To

overcome this imbalance, we have to stop designing from a 'chip forward' mentality in the hope that legacy buildings can cope. Instead, we need to start designing from the destination – the chip – backwards.

There are a hundred brands out there selling a thousand products. But if you look at physics, there are broadly four destinations where heat can go. There's no magical 'fifth dimension', no matter how hard we look. Heat is either expelled into the air, through evaporation, into heat recovery or into a large body of water.



Let's explore those options.

Four thermal destinations

1. Dry cooling: Globally, air can act as a virtually infinite sink. But locally, it's finite. And air is a relatively poor conductor of heat. To cool a 500-megawatt AI factory, you can't just blow air at 200 miles an hour and think you're going to get the efficiencies and Power Usage Effectiveness (PUE) you need in a data centre. You need to make the building bigger. Much bigger. Stick to dry cooling, and the facility size might eventually outpace available land, and you might eventually hit a wall.

2. Evaporative cooling: Water usage is a sensitive topic. Nobody wants to consume water if they don't have to. But honestly, evaporation is thermodynamic magic. It's an order of magnitude that can be more efficient at ejecting heat than dry air. As densities double or triple, when you look at the statistics of what's being built in the DC landscape, however we feel about it, the physics may force us to use more water. Because without the phase change of water, heat might not be siphoned off fast enough.

3. District heating: My favourite option. Where feasible, we reuse. We take whatever heat we can remove from the rack, and we heat homes and sanitary water. Technologically, it's easy. We have the heat exchanges and highly efficient products on the market. The problem is geography. We need a population to accept and own the heat. While it can't be done in the middle of the desert, it can in a condensed city area or a new build site. If built near a data centre, that waste heat can be turned into a charitable donation or a revenue stream.

4. Direct water: Rivers, lakes, the sea. These are the ultimate thermal mass, absorbing heat almost instantly. But while river water doesn't care about a 100-kilowatt data rack, the local ecosystem certainly does. Discharging hot water creates thermal pollution, depleting oxygen in the environment and drawing strict regulatory scrutiny. Also, tapping into natural waterways is a logistical headache requiring highly specialised infrastructure to combat corrosion and constant biofouling from aquatic life. Even taking the



logical extreme and sinking the data centre itself, as seen with Microsoft's underwater Project Natick¹, reveals a huge compromise: thermodynamic brilliance comes at the cost of prohibitively difficult maintenance for rapidly scaling AI workloads.

Ultimately, the fundamental point is this: before you go out and buy those GPUs, you need to know which of these four destinations you're going to use, because that decision dictates everything else inside the building. The issue is that opting for just one of those to cross the thermal wall is insufficient – and, as with most things, that comes with added cost.

The myth of pure liquid cooling

How then do we scale the thermal wall without going bankrupt? How do we span the gap between legacy cooling and an AI liquid-cooled future? Bridge technology.

We know where the heat goes and where to capture it. The 'hottest' heat capture in the industry right now is direct-to-chip liquid cooling. Not only is it thermodynamically superior, but it also funnels heat directly away from the heat source (the chip). But here's a reality check:

pure (non-hybrid) liquid cooling is a myth. Because even in a rack full of liquid-cooled GPUs, we're still burdened with power supplies, memory and networking gear, all of which – no matter how high the loads and temperatures – still need air cooling. And we know the demand is going up.

While we might capture 80% of that heat in liquid, the remaining 20% is still hot air. We can't just erase air handling and mechanical cooling elements from the equation. That has challenges of its own.

To illustrate, let's consider the hybrid car.

The hybrid car dilemma

Think of the modern-day data centre as a plug-in hybrid car. On a physics level, a hybrid is technically not the best at being a car. It's heavier than others in its size class, because it drags around both a petrol engine and a massive battery. That added bulk means it's neither optimised for electric efficiency nor petrol mileage.

Yet we in the data centre industry are doing the same thing. We're building hybrid halls. We're buying massive chillers for the air side and immense CDUs for the liquid side, thereby expanding our infrastructure footprint. Why do we build these expensive, ➤



heavy hybrids? For the same reason people choose to buy the car: security.

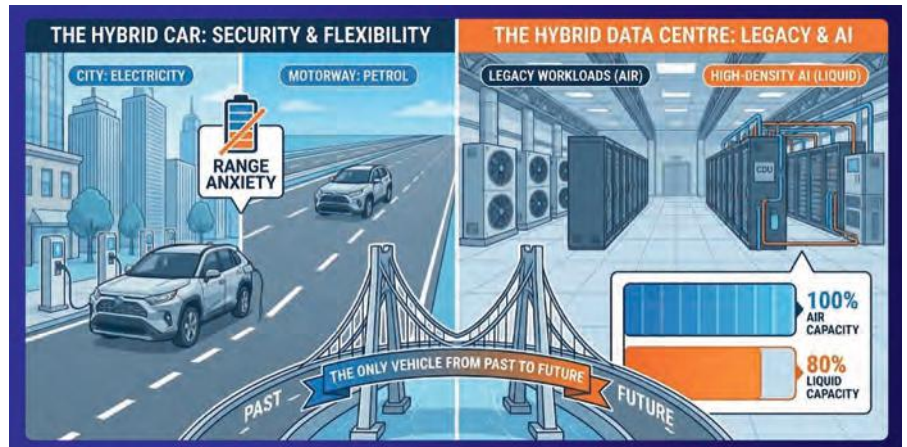
They can drive in the city and on the motorway using electricity and petrol. In a hybrid-cooled data centre, legacy workloads and high-density AI can operate in the same room. It's an expensive bridge, granted, and you're likely paying for 100% air capacity and 80% liquid capacity at the same time. But right now, it's the main vehicle available that's transporting us from the past into the future.

Abandoning legacy thinking

So, we're facing a thermal wall. To cope, we're building complex, heavy hybrid bridges. And we know that physics dictates there are four ways to get the heat out. The temptation now is to go and buy a bigger chiller, a stronger pump. But that's legacy thinking. That's trying to smash through the wall with brute force. To handle the gigawatt era, we don't need incremental steps or a plaster. We need a fundamental shift in how we connect the chip to the atmosphere and science.

To illustrate my point, take Carrier QuantumLeap™. It isn't just a product brochure. It's Carrier's framework for integration. It's our approach to stopping the 'slicing' problem; a methodology designed to take the heat from the AI chip, manage the hybrid cooling loop, and deliver it efficiently to the four destinations.

Here's the takeaway: Density is difficult to avoid. Hybrid is expensive. But it's necessary, because the laws of physics aren't going to change. The biggest risk to a data centre project isn't buying the wrong chiller or CDU. It's the risk generated by the gap between them, of failing to connect the physics of the chip to the



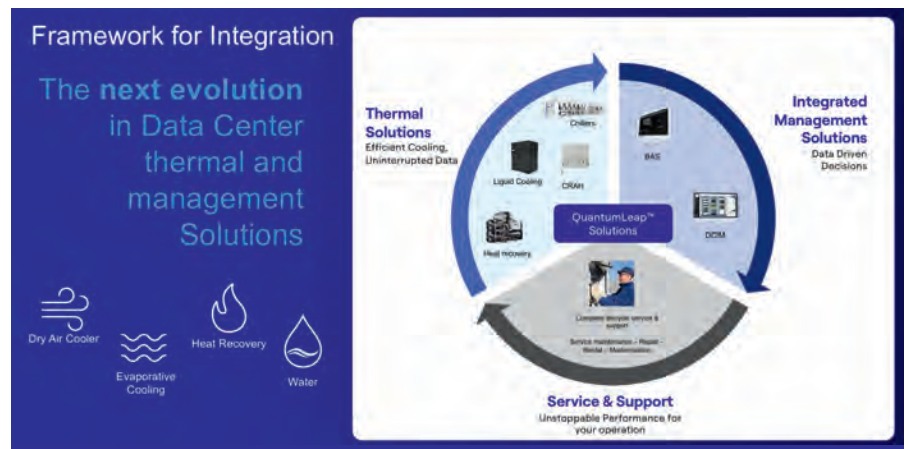
physics of the destination. We're entering an era where the data centre is no longer just 'a big building with air conditioning'. It is a complex thermal power plant with a promise of untold future opportunities.

So, the challenge is this: before buying any components, stop looking at the chiller in isolation from the rack. Instead, start

designing for the entire thermal lifecycle. It's a proven method to provide what data centres need right now: a quantum leap.

Learn how the Carrier QuantumLeap™ team can help you embrace the future of data centre cooling at [quantumleap.carrier.uk](https://www.carrier.uk)

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Source

1. <https://news.microsoft.com/source/features/sustainability/project-natick-underwater-datacenter/>

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How sustainable innovation is transforming air conditioning

Tom Houlker, Director at Houlkair, discusses how and why air conditioning is evolving into smarter, more efficient, and sustainable systems that improve comfort while reducing energy use and environmental impact.



Tom Houlker, Director at Houlkair



Step into almost any modern building on a hot day, and you will notice something curious. If the air feels comfortable, we barely think about it. If it does not, it becomes impossible to ignore. Air conditioning systems are no longer judged only on whether they can cool a room. Today, people judge HVAC systems on how they improve indoor air quality and reduce energy costs.

The core problem is that traditional air conditioning technology was never designed for today's demands. Older air

conditioning units are now outdated, often relying on fixed-output cooling, outdated refrigerants, and inefficient control systems. As temperatures rise and energy costs increase, that approach becomes harder to justify. The International Energy Agency reports that cooling already accounts for nearly 20% of electricity used in buildings globally¹, and demand is still growing. That puts pressure not only on budgets, but also on the carbon footprint of modern buildings.

Air cooling demand is increasing, and sustainability is non-negotiable, therefore the industry has to change. Innovation is required. The future of air conditioning is being shaped by smarter controls, more efficient HVAC systems, cleaner refrigerants, and a stronger focus on the indoor environment. The shift goes beyond the technology and is reinventing what air conditioning is.

Smart control is redefining efficiency in HVAC systems

One of the most significant innovations in air conditioning is not mechanical at all. It is digital. Smart thermostats and

connected HVAC systems are changing how cooling technology operates on a day-to-day basis. Studies show that smart thermostat systems can save energy by 3% to 35%², showing the value of this new method.

Instead of running continuously or relying on manual adjustments, modern systems can respond to real-time conditions. One thing these systems can do is learn usage patterns. For example, if heating is usually turned on in an office early in the morning, the air conditioning system can learn to do that automatically. Another thing smart control allows is adjusted output based on occupancy and the use of remote control settings. This is vital, as you can control your HVAC system no matter where you are. These might sound like convenience features, but in the real world, these features are vital to running a smoother operation.

A major source of wasted energy comes from cooling spaces that do not need it. Smart systems reduce that waste by aligning performance with actual demand. Systems can now detect the busiest rooms

and direct more power to those areas to improve air quality for the room's occupants.

There is, however, a nuance worth recognising. Smart technology does not automatically make a system efficient. If the underlying air conditioning system is poorly designed or incorrectly sized, digital controls will not fix the problem. They simply optimise what is already there. In other words, innovation works best when it builds on strong fundamentals, not when it tries to compensate for weak ones.

Energy efficiency is driving the biggest transformation

While smart controls are changing behaviour, advances in system design are reshaping performance. This shift in air conditioning technology aims to reduce energy consumption while maintaining comfort.

Modern HVAC systems now use technologies such as inverter-driven compressors and variable refrigerant flow to adjust output more precisely. Rather than switching on and off at full power, systems can scale their performance to match demand. That reduces strain on components and improves overall energy efficiency.

Heat pump technology plays a central role here. In the UK, air source heat pumps typically deliver 3 to 4 units of heat for every 1 unit of electricity used, giving them a Seasonal Coefficient of Performance (SCOP) of around 3.0 to 4.5 under typical conditions. This makes them particularly energy efficient compared to traditional heating and cooling systems. More importantly, it highlights a broader shift in air conditioning technology. Instead of treating cooling as a standalone function, modern HVAC systems integrate heating and cooling into a single, more efficient solution.

Sustainable refrigerants and environmental impact

Beyond energy use, refrigerants have become a major focus in the push toward environmentally friendly air conditioning. Many traditional refrigerants have a global warming potential thousands of times greater than carbon dioxide³, meaning even small leaks can contribute significantly to greenhouse gas emissions. That has driven a shift toward eco-friendly refrigerants with much lower global warming potential, helping reduce the overall environmental impact of modern air conditioning systems.

For example, R-32 refrigerant, which is now widely used in newer air conditioning units, has a global warming potential of around 675 compared to over 2,000 for older alternatives like R-410A, significantly lowering its contribution to greenhouse gas emissions.

This shift is not just about ticking regulatory boxes. It reflects a broader understanding of how air conditioning systems impact the environment over time. It is no longer just about performance in the moment. The whole lifecycle now matters, from how a system is installed and used to how it is maintained and eventually replaced.

What innovation means for the future of air conditioning

So, what does all of this mean in practical terms? For homeowners, businesses, and developers, the way air conditioning systems are selected and used is changing.

Modern HVAC systems are no longer just about cooling capacity but about long-term performance and efficiency. Factors such as energy consumption and carbon footprint are becoming just as important as the upfront cost.

There is also a broader shift taking place. Air conditioning is moving from a reactive system to a predictive one. With the help of data and automation, systems can optimise performance to reduce

unnecessary energy use. This not only improves comfort but also extends the equipment's lifespan.

Globally, the stakes are even higher. As demand for cooling increases, particularly in warmer regions, the need for efficient and sustainable cooling technology becomes more urgent. Without innovation, the environmental impact of air conditioning could grow significantly. With the right approach, it can become part of the solution rather than the problem.

Conclusion

Air conditioning is changing, but the most important changes are not always the most obvious. Innovation is transforming air conditioning systems into smarter and more environmentally friendly solutions. From intelligent controls to advanced heat pump design, the industry is moving toward a model that prioritises both performance and sustainability.

What stands out is the shift in thinking. Cooling is no longer just about lowering temperature. It is about creating a balanced indoor environment that supports comfort, health, and efficiency simultaneously. That is where the future of air conditioning is heading. Not just cooler spaces, but smarter, cleaner, and more sustainable ones. 🌿

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Source

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Process cooling in summer

Dave Palmer, General Manager at ICS Cool Energy UK, discusses five questions you should be asking now, before temperatures climb, to expose the strategic blind spots the industry cannot afford to ignore.



Dave Palmer,
General Manager at
ICS Cool Energy UK

Every summer, the industry is facing the same challenge: Unpredictable temperatures and completely predictable pressure on cooling systems.

As heat loads rise, your equipment works harder, runs longer, and carries more of the production burden. And when that happens, any weakness in your cooling infrastructure becomes impossible to ignore.

If you're running a manufacturing line, food processing facility, chemical operation, or pharmaceutical environment, you know a

cooling failure isn't a minor technical issue. It's a businesscritical event. It can shut down production, compromise product quality, and eat into margins almost instantly.

At ICS Cool Energy, we see this pattern across the industry every year. Summer doesn't cause cooling problems – it simply exposes the weaknesses in the system. The facilities that stay resilient aren't the ones with the biggest equipment; they're the ones that understand their vulnerabilities and plan ahead.

Here are the five questions you should be asking now, before temperatures climb.

1. How resilient is your equipment when you actually need maximum performance?

Summer exposes whether your plant is built for peak load or merely coping through cooler months. If your chillers or cooling systems are 8 years or older, running close to capacity, or lacking consistent maintenance, they may struggle when ambient temperatures rise.

Modern systems with improved efficiencies and builtin intelligence perform differently. They don't just run; they respond, helping reduce both operational risk and running costs.

2. What is your contingency plan?

What happens inside your plant if cooling fails at 3 p.m. on a peakproduction day?

This is the real question – and one many sites can't confidently answer.

A credible contingency plan isn't about having a document on file. It's about having the ability to act immediately. That means knowing:

- How quickly temporary cooling can be delivered and connected
- What electrical and hydraulic interfaces are required
- Whether you can supplement load before a peak hits
- Who makes decisions and who executes them

Manufacturers should treat temporary cooling as part of their strategic capacity, not just emergency response. It stabilises production, supports planned works, manages seasonal demand without overcommitting to permanent plant, and ensures your operations don't hinge on a single point of failure.

3. Do you know how your cooling system is performing right now – or are you waiting for alarms?

You can't manage what you can't see. If you can't see how your system is performing, you can't control it.

Data makes cooling predictable. Without live, data-driven insight, your first indication of a problem may be a temperature rise or process disruption already underway.

Remote monitoring and realtime performance data give you the control you need to prevent issues instead of reacting to them. This allows issues to be resolved before they impact production and increase your downtime.

4. Is your maintenance strategy designed for performance or just compliance?

There is a fundamental difference between basic servicing and performance-driven maintenance.

Compliance ensures your system meets minimum standards. Performance optimisation ensures it survives summer.

A proactive approach should include:

- Presummer readiness assessments
- Performance optimisation and verification that your cooling capacity aligns with actual process load
- Cleaning and efficiency improvements

Well-maintained systems don't just last longer – they perform better, use less energy, and are far less likely to fail under pressure. Small improvements in maintenance can mean major improvements in reliability and efficiency when heat arrives.

5. When did you last validate your water quality or glycol levels?

Water quality is one of the most common – and most overlooked – root causes of cooling underperformance. Corrosion, scale, bacterial growth, and incorrect glycol levels quietly erode system efficiency and reliability over time.

In many cases we diagnose, the symptoms appear in summer, but the cause began months earlier.

Routine water treatment and glycol management isn't optional. It protects your equipment and overall plant performance – especially when your cooling system is pushed hardest.



Looking at the bigger picture

Cooling is no longer a background maintenance task, it is a strategic, businesscritical function that directly affects production stability, product quality, and operational cost. Across industry, more organisations are moving away from stale, equipmentonly thinking and adopting a more flexible, resilient model that blends:

- Permanent cooling infrastructure

- Temporary or supplementary capacity to absorb peaks and planned and unplanned works
 - Proactive service, performance optimisation, and continuous monitoring
- This integrated approach doesn't just prevent downtime, it strengthens operational resilience, improves efficiency, and helps businesses avoid unnecessary capital expenditure by deploying the right capacity at the right time.

Final thought

Summer doesn't cause cooling failures, it exposes them.

The organisations that stay productive under pressure are the ones that prepare early, understand their vulnerabilities, and partner with specialists who can help them build a forwardlooking, datadriven cooling strategy. Resilience isn't built in July; it's built now. 📧

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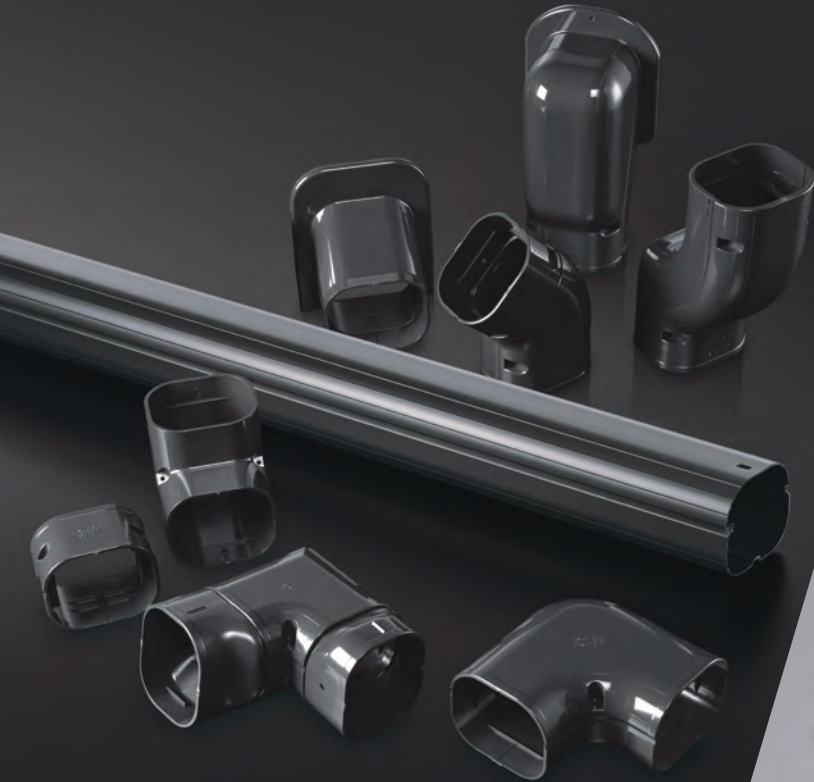
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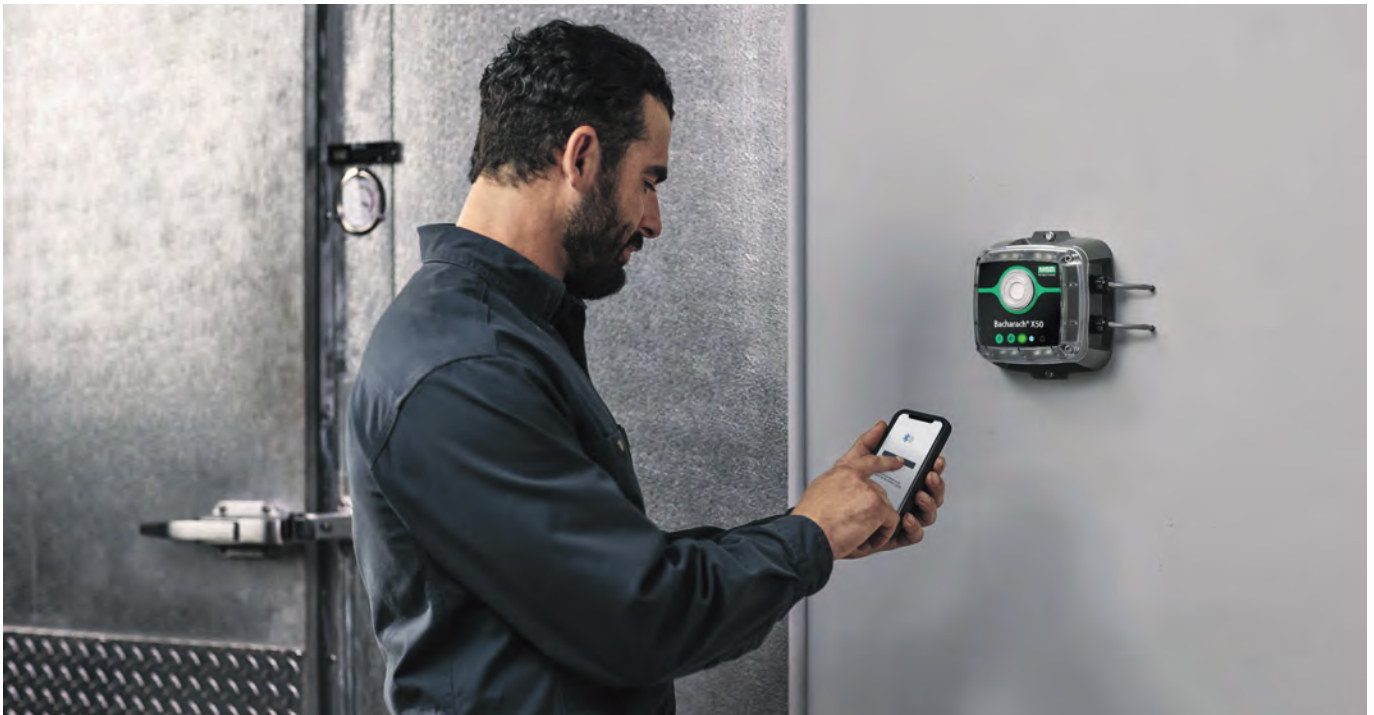
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Safety vs Sustainability:

Navigating the confusion between refrigerant monitoring and leak detection

The terms 'refrigerant monitor' and 'refrigerant leak detector' are frequently used interchangeably across the industry - yet they serve fundamentally different purposes. **Bryan Redmond**, a technical specialist at MSA Safety, unpacks the regulatory requirements and practical applications of each, offering guidance for operators navigating both safety compliance and sustainability goals.

In the modern HVAC-R landscape, 'refrigerant monitor' and 'refrigerant leak detector' are often used interchangeably - yet from a regulatory and operational standpoint, they serve fundamentally different purposes. Understanding this distinction is more than semantic precision; it's the difference between meeting life-safety compliance and achieving meaningful refrigerant emissions reduction.

Let's examine the why, when, and how of these two important systems.

Refrigerant monitors: the life-safety sentinel

Refrigerant monitors are often installed to achieve compliance with EN 378 and Regulation 573/2024 (F-Gas), which govern refrigeration systems and heat

"The choice between a refrigerant monitor and an aspirated leak detector is not an either/or proposition - it's a both/and strategy for effective facility management."

pumps. The core philosophy of EN 378 is straightforward: safeguard individuals from the harmful effects of refrigerant exposure, whether from toxicity or asphyxiation.

When and why are they required?

A refrigerant monitor - typically a diffusion-based point detector - is a mandated safety device for most HVAC/R applications in

Europe. Monitoring is generally required under EN 378 when the volume of refrigerant that could potentially escape into a space is sufficient to pose a danger to occupants.

These devices are engineered for speed and reliability. Where applicable, EN 378 requires monitors to activate an audible and visual alarm within 30 seconds of detecting refrigerant gas at a concentration above a particular pre-set value. Other mitigation actions may also be activated by the alarm, such as mechanical ventilation or shutdown. Units are typically pre-set to trigger at concentrations well below the occupational exposure limit of the particular refrigerant used (or for flammable refrigerants, well below 25% of the lower explosive limit (LEL)).

For most refrigerants, alarm set points between 100 and 150 ppm fall well below harmful levels, providing crucial early warning to evacuate.

The maths of safety: is your room at risk?

Determining whether a specific room requires a monitor isn't guesswork, it's a calculation based on the "Practical Limit" of the refrigerant in use. For every individual room in a facility, the following assessment is performed:

$$\text{Concentration} = \frac{\text{System Charge (kg)}}{\text{Room Volume (m}^3\text{)}}$$

If the resulting figure equals or exceeds the Practical Limit defined in EN 378, a refrigerant monitor is required under EN 378. Different refrigerants have different practical limits – R-410A, for example, has a Practical Limit of 0.44 kg/m³. If your system charge divided by the room volume exceeds this threshold, installation of a refrigerant monitor is mandatory.

Refrigerant leak detectors: high-sensitivity system oversight

If the refrigerant monitor exists to help keep occupants safe, an aspirated refrigerant leak detector is designed for high-sensitivity, ongoing system oversight.

Aspirated systems typically use a centralised Non-Dispersive Infrared (NDIR) sensor to actively draw air samples from various locations. Unlike diffusion-based monitors which typically alarm at 100ppm or more, these systems are engineered with a Minimum Detection Level (MDL) of 1 ppm.

Why low-level detection matters

Why detect at 1 ppm when the safety alarm doesn't trigger until 100 ppm? The answer lies in cumulative refrigerant loss.

Standard refrigerant monitors cannot always detect small leaks- that's not their purpose. However, a system can sustain a persistent, minor leak that loses hundreds of kilograms of refrigerant annually without ever reaching the 100-150 ppm threshold at the monitor's location. This is particularly true in large rooms or spaces with high air-change rates.

By the time a refrigerant monitor alarms, the leak is already significant. When an aspirated leak detector alarms, the issue remains a manageable maintenance

task. Detecting these small leaks enables prompt repairs, drastically reducing refrigerant replacement costs and helping facilities meet their Environmental, Social, and Governance (ESG) targets.

It's worth noting that the majority of refrigerant loss occurs through undetected small leaks - not catastrophic blowouts that would trigger safety alarms.

The critical difference: why not use one system for both?

This is the question I encounter most frequently: If an aspirated detector is so sensitive, why can't I use it for my EN 378 safety compliance?

The answer comes down to cycle time.

The 30-second rule under EN 378

Because aspirated systems must sequentially sample each zone - drawing air through tubing, analysing it, and purging the sensor before moving to the next location- a cycle time is introduced. Depending on the number of zones and total tubing length, it could take up to 90 minutes for a 16-zone unit with maximum line lengths of 300 metres to return to any given location.

While this timeline is appropriate for identifying slow-developing leaks and reducing long-term emissions, it is unsuitable for life safety. If a sudden, large-scale leak fills a room with refrigerant, you cannot wait for an aspirated detector to cycle back to that location.

Under EN 378, refrigerant monitors must be installed in any space where the practical limit could be reached or exceeded. These devices must alarm within 30 seconds of detecting a pre-set concentration of refrigerant. Aspirated systems - regardless of their sensitivity - cannot fulfil this mandatory rapid-response role.

Conclusion: a multi-layered approach

The choice between a refrigerant monitor and an aspirated leak detector is not an either/or proposition - it's a both/and strategy for effective facility management.

Refrigerant monitors are non-negotiable where EN 378's "Practical Limit" is reached. They are the silent sentinels helping to prevent mechanical failure from becoming a human tragedy. However, relying solely on refrigerant monitors means accepting the hidden cost of slow, undetected leaks that drain budgets and may harm the environment.

By implementing aspirated refrigerant leak detection alongside required refrigerant monitors, operators can achieve both objectives: a compliant, safe environment for occupants and a higher-efficiency, lower-emission refrigeration system that delivers measurable returns through reduced refrigerant costs.

In a market increasingly defined by stringent environmental regulations and rising refrigerant costs, understanding this distinction has become a business imperative.

For facility managers and contractors, the path forward is clear: start with EN 378 compliance with appropriately specified refrigerant monitors, then consider where aspirated leak detection can deliver additional value through early identification of minor leaks.

The investment in both technologies pays dividends - not only in regulatory peace of mind, but in reduced refrigerant costs, lower emissions, a stronger position as sustainability reporting requirements continue to evolve, and perhaps most important, in improving safety. 🏡

<https://gb.msasafety.com/about>

Feature	Refrigerant Monitor (Diffusion)	Leak Detector (Aspirated)
Primary Goal	Life Safety Compliance	Emissions Reduction / Cost Savings
Detection Level	50 ppm to 1,000+ ppm	1 ppm
Response Time	< 30 Seconds	Minutes to 1+ Hour (Cycle Dependent)
Compliance	Governed by EN 378	Driven by F-Gas / Sustainability
Sensor Type	Local Point Detector	Centralised NDIR via Air Sampling

From gas boilers to heat pumps

As we move towards an electric economy, one of the ‘barriers’ that is still seen to exist is the lack of heating engineers who can install renewable alternatives to gas.

However, as one of our directors said: *“There’s a heating engineer on almost every street – they’re just called a gas engineer at the moment!”*

So, the issue is getting gas and oil heating engineers to realise that we are now at the end of that era and help them add to their existing knowledge and switch to renewable heating.

So, I thought I’d look at my own journey from gas to heat pumps. Hopefully it can provide some guidance to any heating engineer out there who is still considering their future in the industry, or to anyone looking for a job that can’t be done by AI.

For me, I started out in plumbing and heating because I enjoyed practical work and solving problems. There’s a real satisfaction in fixing something that people rely on every day, especially when it comes to heating and hot water.

My early career was spent working on domestic plumbing and gas heating systems, mainly in social housing, where no two days were ever the same and you quickly learn how important good fault-finding skills are.

What pushed me toward low-carbon heating was seeing how quickly the

industry was beginning to change.

It became clear that heat pumps and other low-carbon technologies were going to play a major role in the future of domestic heating, so I wanted to get ahead of the curve rather than wait to catch up later.

Why I became a heat pump trainer

A large part of my earlier work involved correcting issues that had not been right from day one, and that made me want to understand how to design an entire heating system properly rather than simply fix the outcome.

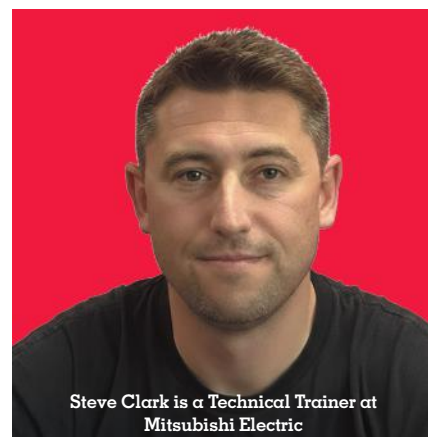
I’ve never liked relying purely on “rules of thumb” that had gradually become accepted as standard practice, so I completed the BPEC Heat Geek Mastery Course in my own time to gain a deeper understanding of heating system design, particularly hydronics and low-temperature systems.

That learning gave me a completely different perspective on heating – not just how to install equipment, but how to design systems so they perform efficiently in real homes.

And that for me, is one of the most important things about renewable heat pumps – they will work in almost any building, if they are designed, installed and commissioned correctly for that individual situation.

So, today I work as a Technical Trainer at Mitsubishi Electric, where I deliver training for installers, develop technical content and help engineers build confidence with heat pump systems.

Low-carbon heating is still evolving,



Steve Clark is a Technical Trainer at Mitsubishi Electric

so there is a real sense that everyone is learning and improving together. Most people recognise that good installations are essential if the technology is going to succeed, so there is a shared focus on raising standards.

I think the biggest barrier to mass heat pump adoption in the UK is still the cost of electricity. Because electricity remains comparatively expensive against gas, a heat pump often needs to achieve around 400% efficiency just to compete with the running costs of a gas boiler.

The positive side of that challenge is that it has pushed UK installers to become highly skilled in low-temperature heating design, that level of efficiency only comes from getting the whole system right – from heat loss calculations and emitter sizing through to pipework, controls and commissioning.

In many ways, that pressure has helped raise standards, because good system design is no longer optional; it is essential.



Climalife technical event: Navigating the GB HFC Phase-Down and the future of refrigerants

At Climalife's recent technical event in April 2026, **Neil Roberts**, Technical Sales Director, delivered a timely Market Update presentation, shedding light on the evolving regulatory landscape for refrigerants in Great Britain. With legislation set to dramatically reshape the industry from 2027, the event provided clarity, choices, and next steps for businesses preparing for the changes ahead.



Legislative change: The countdown to 2027

Neil emphasised that from 1 January 2027, GB is already committed to a guaranteed 23% cut in HFC quota availability - a non-negotiable baseline. The shift has already begun, with the EU leading the phase-down of HFCs. While Great Britain is not simply copying the EU's approach, it is accelerating its own phase-down to reduce emissions of high-GWP F-gases. Northern Ireland, however, must still follow EU regulation (EU 2024/573), which was adopted in March 2024 and introduces stricter controls.

In GB, Defra launched a consultation in November 2025 on further phase-down scenarios, with industry responses submitted by Christmas. The outcome is still awaited, but the 23% cut for 2027 is locked in, and the new GB HFC phase-down could introduce even stricter limits from 1 January 2028. This is not a direct replication of EU rules; GB is taking a distinct path, focusing on a phase-down mechanism rather than placing-on-the-market bans. Defra has not ruled out future changes to placing-on-the-market bans and other aspects (training, certification, leak checking) but for the immediate future all these remain aligned with retained EU 517/2014 legislation.

GB's ambitious proposals: High vs. Medium

Regardless of Defra's final decision, compared to 2026 levels, GB is already committed to a guaranteed 23% cut in HFC quota availability from 1 January 2027. This baseline reduction is non-negotiable and will take effect as part of the existing framework.

Defra's November 2025 consultation introduced three scenarios for further phase-down beyond this guaranteed cut:

- **High ambition:** Defra's preferred option, which could push the total reduction compared to 2026 to 48% from 1 January 2027.
- **Medium ambition:** A less aggressive alternative compared to the High Ambition scenario (34% reduction) but still more than the current planned reduction.
- **Most challenging:** Deemed potentially unfeasible for industry to achieve.

Through consultation with the RACHP industry, the Federation of Environmental Trade Associations (FETA) has proposed to Defra a 'hybrid' option where the current planned reduction in 2027 is retained but then from 2030 the proposed medium ambition option is followed.

After the Climalife event Defra announced on May 15th, 2026, that there will not be any change beyond the 23% quota cut in 2027, but no further details were given on when, or to what extent the quota phasedown timetable will change after 2027. It is very clear there will be a continued rapid reduction of HFC quota with less than 10% of HFC quota available by 2048 under all the proposed scenarios.

Table 1- HFC Phasedown Scenarios proposed by Defra in November 2025 & FETA Counterproposal

Scenario	Reduction Target (Compared to 2026)	Comment
High Ambition	2027 48% 2048 95%	Preferred by Defra
Medium Ambition	2027 34% 2048 92%	Alternative by Defra
FETA 'Hybrid'	2027 23% 2048 92%	Alternative proposed by industry

The refrigerant pathway: low GWP as the only option

Neil underscored that all new equipment should be installed with refrigerants below 1000 GWP. The industry is already seeing a shift, with lower-GWP options like R-32 and R-1234ze becoming commonplace in air conditioning. However, in commercial and light industrial refrigeration, high-GWP refrigerants are still being specified - despite the availability of low-GWP alternatives such as R-454A, R-454C, and R-455A, which have proven manageable after an initial learning curve.

For those trailblazing companies that have embraced A2L refrigerants, the transition has become routine. Yet, retrofit options for existing equipment remain limited. The presentation highlighted that there are no easy retrofit options for systems using high-GWP refrigerants, and compliance with standards (EN 378,

DSEAR, PE(S)R, PSSR) is critical - especially when considering A2L or A3 refrigerants. Systems designed for A1 refrigerants are unlikely to be compatible with A2L or A3 without significant modifications, and manufacturers stress that retrofits should only be undertaken with regulatory approval and industry standards in place.

Retrofit options: Not a solution this time

One of the most pressing questions from the event was: What are the retrofit options? The answer, as Neil presented, is stark: very few retrofit options below 1000 GWP are available. The presentation illustrated the lack of easy retrofit solutions for existing systems with virtually none below 600 GWP for the majority of applications, reinforcing the message that new installations must prioritise low-GWP refrigerants from the outset.

Key takeaways for industry

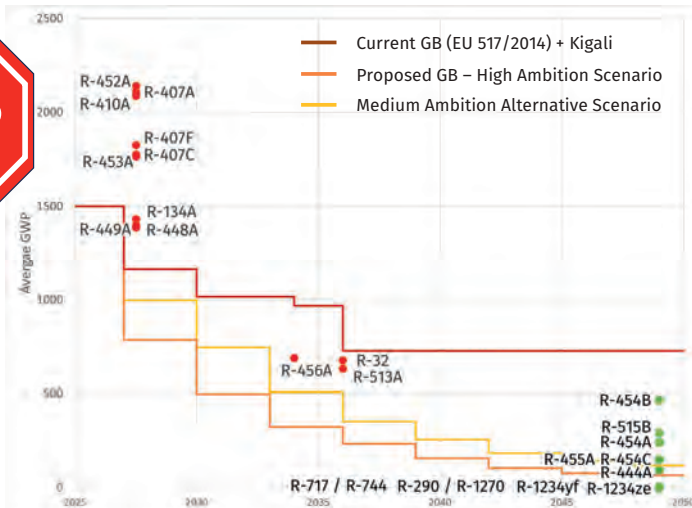
- 1. Act Now:** The phase-down is imminent, and the 23% cut is locked in - plan for it now.
- 2. Low GWP is non-negotiable:** For new installations, refrigerants with GWP <1000 are the only sustainable choice.
- 3. Compliance is king:** Adherence to standards and regulations (EN 378, DSEAR, PE(S)R, PSSR) is more critical than ever, particularly with flammable refrigerants.
- 4. Energy efficiency matters:** While GWP is a focus, total lifetime emissions and energy efficiency should drive refrigerant and system selection.
- 5. Retrofit Realities:** With no easy retrofit options for most high-GWP systems, the emphasis must be on future-proofing new equipment.

The road ahead

The refrigerant landscape is already changing, and the message from Climalife's event was clear: the time to act is now. With the 23% reduction guaranteed, and the potential for even stricter reductions under Defra's High Ambition plan, GB's phase-down demands urgent attention. The EU may be further ahead, but businesses in GB must prioritise compliance and low-GWP alternatives to avoid being left behind.

As Neil concluded: "Low GWP alternatives are available for new installations. Start using them today!"

PHASEDOWN PRESENTED AS AVERAGE REFRIGERANT GWP



For more information, contact Mel Summers at msummers@climalife.dehon.com

AGas Support Transition to Lower GWP Refrigerants with its A2L Compatible Recovery Solutions

As the HVACR industry accelerates its shift to lower global warming potential (GWP) refrigerants, A Gas Rapid Recovery has announced the launch of its new A2L compatible refrigerant recovery solutions, designed to deliver performance, compliance and, above all, safety.

Driven by tightening environmental regulations and F-Gas requirements, the industry is moving rapidly away from high GWP hydrofluorocarbons (HFCs). A2L refrigerants are emerging as a key alternative, offering significantly lower GWP while maintaining system performance and efficiency.

Among the most widely adopted lower refrigerants is R32, which is seeing rapid growth across residential and light commercial air conditioning systems due to its improved energy efficiency and substantially lower GWP compared to traditional refrigerants such as R410A. As manufacturers increasingly specify R32 in new equipment, contractors and service engineers are encountering growing volumes of A2L refrigerants in the field, making safe handling and recovery solutions more important than ever.

The wider adoption of refrigerants such as R32, R1234yf and R1234ze reflects a broader industry transition toward sustainable cooling technologies that support decarbonisation goals while meeting evolving regulatory requirements. With uptake increasing across residential, commercial and industrial applications, the transition to A2L refrigerants

marks a new phase for HVACR, where safety, sustainability and equipment compatibility must work together.

Designed for A2L Applications

AGas Rapid Recovery's latest systems are purpose-built and tested for use with A2L refrigerants. Key features include:

- Fully ATEX and CE compliant, designed for the recovery of R1234yf, R1234ze and R32
- Designed to the latest industry safety standards (Safety standards EN13849-1:2015 & EN 61511-1:2016)
- ATEX rated components throughout the system
- Independently verified PED and ATEX certifications
- Compact, mobile control panel complete with safety status indication.
- Prevention of unexpected re-start upon safety fault conditions

To further support contractors in the safe recovery of A2L refrigerants such as R32, AGas have also introduced A2L dedicated recovery cylinders into the AGas fleet. These cylinders enable safe segregation and handling of A2L gases during recovery and are available nationwide through AGas wholesale partners.

"The industry's move to A2L refrigerants is well underway, and technicians need recovery solutions that put safety first while supporting compliance and sustainability," said Jake Matthews, A Gas Rapid Recovery. "With the growing use of refrigerants like R32 across new HVAC installations, it is critical that contractors have access to equipment specifically designed and certified for A2L applications. We've built these solutions to help contractors adopt lower-GWP refrigerants with confidence."

Safety Guidance for A2L Refrigerants

Given the mildly flammable nature of A2L refrigerants, A-Gas recommends:



- **Risk Assessments:** Conduct thorough risk assessments before carrying out any work
- **Industry Guidance and Regulation:** Follow regulation and industry guidance
- **Training:** Only certified technicians should handle A2L refrigerants
- **Ventilation:** Always work in well-ventilated areas
- **Rated equipment:** Use A2L compatible machines, cylinders and tools. A-Gas supports best practice by working with industry leading partners, providing access to correctly rated recovery equipment and tools designed specifically for A2L applications
- **Leak detection:** Monitor continuously to identify leaks early
- **Ignition control:** Eliminate sparks, flames and high heat sources

Supporting the Transition

As regulatory timelines accelerate, the move to lower GWP refrigerants is no longer optional, it is essential. Refrigerants such as R32 are now becoming standard across many new air conditioning systems, helping the industry reduce environmental impact while maintaining high levels of cooling performance and efficiency.

A2L refrigerants are enabling compliance while supporting long-term environmental goals, including reduced emissions and improved energy efficiency. A-Gas is supporting this transition with advanced recovery technology, dedicated A2L infrastructure, and practical guidance, helping contractors adapt safely and effectively in an evolving market.



Rapid Recovery Operator with Recovery Cylinders

A-GAS[®]

RAPID RECOVERY

Your On-site Refrigerant Recovery Service

Supporting
A2L Recovery



A2L Compatible Recovery Solution for Any Project, Any Size, Anywhere!

A-Gas Rapid Recovery provides A1 and A2L high-speed refrigerant recovery to a wide range of industries including HVAC/R, marine, demolition and more.

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WOMEN IN THE ACR INDUSTRY

Lizzy Holmes, Area Sales Manager at MHI Projects, shares her journey into the HVAC industry as she looked for a career, not just a “job”, and her passion for her role and for contributing to the business’s net zero goals through efficient system design and equipment selection.

I was 18 and didn’t know what I wanted to do as a career, which is completely normal at that age! My dad was a manager at Jaguar Land Rover and persuaded me to get a job there while I figured out which career path I wanted to take. I worked on the production line assembling engines for five years.

I enjoyed what I did, but I knew it wasn’t a long-term career for me. I worked shift patterns and realised that wasn’t something I wanted to do forever.

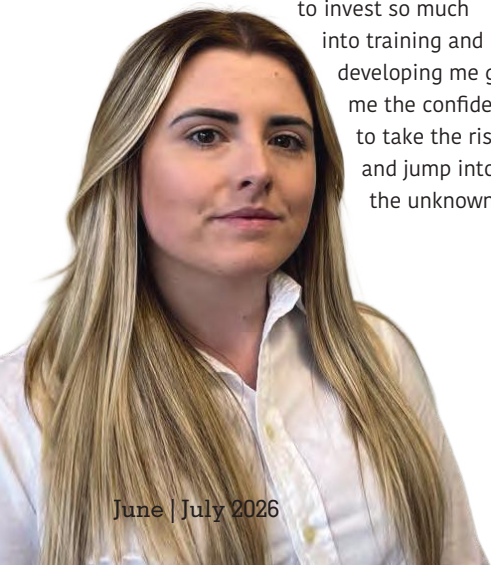
How did you get into the ACR industry?

I knew I wanted a career, not just a “job” – something with responsibility and opportunities to grow.

I saw the role advertised on LinkedIn and initially thought, “I don’t know anything about HVAC, I can’t do that!” But I decided to take the risk.

The job description highlighted the in-depth training programme on offer, and even though I had no previous experience or knowledge in the industry, the extensive training provided was what really attracted me to the role.

Knowing a company was willing to invest so much into training and developing me gave me the confidence to take the risk and jump into the unknown!



What does your current role involve?

I work with both contractors and consultants, offering a cradle to grave approach to designing VRF systems, whether that’s for a contractor design and build project or for inclusion within a consultant’s specification document.

I attend initial site visits to support customers with my recommendations, remain involved throughout the design process, and continue supporting post order to ensure everything runs smoothly with deliveries and commissioning.

What excites/interests you about the industry?

Every day is different! One day I could be on a roof looking at plant space for condenser locations, while the next I’m in the office scaling drawings, designing VRF systems, or meeting contractors and consultants to discuss upcoming projects.

The HVAC industry is at the forefront of helping achieve our net zero goals, as heating, cooling, and ventilation account for a large share of global energy use and carbon emissions. Because of this, it’s more important than ever to ensure the correct equipment is selected, along with the right design and controls.

How would you like to see your career developing?

Since joining the industry four years ago, I’ve gained so much knowledge and experience, and now I want to share it! I love the idea of mentoring and training new starters in the industry and supporting them throughout their HVAC careers.

There is a shortage of young people entering the industry, so I feel it’s really

important for people like me to shine a light on the opportunities available and highlight the value of a career in the HVAC industry.

What is the best piece of advice you were ever given?

“Just be yourself” – this has stuck with me since my early days!

People in sales can sometimes be stereotyped and seen almost as a caricature, but by being genuine, you build trust with your customers, and they keep coming back to you.

What do you see as the challenges facing the industry?

The evolving legislation around refrigerants and phasedown, along with new refrigerants and technologies, is being outpaced by ever changing regulations, with the phasedown curve becoming steeper all the time. This can be challenging.

What would you say to other women who are considering coming into the ACR industry?

Give it a go! I am so glad I made the jump into this industry four years ago, and you might be surprised by how many women already work in the industry.

The stereotype that “it’s a man’s industry” couldn’t be further from the truth! I couldn’t imagine doing anything else, and it really is a career for life!

Is there a little-known fact about yourself that would surprise other people?

I am an avid golfer and have played since I was five. Thanks, Dad, for roping me into your retirement sport! 🏌️‍♀️

Have you got the right tools for the job?

TOOLS TALK

Luke Parry, Area Sales Manager and BOSCH expert at DiversiTech International, explains why the BOSCH RG-4.0 is the “must-have” recovery machine to own in your tool line-up for 2023.

This efficient, well-designed and robust machine makes refrigerant recovery easier and safer, while boasting the sleek “BOSCH” branding. Its 1/2 HP 1700-1750 rpm (110V) / 1/2 HP 1400-1450 rpm (240V) motor ensures it always delivers the best performance anywhere.

means just that – it’s safe to use with Hydrocarbons!

(Certified by third party - latest RE-Certification. September 2022)

The Bosch RG-4.0 is available from leading wholesalers and all machines are backed by a UK-based Service Centre.



Future-proofing

The use of Hydrocarbon refrigerants has increased over the years within the industry. These refrigerants (R600 and R290) have a much lower environmental impact than HFCs. There is also further evidence that these natural refrigerants offer better performance – and are more efficient at absorbing heat.

Recovery Rates (Max Capacity)	
PUSH / PULL	6.84 Kg/min
	410.5 Kg/hr
Liquid	2.03 Kg/min
	122.1 Kg/hr
Vapour	0.17 Kg/min
	10.7 Kg/hr

The BOSCH recovery machine range

- BOSCH RG 4.0
- PROMAX RG 3000
- PROMAX MINIMAX
- PROMAX RG 5410A



See the full range of BOSCH products at www.diversitech.global or email our sales team at sales@diversitech.com

The right tools for the job

With the growing use of hydrocarbons in the refrigeration industry, it is important to ensure that the right equipment is being used when servicing and maintaining any equipment.

There are very few options on the market for the safe recovery of hydrocarbons. The Bosch RG 4.0 is a refrigerant recovery machine which is suitable for recovering all HCFC, HFC, HFO refrigerants and is A2L compliant.

The proof is in the certification!

Being Bosch, the product development team were not content at stopping there. The Bosch RG 4.0 is also independently certified as being SAFE for USE with A3 refrigerants – which



Adapting to demand: variable-speed pumping improves efficiency at major UK stadium

A phased pump upgrade at a major UK stadium shows how targeted retrofits can deliver rapid efficiency gains while improving long-term system resilience.

Addressing ageing infrastructure in commercial venues

On matchday, large stadiums operate at full capacity – with tens of thousands of spectators, peak demand on cooling, water and ventilation systems, and little margin for error. Yet within hours, the same venue can return to a far lower level of activity, with building services required to scale back just as quickly.

Managing that shift is a challenge. Behind the scenes, HVAC and water systems must respond continuously to changing conditions, balancing performance, energy use, and reliability. As energy costs rise and sustainability targets tighten, the ability to operate flexibly is becoming as important as installed capacity.

A recent pump system upgrade at a major UK stadium, delivered by Grundfos, demonstrates how targeted intervention in core infrastructure can deliver measurable improvements in both energy performance and operational resilience.

From fixed to flexible operation

Like many large venues, the site was operating with ageing fixed-speed pump systems. While dependable, these systems were no longer suited to a modern, high-use environment, where load profiles vary significantly throughout the day and across the season.

Following a site visit and a detailed system review, an upgrade plan was developed to meet the demands of the site.

Three large, fixed-speed units were replaced with high-efficiency

Grundfos TP inline models, supported by variable speed drives to enable demand-led operation.

The transition to variable-speed pumping represents a fundamental shift in system control. In fixed-speed systems, pumps operate at constant output regardless of demand, resulting in unnecessary energy use during periods of partial load. By contrast, variable-speed systems adjust performance dynamically, ensuring that output more closely reflects real-time system requirements. For a stadium environment, this adaptability is critical.

Glynn Williams, Senior Area Sales Director for UK & Ireland at Grundfos, said:

“Large venues rarely operate at a steady state, and fixed systems often struggle to respond efficiently to those fluctuations.

“Demand-led operation allows system performance to track much more closely with actual load conditions, responding in real time and improving both efficiency and overall performance”.

Measurable results

The impact of the upgrade has been significant. Annual energy savings exceed 422,000 kWh, alongside a reduction of more than 100 tonnes of CO₂ emissions. The project also achieved a payback period of just over one year. Following the performance of the initial phase, Grundfos will replace all remaining pumps throughout the stadium.

“This reflects a wider opportunity across the UK, where many legacy systems operate without modulation or effective control.

“These results demonstrate that even relatively contained interventions within ageing buildings can deliver fast and measurable returns,” adds Glynn.

Beyond energy savings, reliability is a key consideration. Pump systems underpin essential services including heating, cooling and water management, all of

which must perform consistently under high-demand conditions.

In this case, the upgraded system improves both efficiency and resilience. By responding dynamically to load changes, it reduces mechanical strain while maintaining stable performance across the system.

A wider trend in retrofit


Although delivered within a high-profile sporting venue, the challenges addressed are far from unique. Across the UK, building owners are facing increasing pressure from ageing infrastructure, rising energy costs and stricter environmental targets.

Retrofit solutions are therefore becoming an increasingly practical route to performance improvement. Large venues provide a clear example due to their highly variable loads, but the same principles apply across commercial offices, leisure facilities, and public buildings. Systems that can respond dynamically to demand are better positioned to deliver both efficiency and long-term reliability.

Looking ahead

A key takeaway from this project is the value of detailed system analysis. By identifying specific inefficiencies and targeting them directly, significant improvements can be achieved without large-scale intervention.

Equally important is the role of intelligent control. The combination of high-efficiency pumps and variable-speed drives enables a more responsive and adaptable system, supporting both performance and asset longevity.

With major events placing increasing emphasis on sustainability and operational efficiency, the performance of building services infrastructure will remain firmly in focus. As this project illustrates, improving performance does not always require complex solutions – just the right combination of system insight, control strategy and targeted investment. 



Glynn Williams, Senior Area Sales Director for UK & Ireland at Grundfos

RS-53 (R470A)

THE ONLY NON-FLAMMABLE DROP-IN REPLACEMENT FOR R410A ON THE MARKET

- R410A split air-conditioning unit converted to RS-53 & operating satisfactorily without any problems
- Low direct GWP (less than half) Drop-in replacement for R410A in existing equipment
- Non-flammable & low toxicity
- Similar energy efficiency to R410A
- Minimal changes to hardware during retrofitting
- Close match for R410A in cooling capacity
- Similar discharge pressure & temperature to R410A
- Compatible with lubricants commonly used with R410A



R410A split air-conditioning unit converted to RS-53 (R470A) & operating satisfactorily without any problems

RS-51 (R470B)

NEW LOW GWP DROP-IN REPLACEMENT FOR R404A & R507

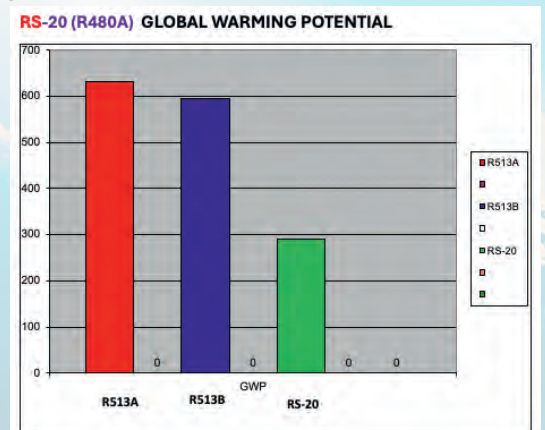
- GWP more than 80% below R404A & ca half R448A & R449A
- Similar performance to R404A
- Lowest GWP replacement for R404a & R507 on the market
- Non-flammable & low toxicity



RS-20 (R480A)

LOW GWP REPLACEMENT FOR R134a

- No changes to equipment required
- GWP below 300 & 80% less than R134a
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- Similar performance to R134a
- An almost perfect performance match to replace R134a in vehicle air conditioning
- Similar discharge pressure & temperature
- Equivalent cooling capacity



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Star Refrigeration delivers energy and carbon savings at DHL Wetherspoon distribution centre

Star Refrigeration has helped J D Wetherspoon and DHL stride forward in energy efficiency and sustainability with the successful upgrade of the frozen storage refrigeration system at their Daventry distribution centre.

The installation of Star's low-charge ammonia Azanefreezer 2.0 has delivered energy savings far exceeding initial projections, cutting annual electricity use by more than 600,000kWh, reducing costs by nearly £200,000 per year, and lowering carbon emissions by 123 tonnes.

The project forms part of a long-term partnership between Star Refrigeration and DHL, who operate the 192,000 m3 J D Wetherspoon distribution hub. Faced with rising maintenance costs and an ageing refrigeration plant originally installed in 2004, DHL sought a future-proof, environmentally responsible solution capable of supporting both firms' net zero goals. A comprehensive technical and financial analysis conducted by Star demonstrated the limitations of the existing pumped-circulation ammonia system and outlined the efficiency, safety and lifecycle benefits of upgrading to a modern, low-charge ammonia design.

The business case was compelling. Forecasts suggested that maintaining the old plant would incur approximately £400,000 in upgrade costs between 2024 and 2027, with a further £180,000 expected in running costs. By contrast, the Azanefreezer 2.0 offered a system with no water usage or associated treatment requirements, advanced intelligent controls, and a significantly lower ammonia charge of just 220kg, improving both safety and environmental performance.

The new 290kW system was designed to operate alongside an existing 120 kW Azanefreezer 1.0 installed in 2016. Working together, the units now provide a robust, energy-optimised refrigeration solution capable of supporting the facility's 31,000m³ frozen store with exceptional reliability and efficiency. To minimise disruption to operations, Star implemented a phased decommissioning of the old plant during winter, allowing the freezer to remain fully operational throughout the installation.

Since the upgrade, the site has achieved a remarkable 17% improvement beyond the UK's 'Best Practice' benchmark for cold storage facilities of a comparable size. With annual energy savings more than triple the original £5,000-per-mongh estimate, the project has delivered a payback period of under two years – far faster than projected. **Daniel Johnson**, Engineering Manager at DHL, said: "We have analysed the electricity figures before and after the installation, and the results speak for themselves: the new system is saving on average around 617,000 kWh per year. This has produced substantial energy cost reductions and helped us exceed industry efficiency standards. Working with Star Refrigeration has been a very positive experience. Their team took the time to understand our operational demands and sustainability goals, and the new system now provides long-term resilience, efficiency and environmental benefits."

The refrigeration performance and operational visibility of the site have been further strengthened by Star's Ethos technology, and AI-driven digital optimisation system that provides real-time monitoring, performance benchmarking, and predictive analytics. Ethos enables Star's engineering and maintenance teams to identify inefficiencies, anticipate future requirements, and support ongoing energy reductions. Remote monitoring, combined with the expertise of Star's 30-strong Derby-based team, ensures the system continues to operate at peak performance.

The project represents an important milestone in the evolving UK cold chain landscape, where operators are facing rising pressures to reduce energy consumption, minimise carbon impact, and comply with future environmental regulations.

Aiden Perks, Regional Sales Manager (Midlands) at Star Refrigeration, said: "This project shows what is possible when businesses commit to forward-thinking engineering and data-driven decision-making. The impact at Daventry reduced energy use, lower costs, and demonstrated the value of strong partnerships that place innovation, lifecycle costs, and sustainability at their core."

With more than 18 months of operational data confirming consistently strong performance, the Daventry facility is now considered one of the most energy-efficient cold stores in the country, offering a powerful example of how industrial refrigeration can support both commercial competitiveness and environmental responsibility.

The full project video can be viewed on Star Refrigeration's YouTube channel at: www.youtube.com/watch?v=BH2stB5Szvs



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PANASONIC EXTENDS HEATING-OPTIMISED INVERTER SERIES FOR COMMERCIAL R290 ECOi-W HEAT PUMP RANGE

Panasonic Heating & Cooling Solutions announces the launch of the AQUA-G EVO series as part of the ECOi-W commercial heat pumps range. The range showcases latest R290 technology, delivering high seasonal efficiency, quiet operation and reliable heating even in extreme conditions. The AQUA-G EVO 60-110H reflects Panasonic's longstanding commitment to sustainable, future-ready HVAC solutions that support organisations and building owners in meeting European decarbonisation goals.



Designed for the demands of the energy transition

The AQUA-G EVO has been purpose-built to meet the rising commercial demand for sustainable heating technologies that can effectively replace gas boilers across commercial, light industrial and multi-residential buildings. Using the natural refrigerant R290, with an ultra low Global Warming Potential (GWP) of just 0.02¹, the range aligns with evolving F-Gas regulations and supports corporate sustainability commitments across European markets.

Performance and versatility at scale

Featuring an inverter-driven compressor and pump, the AQUA-G EVO delivers stable temperature control and strong seasonal energy efficiency, directly reducing energy consumption and operational costs. Advanced refrigerant circuits and defrost management logic ensure reliable performance throughout harsh winter conditions, a critical requirement for commercial heating applications. At -10°C outdoor temperature, capacity losses are around 15%, while conventional heat pumps have approximately 38% capacity losses at this temperature. The Panasonic unit can produce water at 55°C with the outdoor temperature at -18°C. It produces up to 75°C leaving-water temperature for DHW management at -2°C.

Available in three sizes; 60, 80, and 110, the range is engineered to serve diverse installation environments. The system enables cascade operation of up to eight units, providing a combined heating capacity of roughly 880 kW. Installations using up to four units benefit from a notably compact layout, allowing units to be installed side by side with minimal spacing to reduce overall plant room requirements.

Total Panasonic HVAC Ecosystem

Panasonic delivers complete HVAC solutions for commercial projects, from high efficiency chillers and heat pumps to a wide range of customisable indoor units, including fan coils equipped with nanoe™ X for improved indoor air quality. Our smart building platforms enable seamless, centralised control across multiple sites.

Within this integrated ecosystem, the AQUA-G EVO is purpose built for decarbonisation, boiler replacement, and sustainable heating.

Source

1. Based on the Sixth Assessment Report (AR6) adopted by the Intergovernmental Panel on Climate Change (IPCC), R290's minimal climate impact positions it as a key enabler in accelerating the shift to low carbon heating.

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