

The magazine of the Chartered Institution of Building Services Engineers





Ultimate noise reduction is no coincidence

16.000 hours of engineering

Unique material composition delivers perfect sound absorption

Compact design for small and narrow spaces

WAVIN AS+

PREMIUM NOISE REDUCING SOIL AND WASTE SYSTEM

Calculate sound reduction with Wavin SoundCheck Tool

Scan the QR code to discover more about Wavin AS+







Building trust

wo major initiatives are set to overhaul services design in the UK in the

coming years as policy-makers and designers strive to create the framework necessary to deliver net zero carbon in buildings.

The pilot for the UK Net Zero Carbon Building Standard (NZCBS) is currently being tested by industry to see how achievable stated operational and embodied carbon limits are for different building types. This month, Max Fordham's Henry Pelly compares the standard's carbon limits with the consultant's own completed buildings, revealing the sectors providing the toughest challenges in meeting the limits (page 22).

Draft standards for new heat networks have also now been published with the first technical specification and assurance documents for the Heat Network Technical Assurance Scheme (HNTAS) appearing in July. On page 8, co-technical author Tom Burton explains how new KPIs aim to deliver heat networks that will guarantee consumers reliable, cost-effective heat when HNTAS comes into force in 2026.

Next month is a major milestone for CIBSE – the 30th edition of the Young Engineer Awards (YEAs). To mark the occasion, the institution's Global Young Engineers Network has unveiled a special showcase of 30 rising stars under 30-years-old, recognising the brightest and most talented building services engineers shaping the future of the profession.

The 30 have been selected across five categories: Emerging leader; Sustainability champion; Innovator; Wildcard; and Ambassador. The latter recognises those who have been 'inspiring, mentoring and leading' the next generation of engineers – embodying the spirit of 'paying it forward', which is the theme of current CIBSE President Vince Arnold. To see who has made the list turn to page 18, and to find out about each winner, visit bit.ly/CIBSE30under30

One of the founders of the YEAs is Professor Tim Dwyer, technical editor at *CIBSE Journal*. He achieved his own milestone recently with his 250th CPD article. Tim has handed over the CPD baton to Andy Pearson, who has marked his first month in post with two CPDs – turn to page 39 to answer questions on hybrid heat pumps and the design of fan coil units using low temperature heat sources.

Alex Smith, editor asmith@cibsejournal.com

Editorial

Editor: Alex Smith
Tel: +44 (0)1223 378034
Email: asmith@cibsejournal.com
Technical editor: Tim Dwyer
Reporter: Molly Tooher-Rudd
Designer: Kevin Reed
Chief sub-editor: Jo Halpin

CIBSE Journal is written and produced by CPL One Tel: +44 (0)1223 378000 www.cplone.co.uk 1 Cambridge Technopark, Newmarket Road, Cambridge CB5 8PB.



Editorial copy deadline: First day of the month preceding the publication month

Advertisement sales

Display and sponsorship Jon Morton jon.morton@redactive.co.uk
Tel: +44 (0) 20 7324 2786
Products & services Daniel Goodwin daniel.goodwin@redactive.co.uk
Tel: +44 (0) 20 7880 6217
Recruitment advertising
cibsejournaljobs@redactive.co.uk
Tel: +44 (0) 20 7880 6215
Advertising production Jane Easterman jane.easterman@redactive.co.uk
Tel: +44 (0) 20 7880 6248

The opinions expressed in editorial material do not necessarily represent the views of the Chartered Institution of Building Services Engineers (CIBSE). Unless specifically stated, goods or services mentioned in editorial or advertisements are not formally endorsed by CIBSE, which does not guarantee or endorse or accept any liability for any goods and/or services featured in this publication.

We remind all readers that it is their responsibility to verify advertisers' products claims.

Contributors



Helen Meutermans Graduate of the Year on overcoming public speaking fears to win the major award



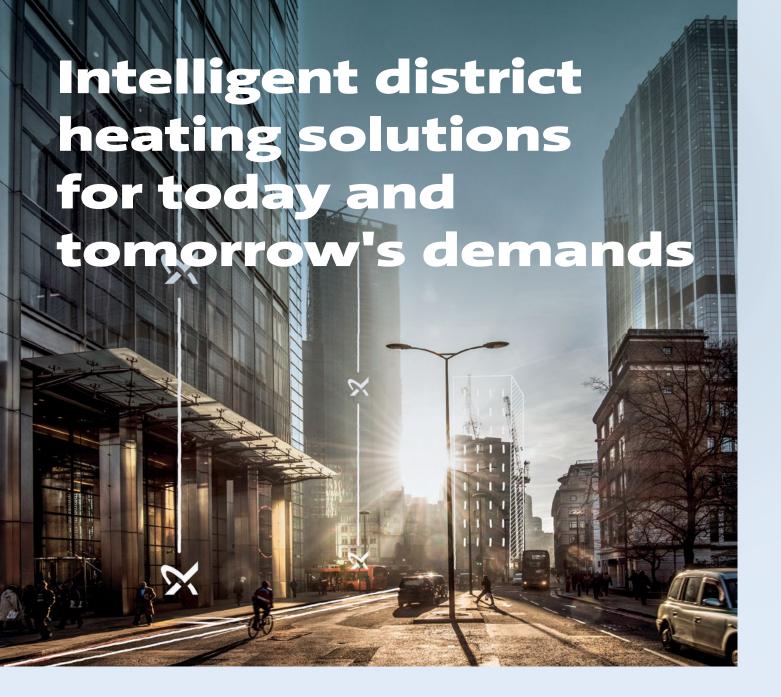
Anastasia Mylona How the rest of the world is responding to the challenge of decarbonising heat and cooling



Henry Pelly
How the
performance of
Max Fordham's
completed
buildings compare
with pilot UKNZCBS limits



Andy Pearson This month's CPDs are on hybrid heat pumps and fan coil units using low temperature heat sources



Get optimal, energy-efficient district heating systems

To achieve net-zero emissions by 2050, we need to increase energy efficiency and accelerate the energy transition. District heating is set to play a key role here — and at Grundfos, we offer a range of intelligent and efficient pump solutions that can help optimise all district heating systems. Our solutions increase energy efficiency and reliability today — and make sure you're equipped to handle the challenges of tomorrow. As your strategic partner, we're dedicated to helping you achieve a seamless energy transition. From advanced system management and increased efficiency to minimised heat loss and optimal pressure management, we're ready to help you elevate your district heating operations.

Let water flow smart





Contents

News

6 News 10 CIBSE news

Events & Training 10 Looking ahead

Voices

16 A global challenge

Anastasia Mylona on how international best practice can inform UK policy, technology and design for more sustainable, equitable and resilient heating and cooling systems

50 Q&A: Future focus

Winner of the CIBSE ASHRAE Graduate of the Year 2024, **Helen Meutermans** reflects on her journey and gives advice to the next generation of engineers

Features

18 30 under 30 2025

Celebrating 30 years of the CIBSE Young Engineers Awards, this initiative showcases the brightest young engineers across five categories

22 Net zero's mission possible?

Max Fordham has been testing the UK Net Zero Carbon Buildings Standard pilot. The consultant's **Henry Pelly** reveals which building types are the most challenging

26 Engineering for extremes

A college project in Niger aims to change the perception of low-energy buildings in extreme climates.

Molly Tooher-Rudd speaks to the project team

28 Al in the NHS

During Covid, **Dr Carl-Magnus von Behr** saw NHS staff struggle with compliance paperwork. His new Al tool now delivers faster, smarter access to information

Technical

Air conditioning, air movement and ventilation: heat recovery systems

31 Pushing the cooling limits

The limits of passive cooling, healthy learning environments and mitigating overheating were the core subjects of a topical summer event hosted by the CIBSE Natural Ventilation Group in July. Chair **Chris Iddon** reports

34 Down the plughole

Wastewater heat recovery systems can reclaim up to 60% of shower energy. **Tim Dwyer** summarises a new Rehva guide that highlights their potential

36 Real-time Passivhaus design

A new integrated simulation tool for the Passivhaus design methodology aims to close the gap between architectural form-making and environmental performance at the early design stages, as Beyond Carbon Associates'

Joel Callow explains

CPD

39The pros and cons of various hybrid heat pump heating systems

This module looks at ways in which air source heat pumps can be combined with traditional heating systems

45 Design considerations for fan coil units with low-temperature heat sources

This module explores basic design considerations when using fan coil units with a lower-temperature heating system

Classified

49 Products



www.cibsejournal.com

The official magazine of the Chartered Institution of Building Services Engineers

SOCIAL MEDIA



@CIBSEJournal



CIBSE LinkedIn



CIBSE Journal newsletter



www.cibse.org

For cibse

Journal production manager: Nicola Hurley Tel: +44 (0)208 772 3697, nhurley@cibse.org

CIBSE, 91–94 Saffron Hill, London, EC1N 8QP Tel: +44 (0)208 675 5211 ©CIBSE Services Ltd. ISSN 1759–846X

Subscription enquiries

If you are not a CIBSE member but would like to receive CIBSE Journal, subscribe now! Costs are £80 (UK) and £100 (international). For subscription enquiries, and any change of address information, please contact Nicola Hurley at nhurley@cibse.org or telephone +44 (0)208 772 3697. Individual copies are also available at a cost of £7 per copy, plus postage.

CIBSE Journal, ISSN 1759-846X (USPS 4070) is published by CPL One, 1 Cambridge Technopark, Newmarket Road, Cambridge CB5 8PB, UK.



Subscription records are maintained at CIBSE, 91–94 Saffron Hill, London, EC1N 8QP, UK.

ISSN 1759-846X (print) ISSN 2756-1895 (online)

Credits

p8 iStock.com / liievgeniy p12 iStock.com / BCFC p26-27 Article 25 p31 iStock.com / Shuoshu p34 iStock.com / Nikkytok





ABC audited circulation: 19,220 January to December 2024 Printed by: Warners Midlands PLC

BSR 'not to blame for housebuilding delays'

Dame Judith Hackitt says 'other factors' are cause of rejected applications, as CLC issues guidance to speed up high-rise approvals

verall shortfalls in housing delivery cannot be blamed on delays by vetting of high-risk high-rise buildings (HRBs) by the Building Safety

Regulator (BSR), Dame Judith Hackitt told peers.

Giving evidence to the House of Lords Built Environment Committee, the chair of the post-Grenfell building safety inquiry was asked if wider doubts about government housing targets might increase political pressure on the BSR. She replied that the regulator must be 'bolder in defending itself'.

Hackitt said the 30,000 homes currently paused in the BSR's Gateway 2 process form only a fraction of the government's target of 1.5m homes, adding: 'There are other factors at play.' She noted that some applications continue to fail because of 'pretty basic stuff' that applicants should be able to provide.

Reflecting on the pace of change, Hackitt said she initially expected her recommendations to take 'five to six years' to implement, but progress had taken longer. However, she said that the reforms were now in place, describing them as a 'big change in culture and a shift in responsibility'.

Her comments came as the Construction Leadership Council (CLC) published guidance aimed at speeding up Gateway 2 approvals for new HRBs. The package sets out baseline principles and practical recommendations to help applicants prepare submissions.

Karl Whiteman, Berkeley Group divisional chairman and CLC building safety sponsor, said the guidance would 'ensure the regulator can approve submissions swiftly and consistently, and enable the sector to increase the delivery of safe and high-quality homes'.

While the BSR no longer sits under the HSE, Tim Galloway, deputy director at the HSE, said: 'Applications that clearly demonstrate compliance are approved faster, and everyone in BSR wants those designs and plans off the page and on to site as quickly as possible.'

Architect BDP sues Kingspan over insulation claims

Architect BDP has launched legal action against insulation manufacturer Kingspan, saying it may be liable for the cost of recladding a mixed-use development because of 'statements' about its K15 insulation product.

BDP is being pursued by contractor Laing O'Rourke for £1.83m in a separate legal case concerning The Rock, a mixed-use development in Bury, Lancashire, completed in 2010.

The firm denies it is liable, but is nevertheless pursuing Kingspan Insulation and three other companies in a related lawsuit. BDP says if it is found to be liable to Laing O'Rourke, it is 'entitled to a contribution, amounting to an indemnity, from Kingspan Insulation'.

Full case details have not been published, but Laing O'Rourke is claiming compensation for replacing 1,717m 2 of K15 cladding.

Fire safety code of practice proposed for products

The BSI has launched a public consultation for a new fire safety code of practice.

The standard, PAS 2000, Construction products – Bringing safe products to market – Code of practice, is scheduled to be published in early 2026.

It will provide vital guidance on the due diligence manufacturers should carry out before placing their construction products on the market.

The document will address: premarket risk assessment; factory production control processes; product information and collection; and use of market feedback.

The consultation closes at midnight on Monday 8 September.

Review and comment on the draft here: **bit.ly/CJPAS2000pr**

UK temperature rise breaks weather records

Met Office figures highlight nation's shifting climate

The past three years have all been in the UK's top five hottest on record, according to the Met Office's latest annual assessment of the UK's climate.

The recent State of the UK Climate 2024 report shows the country has been warming at approximately 0.25°C per decade since the 1980s.

From 2015 to 2024, it was 0.41°C warmer than 1991 to 2020, and 1.24°C warmer than from 1961 to 1990.

The study shows how rising temperatures are leading to fewer days when buildings need heating and more days when they require cooilng. From 2015 to 2024 there were 5% fewer heating degree days than from 1991 to 2020 and 14% fewer than 1961 to 1990.

Cooling degree days almost

doubled from 2015 to 2024 compared with 1961 to 1990.

And 2024 saw the fourth-lowest heating degree days than in any year since 1931. It included the UK's second warmest February, warmest May, fifth warmest December, fifth warmest winter and the warmest spring on record, the Met Office said.

Between 2015 and 2024, the UK recorded its all–time highest maximum temperature in five of the 12 months of the year.

Hottest summer days are warming about twice as fast as average summer days. The 21st century has also seen six of the 10 wettest winter half-years (October–March) in England and Wales since 1767.

Trump axes EPA scientific research arm

The US Environmental
Protection Agency (EPA) is
set to close its scientific
research arm as part of Donald
Trump's downsizing of the
federal government.

The Office of Research and Development (ORD), analyses dangers from hazards, including climate change and indoor air contaminants.

Thinktank Heritage Foundation Project 2025's Mandate for Leadership heavily criticised the ORD as 'precautionary, bloated, unaccountable... and inclined to pursue political, rather than purely scientific goals.'

A new Office of Applied Science and Environmental Solutions, under Administrator Lee Zeld, is set to be created by the EPA.

COMPREHENSIVE

EXTENSIVE PRODUCT RANGE AND BESPOKE SOLUTIONS

CRANE

FLUID SYSTEMS

Trusted since 1919, our extensive portfolio of general and public health valves, pipe fittings and commissioning valves for constant and variable flow ensure you don't have to look anywhere else. Even if you need a bespoke solution come to us.

Find out more at Cranefs.com/solutions











Open fires and log burners offer emotional comfort

Households with secondary energy sources are not considering reducing their use of log burners and gas fires, according to a new government study.

The research, published by the Department for Energy Security and Net Zero, found that study participants using secondary heating did so because their primary heating couldn't always fulfil their needs, such as for affordability and keeping warm. It also revealed that some secondary heating, such as open fires and log burners, provided emotional comfort.

Fairer pricing call for heat networks

Proposals by Ofgem to protect heat network customers against unfair prices are 'inadequate', the Heat Trust has said. In its response to the energy regulator's consultation on fair pricing protections for heat networks, the trust says many consumers are currently paying heat prices double those for domestic gas customers with their own boiler. The response says Ofgem's proposals do not deliver fairer pricing or equivalent price protections to those in place for gas and electricity consumers.

Blending of hydrogen capped at 2%

Blending of hydrogen into the gas transmission network will be capped at 2%, the Department for **Energy Security and Net Zero has** proposed. The consultation, published in July, says most applications can handle a blend of up to 20% hydrogen by volume the level proposed by the previous government in a 2023 consultation. However, it says the majority of gas transmission system end users will require modifications or upgrades to equipment and processes, which become 'more significant, complex and costly' as the level of hydrogen blend increases.

Government reveals heat network KPIs

Draft technical obligations for new networks released

The Department for Energy Security and Net Zero (DESNZ) has published the draft new build technical specifications and assessment procedures for its heat network assurance scheme.

The overview gives the first detailed insight into what compliance with the Heat Network Technical Assurance Scheme (HNTAS) will require. It contains KPIs and an outline of the technical and procedural obligations across the new build 'assurance pathway'. It will apply to communal and city-wide district systems. Existing heat network documents have yet to be published.

KPIs include acceptable heat losses for the secondary heat network – a key measure for performance. The limit is 100W per dwelling on average, the same as the voluntary standards set out in CIBSE CP1 (2020).

Co-technical author and FairHeat principal engineer Tom Burton said the metrics were very achievable for networks that follow good practice and the peer approval process. Those who have been working to CP1 will sail through these KPIs,' he said.

Assessments against minimum



standards will be made in the various stages of the life-cycle for six heat network elements, including the energy centre and distribution systems.

At design and construction stages, assessments will be made to validate claims that certain performance outcomes will be achieved. A network passing an assessment will be awarded an HNTAS certificate as evidence of compliance with the scheme.

Once a network achieves this certification, the heat network operator will be required to regularly submit data to HNTAS to show it continues to meet key performance indicators.

A public consultation, and more documents covering life-cycle stages, are expected to follow soon.

How HNTAS aims to put consumers first

By Tom Burton, co-technical author, HNTAS



HNTAS is heavily consumer focused. Its aim is to provide assurance that minimum levels of performance and reliability are being achieved, meaning lower costs, improved comfort and fewer outages.

The newly published documents reflect extensive work and industry engagement to establish KPIs that identify the root causes of poor heat network outcomes, such as heat

loss and instability in temperature and pressure. This allows visibility of problems that have previously been difficult to diagnose because of a lack of data.

HNTAS is a preventative assessment regime, where decisions made at each stage of the design/construction/commissioning process will be assessed.

Assessment will be a cost for developers, but there is strong evidence that this will result in overall savings in the development and operation of heat networks.

One of HNTAS' aims is to improve the reputation of heat networks, allowing them to grow at the pace needed by government to meet its target of distributing 20% of heat through heat networks by 2050. View documents at **bit.ly/4oLKLdy**

Panel appointed to oversee Building Regs review

Former CIBSE technical director on the six-strong body

Former CIBSE technical director Hywel Davies is on the panel set up by the government to oversee its review of Building Regulations.

He is part of a six-strong group – appointed in July by the Ministry of Housing, Communities and Local Government – that will support the Building Safety Regulator's work on the review, which was announced last December by Deputy Prime Minister Angela Rayner.

Davies, who previously chaired the government's statutory Building Regulations Advisory Committee, is one of two technical experts on the panel. The other is Professor Luke Bisby, an expert witness to the Grenfell Tower Inquiry and chair of fire

and structures at the University of Edinburgh. Also on the panel are: Rachel Ferguson, senior development manager at compact home developer Pocket Living; Danielle Michalska–Morris, director of research and technical innovation at volume housebuilder Taylor Wimpey; Dinah Bornat, architect; and Dan Rossiter, British Standards Institute built environment sector lead.

Building safety minister Alex Norris said: 'The appointment of this panel is an important step in our response to the Grenfell Tower Inquiry. Guidance that supports compliance with Building Regulations must be clear, accurate and practical, and subject to regular updates to ensure it remains effective.'

Clemence-Jackson to head up NZCBS

Chair of CIBSE's Sustainability
Special Interest Group Katie
Clemence–Jackson has been
named as chief executive officer of
the company that will own and
manage the new UK Net Zero
Carbon Buildings Standard
(NZCBS). She previously chaired
the standard's Technical Steering
Group, which culminated in the
NZCBS pilot version. The standard
establishes a definition for net zero
carbon for each of the UK's main
sectors and building typologies.

Clemence–Jackson said: 'In my new role, I will take the lead on continuing the standard's trailblazing trajectory, and building the firm foundations and connections it needs to keep making a huge impact across the country.'

See page 22 for pilot review.

This valve has been fully functionally tested. Just like all our others.

Every single Elite Prime PICV & Hook-Up is meticulously tested, in accordance with BSRIA BTS 01. These tests include verification of flow performance across the valve's differential pressure range to ensure low hysteresis. So, when you need the complete valve solution none of the others will do.

Find out more at hattersley.com/justlike





Past President presents her vision to Hong Kong

Cousins' keynote presentation shared insights from her Building performance reimagined presidential report

IBSE immediate Past President Fiona Cousins has championed building performance in a keynote presentation to the CIBSE Hong Kong Region in July.

Her address highlighted the need to reframe building performance by considering not only technical efficiency, but also user experience, adaptability, health and resilience.

The presentation was part of the 'Beyond building systems – next-gen technologies and approaches for a sustainable future' event, jointly supported by CIBSE Hong Kong and the Hong Kong Green Building Council, and organised by the School of Energy and Environment at City University of Hong Kong.

Cousins' 2024-25 presidential theme challenged the traditional ways building services engineering is approached, advocating for greater integration of systems, collaboration across disciplines, and a more people- and outcomes-focused mindset.

In her presentation, she explored the potential of next-generation technologies and system approaches to reshape the built environment, and spoke about the importance of embracing innovation while grounding engineering decisions in measurable outcomes and long-term sustainability.

Cousins' visit underscored the global relevance of her presidential message and reflected CIBSE's commitment to supporting engineers across borders in advancing sustainable, high-performance buildings.



Enter the Building Simulation Awards

The CIBSE Building Simulation Awards, including the Young Modeller Award, are open for entries. Shortlisted finalists will present projects online, in front of an audience and the judging panel, and the winners will be announced at the Build2Perform stage at Elemental London, ExCeL London, on 19-20 November. The annual awards are organised by the CIBSE **Building Simulation Group and** the deadline for submissions is 10 October.

To enter the Building Simulation Award, visit bit.ly/ CJCBSA25 or to enter the **CIBSE Building Simulation** Young Modeller Award 2025, visit bit.ly/CJCYBSA25

Training

New course: Introduction to principal designer and principal contractor roles

This course will help attendees understand and meet the requirements of principal designer and principal contractor. It will provide an overview of the regulatory framework, and an understanding of the principal roles with the Construction (Design and Management) Regulations and Building Safety

The course will explain how individuals can demonstrate competence and assess other's competence, and how this applies to higher-risk buildings as defined by the Building

Attendees will discuss and debate the new principal roles in real examples, to help them apply their knowledge to their own organisations

Visit bit.ly/CJPCPD25

For full details and booking:

www.cibse.org/training

Building services explained

Commissioning Code M: Commissioning management 26 September

Electrical services explained

22-24 September

Low carbon consultant

24-25 September

BS9251 Automatic water suppression systems overview 29 September

Introduction to the Building

1 October

Advanced simulation modelling for Design for Performance

1-2 October

Designing water efficient hot and

cold supplies

Earthing and bonding systems

6 October

Embodied carbon in MEP design: how to use CIBSETM65

Mechanical services overview

7 October 13 October The importance of energy-efficient buildings

15 October

Leadership identity and

16 October

17 December

Mechanical services explained

27-29 October remote 12-14 November face to face

Low and zero carbon energy

technologies

21 October Air conditioning inspection

12 November

Energy Savings Opportunity Scheme (ESOS)

13 November

Understanding the law for engineers

25 November

Energy surveys

28 November

International building services

4 December

Mastering the application of

heat pumps

11 December

Analysing heat pump systems



Judges reveal 2025 façade awards shortlist

Bricks made from Venice mud and the largest Passivhaus lab among the projects selected

The shortlist for the Society of Façade Engineering (SFE) Awards has been revealed.

Taking place in London on 5 November, the awards recognise excellence and achievement in façade engineering, with shortlisted entries — including from Hong Kong, Brazil, China, Italy, Canada, America, Spain, Switzerland and the UK — showing the vast array of projects in which engineers are involved.

Notable entries include A Brick for Venice by AKT 11 – shortlisted in the Special Structures category – which showcases bricks made from the excess mud dredged from Venice's canals and air-dried without kiln firing.

Also of note is the Life and Mind Building in Oxford – shortlisted for New Build Project of the Year UK, for Ramboll UK – which is the largest building project ever undertaken by the University of Oxford. It is the UK's largest laboratory designed to Passivhaus principles, targeting 40% carbon reduction against Part L and Passivhaus principles. The façade features the brainwave pattern of Sage Boettcher, a postdoctoral fellow

from the university's Department of Experimental Psychology.

Shortlisted in the New Build International category, Eckersley O'Callaghan's Banquet Hall sits 200m above ground, at the top of The Henderson, the new Grade A office building in central Hong Kong (see image left). It was designed by Zaha Hadid Architects and features 7.5m-tall frameless glass walls spanning floor to ceiling.

Five people are shortlisted for the Young Façade Engineer of the Year, helping raise the profile of those in the early stages of their careers. They are: Lora Stoeva, WSP UK; Rhea Ishani, Ramboll UK; Rafaella Monteiro, Maffeis Engineering; Amaldev Premkumar, Ramboll UK; and Mitch Albarran, Arup.

The judges were impressed by the scope and overall high quality of the submissions for the façade awards, demonstrating the breadth of knowledge in the field.

Winners will be announced at the awards ceremony being held at Old Billingsgate, London.

To view the full shortlist, visit: www.cibse.org/facadeawards
Table bookings for the awards evening are now open. Visit: bit.ly/Facdeawards25

In October

CIBSE Young Engineers Awards

9 October, Senate House, University of London

This year is the 30th edition of the Young Engineers Awards, which showcase the innovative thinking, hard work and skills of graduate, undergraduate and apprentice engineers. They also recognise employers who demonstrate outstanding commitment to developing and nurturing young talent. www.cibse.org/yea

Ready Steady Light

14 October, Sidcup

The Society of Light and Lighting's annual competition, in partnership with Rose Bruford College and the International Association of Lighting Designers, challenges teams to create an exterior lighting installation with limited kit, in only three hours.

bit.ly/Readysteadylight25

CIBSE Patrons Networking Event

15 October, Aecom, London

A networking evening offering the opportunity to exchange insights, broaden perspectives and make connections. Whether you want to share ideas, find new collaboration opportunities or just meet others in your field, this Patrons Networking evening is perfect for your professional growth.

bit.ly/CIBSEpatronsnetworking

CIBSE ANZ Annual Awards

23 October, Melbourne

CIBSE Australia and New Zealand
Region's Young Engineers Awards celebrate
emerging industry talent, and those who
support them. The night will reveal the winners
of the four CIBSE ANZ Young Engineers
Awards categories, with drinks and canapés.
bit.ly/ANZawards25

Fresh perspective for SDE awards

The Society of Digital Engineering (SDE) Awards are back, with a stunning new venue, NLA – The London Centre, a brandnew Digital change maker award category, and judges from leading organisations in the built environment.

The 2025 Awards will also feature a live presentation, bringing fresh insights and inspiration to the celebration. The accolades recognise those in the sector who contribute to the digitalisation of 'what we do, where we live and how we experience it.'

Entries are open, the deadline is 5 October, with the awards taking place on 19 November. For more information, visit

bit.ly/CJSDEDA25

Working group to establish position statement on Al

CIBSE has launched an expert Artificial Intelligence working group to guide the institution's response to emerging AI technologies, policy and ethics.

The group includes experts from within and outside the building services sector, including engineers, architects, lawyers and Al start-ups.

Its first objective is to develop a CIBSE position statement, before creating a dedicated Special Interest Group on AI. This will be open to CIBSE Members and the wider building services community. Key areas to be explored include terminology, relevant policy and legislation, ethics and guidelines.

After the first meeting, CIBSE's software product manager, Ben Arnold, said: 'I'm genuinely excited by the breadth of knowledge and experience in the room. I'm confident this will help CIBSE, and the wider industry, navigate the evolving landscape of AI with confidence.'

Guide D authors to present new edition's highlights

The new edition of CIBSE Guide D: Transportation systems in buildings will be launched at a special event on 23 September.

The authors will provide an overview of the document, outlining its content and highlighting new material.

The guide, now in its seventh edition, is an internationally recognised reference for the design, installation and maintenance of lifts, escalators, and vertical movement systems.

Recognised across the industry, Guide D sets the benchmark for safe, efficient and future–ready building transportation.

The launch event will take place at Kettering Park Hotel, Kettering from 9am–4pm.

Register to attend, by

6 September, at: bit.ly/CJGD25



CIBSE creates Society of Vertical Transportation

New community replaces the Institution's Lift Group

The Society of Vertical Transportation (SoVT) will launch in September, following the release of the new edition of CIBSE Guide D: Transportation systems in buildings (see bottom left).

It will be a dedicated professional home for those involved in the design, operation and evolution of how people and goods move through buildings – across lifts, escalators and intelligent mobility systems.

For all involved in vertical transportation engineering – including consultants, manufacturers and maintenance specialists – SoVT will champion technical excellence, support collaboration and foster innovation across the sector.

The society will offer a route to professional recognition, with

structured membership options that reflect individual experience and qualifications. Eligible members will be able to use both CIBSE and SoVT post-nominals.

SoVT members will gain access to exclusive technical content, events, peer networks and the full breadth of resources on the CIBSE Knowledge Portal.

Membership is open to all – from students and apprentices to senior practitioners and fellows.

By bringing together professionals across disciplines, the society aims to raise the profile of vertical transportation and support the next generation of expertise.

Register interest at: bit.ly/CJSoVTL

New tools drive embodied carbon transparency

Precision Refrigeration has embedded CIBSE TM65 into its product development and sustainability strategy, using the methodology to quantify and reduce embodied carbon across its range of award-winning commercial refrigeration equipment.

Insights gained through CIBSE TM65 have shaped the company's internal practices, with embodied carbon now considered alongside cost and performance when selecting materials.

Importantly, it has become a shared

language across departments, for more transparent communication.

To further strengthen the credibility of its reporting, Precision Refrigeration uses CIBSE Certification's Embodied Carbon Verification scheme.
This formal validation of the CIBSE TM65 calculations reinforces trust and accuracy, and aligns the company's sustainability claims with industry expectations.

Read more at bit.ly/CIBSEECV

New Fellows, members and associates

Ahmed, Lubna

Dubai, United Arab Emirates

Chan, Chi Wai

Kowloon, Hong Kong

Dowson, Anna

London, United Kingdom

Finch, Paul

Ware, United Kingdom

Galliers, Shawn

Gloucester, United Kingdom

Hegarty, Karl Andrew

Hopkin, Charlie

Manchester, United Kingdom

Hui, Wan Ching

Tai Po, Hong Kong

Lo, Yu Hung

Luk, Chung Man

Kowloon, Hong Kong

Singh, Bishnujee

Lynnwood, United States

Walsh, Michael John

Crofton, United Kingdom

MEMBER

Abdelwahab, Mohamed

Doha, Qatar

Aderoba, Ife

London, United Kingdom

Afzal, Amir

High Wycombe, United Kingdom

Alsheikh, Osama

Barnet, United Kingdom

Anand, Janeet Singh Salmiva, Kuwait

Awed Saber Ibrahim, Mahmoud

Riyadh, Saudi Arabia

Baccus, Munawwar Wazim

Port Louis, Mauritius

Balasubramani, Arumugam

Dubai, United Arab Emirates

Burnell, Nathan

Wedmore, United Kingdom

Caldeira Renda, Pedro Miquel Loule, Portugal

Campbell, Neil David

Manchester, United Kingdom

Chan, Fu Kwok

Tai Po. Hong Kong

Chan, Hin Cheung

Sham Shui Po, Hong Kong

Chan, Ka Wing

New Territories, Hong Kong

Chan, Muk Yan

Wan Chai, Hong Kong

Chan, Wai Hou

Kowloon, Hong Kong

Chan, Wai Man

Tseung Kwan, Hong Kong

Chandavarkar, Rohan

Dubai, United Arab Emirates

Che, Lan Tak

Aberdeen, Hong Kong

Cheng, Ka Kit

Tsuen Wan, Hong Kong

Choi, Tak Shing

New Territories, Hong Kong

Chong, Kwok Chin

New Territories, Hong Kong

Chung, Chi Ho Joe Kowloon, Hong Kong

Coleman-Street, Ralph

Birmingham, United Kingdom

Cupido, Leo

Dubai, United Arab Emirates

Davy, lan

Dublin, Ireland

Etherington, Graham Charles

Leeds, United Kingdom

Fung, Wai Lap

Tuen Mun, Hong Kong

Furmanova, Anastasiia

Kilkenny, Ireland

Gartshore, Dale

Skve. Australia

Gavan, Kantee

Port Louis, Mauritius

Greco, Giacomo Amerigo

London, United Kingdom Greene, Racquel Alexandria

Nassau, Bahamas

Han, John

Douglaston, United States

Harris, Ryan

London, United Kingdom

Hemingway, Sam

Brisbane, Australia

Jivendrarasa, Shiyam Sathiyajith

Pontrypridd, United Kingdom

Kalyva, Eleni

Plymouth, United Kingdom

Kashimii, Mohammed Fazil

Abu Dhabi, United Arab Emirates

Kepinski, Lukasz

Glasgow, United Kingdom

ASSOCIATE

Abeysinghalage, Pradeep

Stouffville, Canada

Buchanan, Anna

Sheffield, United Kingdom

Collington, Amy

Cardiff, United Kingdom Correa, Florencia Pia

London, United Kingdom Crosby, Thomas

York, United Kingdom

Hartley, Daniel

Stockport, United Kingdom

Hignett, Katarzyna

Warwick, United Kingdom

Jackson, Thomas

Runcorn, United Kingdom

Kalanchiyalage, Sameera Lakmal Wickramathilaka

Dundee, United Kingdom

Legg, Owen Alan Thomas

Welwyn Garden City, United Kingdom

Lord, Joe

Solihull, United Kingdom

Marano, Salvatore Andrea

Bexleyheath, United Kingdom

Marvin, Tom

Leeds, United Kingdom

McGhee, Nathan

Flitwick, United Kingdom McPartland, Tom

Stanford-le-Hope, United Kingdom

Pople, Joe

Shirehampton, United Kingdom

Sharma, Mayank Popham, United Kingdom

Shearman, Henry

Devon, United Kingdom

Smart, Kieran

Edinburgh, United Kingdom Smith, Tom

Richmond, United Kingdom

Stenton, Samuel

Redditch, United Kingdom

Sumner, Joshua

Bristol, United Kingdom

Machen, United Kingdom

Tattersall, Harry

Townsend, Richard

Thompson, Jade Frances

Gateshead, United Kingdom

Tower, Philip Huddersfield, United Kingdom

London, United Kingdom

Bromsgrove, United Kingdom

Williams, Michael

Wakefield, United Kingdom

LICENTIATE

Ahmed, Faris

Leeds, United Kingdom

Ali, Zain

Sidcup, United Kingdom

Bagnoli, Isabel

Oxford, United Kingdom

Baker, Jonathan London, United Kingdom

Barke, Daniel

Gillingham, United Kingdom

Barrett, Rio

Leeds, United Kingdom

Bastow, Amy Leatherhead, United Kingdom

Bentham, Sam

Leatherhead, United Kingdom

Bleasdale, Amelia Horsforth, United Kingdom

Leeds, United Kingdom Briar, Jordan

Bristol, United Kingdom

Brookes, Millie Sutton Coldfield, United Kingdom

Burland, Olivia Romford, United Kingdom

Carter, Ethan

Leeds, United Kingdom Chan, Tsz-Fung

Basinastoke, United Kinadom Clarke, Samuel

Leatherhead, United Kingdom

Collins, Finlay

Manchester, United Kingdom

Birmingham, United Kingdom

Jamieson, Paul Salford, United Kingdom

Jones, Chloe

Redditch, United Kingdom

Osobe, Eddie Dartford, United Kingdom

Philip, Niamh

London, United Kingdom Richmond, Max Waltham Cross, United Kingdom

The perfect combination..... P-Sensor and the CMR Velogrid



Velocity Averaging Sensor



CMR are the inventors and manufacturers of both the P-Sensor and the Velogrid. The Velogrids are made to measure to fit any ductsize up to 3m x 3m and the P-Sensor has a keyboard to easily enter: duct height - width - density - magnification factor and the scaling in m/s - m3/s - m3/h - l/s. It can even work out the Air Change rate. And the BMS gets three linear volume signal outputs of 0..10V 4..20mA and an addressable Modbus rtu bus.

22 Repton Court Repton Close CMR CONTROLS Ltd Basildon Essex SS13 1LN www.cmr-controls.com

Tel +44 (0) 1268 287222 Fax +44 (0) 1268 287099



cibse Journal 13 www.cibseiournal.com

CIBSE launches five-year plan to lead global change

Strategy will see growth and technical excellence in all regions, ensuring the profession is 'fit for the future'

IBSE has unveiled a fiveyear strategy that aims to empower its members to deliver outstanding outcomes for society and the planet.

CIBSE's ambition is to grow and raise the profile of its global membership while promoting the highest standards of professionalism. The strategy aims to harness members' expertise to drive collaboration and shape policy, said the institution.

CIBSE CEO Ruth Carter said: 'We are entering the most progressive and important chapter in our history. Our strategy defines our direction in leading change, setting global standards and empowering our members to deliver world-class, sustainable and future-ready buildinas.'

Lifelong learning is a key part of the strategy, according to CIBSE, which will provide training on decarbonisation, regenerative and regenerative design, focusing on the future health and resilience of buildings.

The CIBSE 2025–2030 strategy has four themes: supporting the global community; championing the profession; delivering outstanding technical professionalism; and engineering the future (see panel).

Carter said: 'The strategy sets out clear, measurable targets to strengthen our existing global network, ensuring members have the tools, connections and influence they need to succeed.'

CIBSE Membership has reached a record high — with more than 23,000 professionals across 95 countries, making it the fastest–growing professional engineering institution in the past six years. Every day on average, 1.3 event activities such as CPDs, training sessions, and seminars are held by CIBSE Groups, Regions and Societies somewhere in the world.

Carter explained: 'Our vision is to be the most progressive, dynamic and trusted voice in building services, championing excellence in delivering net zero, safety, health and wellbeing, and building performance.'

CIBSE has published a number of technical guides over the past 12 months including important new guidance on embodied carbon.

TM65 was developed for the UK market but, because of international interest, it has now been adapted for Australia and New Zealand, North America and now UAE/MENA.

Carter said: 'Global recognition of CIBSE's knowledge is evidence of our technical expertise and international adaptation of the model will ensure that wherever our members work, they



have access to trusted, regionally appropriate knowledge.

'The strategy defines more than growth – it's about shaping the future of our industry and the world it serves.'

In 2024, CIBSE accredited 28 academic programmes, nine universities in the UK and one in China, and approved seven training and development schemes, assessed 376 apprentices and delivered CPD to more than 2,700 learners worldwide.

Carter said: 'Our strategy sets a clear commitment to continue to grow and support lifelong learning.'

She said CIBSE had taken a huge leap forward with its move to Farringdon at the end of 2024.

'Our vision is to create a world-class Skills Centre for CIBSE Members and the wider built environment community in the heart of London.' Opening its doors in early 2026, the Skills Centre will be a centre for innovation, collaboration and learning for CIBSE's 'global built environment community'. Carter added: 'We are seeking supporters to help bring this vision to life. This is a once-in-a-generation opportunity to be part of something transformative, not just for CIBSE, but the entire industry.'

To support the campaign, contact Robert Astick at **rastick@cibse.org.**

To read the CIBSE Strategy visit: www.cibse.org/strategy

CIBSE Strategy 2025-30

Supporting the global community

Foster a global community, creating opportunities and promoting the highest standards of professionalism. CIBSE aims to grow its membership and continue to elevate the profile of members and the profession globally.

Championing the profession

Continue to shape policy, drive collaboration and shape the future of the built environment. Elevating the reputation of members and their impact.

Delivering outstanding technical professionalism

Support lifelong competence and learning, embed circular economy principles, lead on decarbonisation and regenerative design.

Engineering the future

Provide technical knowledge that embeds health, wellbeing and resilience in buildings, while leading on technical requirements, standards and training.



ENTRIES OPEN

The CIBSE Building Performance Awards are back for their 20th year with over 20 categories to recognise and celebrate engineering excellence in the built environment.

These awards, reward the people, products and projects that demonstrate engineering excellence in the built environment.

Entries close: 5 September 2025



@CIBSEAwards
#BPA2026

Sponsors













A global challenge

International best practice can inform UK policy, technology and design for more sustainable, equitable and resilient heating and cooling systems, says CIBSE's **Anastasia Mylona**

The CIBSE decarbonisation event this summer highlighted the challenges and opportunities in decarbonising our heating and cooling demand. This is not just the case in the UK – countries around the world are on a similar trajectory – so there is a great opportunity to learn from each other in research, policy and technology.

Heating and cooling account for a significant portion of global energy consumption and carbon emissions. In the UK, space heating alone is responsible for more than 30% of total energy use and around 17% of national greenhouse gas emissions.

As the country strives to meet its 2050 net zero target, decarbonising heating and cooling systems is an urgent and complex challenge.

Around the world, countries are deploying innovative approaches tailored to their climates, energy infrastructures and policy contexts.

Learning from these international efforts can help the UK refine its own strategies and avoid costly mistakes or long-lasting, unintended consequences.

The UK landscape

Heating: navigating transition

The UK's heating infrastructure is dominated by natural gas, with around 85% of homes connected to the gas grid. Decarbonising such an established infrastructure is no small task. The government's Heat and Buildings Strategy, published in 2021, sets out plans to support heat pumps, hydrogen trials and heat networks. Yet progress remains incremental, with high upfront costs, skills shortages and public uncertainty.

Heat pumps are positioned as a cornerstone of domestic decarbonisation, particularly in off–Grid areas, but deployment lags far behind targets. According to the Microgeneration Certification Scheme,



"Progress remains incremental, with high upfront costs, skills shortages and public uncertainty"

fewer than 200,000 heat pumps were installed in the UK in 2023, well short of the government's aim of 600,000 per year by 2028.

Meanwhile, heat networks are being expanded and modernised, with a focus on low carbon heat sources such as geothermal, waste heat and largescale heat pumps. The Green Heat Network Fund and zoning regulations promise to accelerate deployment, but questions remain around scalability, consumer protections and integration with existing buildings.

Cooling: a growing concern

Historically, cooling demand in the UK has been low. However, with the increasing frequency of heatwaves and a warming climate, demand is rising fast, particularly in commercial and healthcare sectors. Air conditioning use is set to triple by 2050 globally, with the UK already seeing a sharp rise in installations.

Passive cooling strategies, building fabric improvements and district cooling systems must form a core part of the UK response. Retrofitting existing buildings with passive design features, such as shading and ceiling fans, can reduce reliance on mechanical cooling and improve resilience during extreme weather events.

Learning from the rest of the world

Other countries provide valuable case studies. In Scandinavian nations such as Sweden and Denmark, district heating powered by biomass, waste heat and renewable electricity is mainstream. Nearly 65% of Danish households are connected to highly efficient district heating systems, increasingly powered by surplus wind energy. Denmark's approach to heat network regulation and public ownership has ensured longterm planning, affordability and consumer trust.

Germany has taken a different approach, offering generous incentives for heat pump installation, with mandated use in new buildings from 2024. A strong focus on training and standards supports the development of a skilled workforce capable of delivering high-quality installations.

In Asian countries such as Japan and South Korea, heat pump technologies experiment with CO₂ refrigerants to improve environmental impact, while large–scale district cooling is integrated into urban developments, highlighting the potential for district–level solutions in dense urban environments.

Developing countries, too, offer insights, particularly in integrating passive design and low-tech cooling. In India, the national Cooling Action Plan encourages thermal comfort through vernacular architecture and low-energy building design. These

approaches remind us that decarbonisation does not always depend on high-tech or mechanical solutions to be effective.

Policy, technology and behaviour: an integrated approach

Globally, one clear message emerges. No single technology or policy will decarbonise heating and cooling on its own. Success depends on a systems-level approach that integrates supply, demand, policy, technology and user behaviour.

For the UK, this means continuing to invest in diverse heating and cooling technologies, while addressing demand through building retrofit and energy efficiency. It also means fostering the skills, standards and occupant engagement needed to build knowledge, trust and ensure uptake.

Policymakers must also address the unique challenges of the UK's building stock. The prevalence of older, poorly insulated homes presents a barrier to electrification. Mass retrofit programmes, particularly for insulation and ventilation, are essential. Standards, such as Energy Peformance Certificates and the Minimum Energy Efficiency Standard, can help drive improvements, but support for lowincome households will be critical to ensure equity.

CIBSE leadership in a global context

CIBSE Members will play a crucial role in this transition. From design to commissioning and post-occupancy evaluation, engineers must bring a deep understanding of technology and human behaviour.

They must be continuous global learners. International collaboration, through organisations such as the International Code Council, Rehva, ASHRAE and CIBSE's own non-UK chapters, offer a rich forum for knowledge exchange.

By embedding these lessons into local policy, design and delivery, we can accelerate the decarbonisation of heating and cooling in a way that is effective, equitable and resilient.

Dr Anastasia Mylona,
 CIBSE technical director

The benefits of smaller, smarter VRF



The footprint of Mitsubishi Electric's new City Multi R32 VRF YXM is 6% smaller than market average thanks to new patented technology, says Mitsubishi Electric's Graham Temple

he new City Multi R32 VRF YXM is our most versatile variable refrigerant flow system yet, packed with enhanced features and unique advanced technology to offer complete flexibility in design, installation and operation.

City Multi has long led the market with its patented twopipe design that reduces brazing points and saves riser space with minimal height and length restrictions.

Now, the addition of a new patented vertical flat-tube heat exchanger improves efficiency and saves space while delivering better heat transfer and less whole life carbon.

The modular chassis has been completely redesigned to offer a footprint 6% smaller than the market average, to reduce embodied carbon emissions, yet still offer all the familiar benefits of a VRF system with true plug-and-play simplicity. New patented defrost technology increases the efficiency of the defrosting process to maximise heating performance during colder weather.

Available to specify now and to install from spring 2026, it offers system capacities from 12kW to 113kW in heat pump and heat recovery options.

The new three-sided heat exchanger delivers easy service access for maintenance, reducing downtime, and the new outdoor unit fan design optimises airflow for better system performance, energy efficiency and improved noise levels. A range of indoor units and advanced controls boosts efficiency, lowers operational costs, and reduces carbon emissions.

With R32 becoming the refrigerant of choice, the compact chassis also meets EN378 part 3 standards for the installation of safety measures, ensuring reliability and compliance with industry regulations.

The primary reason for moving to R32 refrigerant is its significantly lower global warming potential (GWP) compared with traditional refrigerants like R410A. This shift aligns with global efforts to reduce greenhouse gas emissions and mitigate climate change. Additionally, R32 offers higher efficiency, requires less refrigerant volume per kilowatt and is easier to reuse and recycle.

If you would like to know more about the new City Multi R32 VRF YXM range, register for updates at **bit.ly/CJMitCM25**

 Graham Temple is marketing manager at Mitsubishi Electric



Section of the CIRST Young Engineers Awards (VEAs) have

he CIBSE Young Engineers Awards (YEAs) have been shining a light on emerging building services talent for 30 years. To mark the anniversary, CIBSE Global YEN is unveiling its 30 under 30 for 2025. This showcases the best and brightest young engineers,

and goes beyond the scope of the YEAs to include those beyond graduate, undergraduate and apprentice level.

30 Under 30 recognises the breadth of talent in the sector with five categories: Emerging leader; Sustainability champion; Ambassador; Innovator; and Wildcard.

Headline sponsor: Harvey Group



Lewis
Turner
Arup

→
Simran
Chaggar
FairHeat







Innovators

This category highlights the sectors' true innovators. Our chosen five demonstrated creative use of new technologies and digital tools, development of bespoke digital solutions, innovation in construction processes, breakthroughs in product design, and fresh approaches to the design process.

Sponsored by Grundfos



Presidential theme: Ambassadors

'Paying it forward' is the key theme championed by CIBSE's President, Vince Arnold, and the nine young engineers selected in the Ambassadors category have already answered his call for engineers to 'inspire, mentor and lead' the next generation. Their submissions showcased a commitment to Stem engagement, support for educational programmes, community contributions, active involvement in industry groups, and more.

Sponsored by Ideal Heating



†
Sundara
Gurushev
Madaster

→
Yusra
Oosman
Manipal
University
Dubai



† Rida Wynne Mott MacDonald



←
Panumart Booncharoensombut
XCO2





→ Priyankadevi MurugappanWSP



Emerging leaders

Leadership can take many forms, from projects, to people, to mentorship and much more. In this category, we recognise the future leaders of building services and those already leading at an early stage of their career.

Sponsored by Harvey Group



Samuel Walker **OBS Lighting** Consultants



← Jill Leung



Jennifer Cox Cundall

← Tsz Kai Lam **Swire Properties**





Alexandro Justin Waterman Building Services









† Zhengguang Liu University of Manchester

Sustainability champions

This category celebrates individuals and organisations driving the sustainability agenda in building services whether by delivering meaningful change on projects or in organisations, shaping technical guidance, or championing the principles of sustainable design.

Sponsored by Albion Valves





← Aashika Shibu Etude

Wildcards

This category honours those making a standout contribution to engineering in ways not covered by our other awards. Open to industry professionals and those outside the sector, it recognises impact in its broadest sense.

Sponsored by CIBSE Patrons



← Athiya Junaid WSP

↓ Tom Bull Aecom



↓
Patrycja
Sędor
Bring Energy





†
Henry
Htun
Uptown
International
School



†
Sophie
Sibley
Synergie
Environ

For details of all the 30 under 30, visit bit.ly/CIBSE30under30

Celebrating the future

By Max McCone, global chair, CIBSE Young Engineers Network (YEN)

New initiatives such as this don't happen without an incredible amount of hard work and support. CIBSE Global YEN would like to thank head judges Vince Arnold, Clare Wildfire, Ewen Rose, Jonnie Clarke and Simon Carpenter, as well as guest judges, including IT & Controls group chair Jon Belfield and WiBSE chair Jessica Glynn. Thanks also to the 20 incredible

category judges from across our 17 YEN regions, and to Josh Emerson, chair of CIBSE Patrons, for his support and for coming up with the idea of the 30 under 30 initiative.

The application process was designed to showcase the diverse talents and aspirations within building services engineering. Applicants responded to a series of written

questions, allowing them to showcase their achievements and contributions, and then submitted a video on the role they would play in shaping the future of building services.

This outstanding, diverse talent was on full display throughout this process, and I can confidently say that those chosen are ones to watch.

Congratulations to all our winners!



Net zero's mission possible?

Max Fordham has been testing the pilot version of the Net Zero Carbon Buildings Standard to see if its projects would hit the carbon limits. The firm's **Henry Pelly** reveals which building types are providing the most difficult challenges

he UK Net Zero Carbon Buildings
Standard (UK-NZCBS) is one of the
most important initiatives the UK built
environment sector has produced
in years. It has been developed to answer the
question: what does it mean for a building to be
aligned with a net zero carbon world?

For years, net zero carbon has been used inconsistently, with little alignment between claims and outcomes. In 2019, the UK Green Building Council (UKGBC) started developing an agreed industry definition with its Net Zero Carbon (NZC) framework. However, the UK-NZCBS – which was partially built on the work of the NZC framework – is a more comprehensive standard, with greater detail and definitive limits.

What is the UK-NZCBS?

It is a standard that provides the industry with a consistent approach to assessing whether a building can be defined as net zero carbon.

Adopting the standard means that a building is aligned with a net zero carbon future. It takes into account operational and embodied carbon, with measurable limits and requirements, and those targets become more ambitious over time, in line with the UK's carbon budgets.

As the focus is on alignment, offsetting is not required. Crucially, verification of net zero carbon

performance will only be for buildings that are built and in operation – so claims can only be made by projects that have delivered against the standard in practice.

The UK-NZCBS has been developed by key industry bodies, including RIBA, LETI, CIBSE, RICS and the UKGBC, and there has been input from hundreds of industry professionals, who have formed task and sector groups to review the detailed requirements. Overall, it has been a great example of industry collaboration.

The standard is in its pilot stage, with real projects being tested against it. Version 1 will be published at the end of this stage, at which point buildings can be submitted for formal verification.

The pilot sets the following requirements:

- No fossil fuels in the project (with some exceptions for life-safety backup systems)
- Appropriate energy use intensity (EUI) limits (to building type and new/retrofit projects)
- Appropriate upfront carbon limits (to building type and new/retrofit projects)
- Minimum PV generation requirement
- Maximum allowable refrigerant global warming potential (GWP).

Additionally, it requires that projects report on:

- Peak energy demand
- Whole life carbon (WLC).

22 cibse Journal www.cibsejournal.com

All the limits are set by the year in which the project starts on site. The limits for 2025–26 align with current best practice and become gradually harder to achieve.

Inevitably, there is push-back on some elements of the standard, focusing on three broad areas: retrofit has lower upfront carbon targets than new builds; there is no overall WLC limit; and some of the limits are unfeasible in practice. It is worth exploring these points, but none of them challenges the overall picture of a standard that is an excellent framework for delivering net zero carbon-aligned buildings.

The UK-NZCBS is aiming for a standard that is technically rigorous and operationally workable, which is hard, and the right trade-offs have been made between both factors.

Retrofit versus new build

The suggestion that more onerous retrofit limits will make demolition more attractive does not stand up to scrutiny. Our experience shows that the gap in upfront emissions between retrofit projects and new-build ones is very wide. So while the absolute limits for retrofit are lower, they are much more achievable than for most new-builds.

Moreover, where substantial extensions or rebuilds form part of a retrofit scheme, these elements are rightly assessed against new-build limits. The structure rewards true retrofit, not superficial reworking.

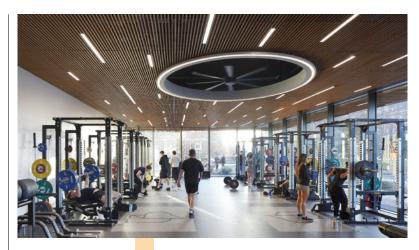
Taking this approach is supported by data collected in the development of the UK-NZCBS and from the Greater London Authority's analysis during the M&S Oxford Street inquiry. Having separate retrofit and new-build targets works well – it incentivises retrofit while still capping the upfront carbon to encourage sustainable practices from project teams.

Calls for instituting an absolute WLC limit for projects sound reasonable, especially as this metric encompasses the total impact of a building over its lifetime, but it will be hard to make workable in practice.

Upfront embodied carbon and energy use are measurable and verifiable now, and the data on which they are based is reliable. By contrast, WLC targets can only be set by using much more uncertain assumptions about material lifespans, future electricity and material manufacture decarbonisation, and end-of-life scenarios.

We are limited by what is knowable about a building over its lifetime. While there are no limits on WLC, the standard does require reporting against the metric, and the intention is to introduce WLC limits in future.

However, by setting limits on upfront carbon, energy use, refrigerant GWP and minimum PV generation, and by banning fossil fuels, almost



Ravelin Sports Centre, University of Portsmouth

Operational performance: 100–128kWh·m⁻² per year
Meets 2028 NZCBS target (~10% of typical UK sports centre)
Limit for UK sports centre (2028 new build):
174kWh·m⁻² per year

Features

- Compact form factor
- Extensive daylighting
- Mixed-mode ventilation and heat recovery from cooling, ventilation, waste pool water
- Leanly sized air source heat pumps
- PV array to meet 20% building energy demand
- Soft Landings throughout



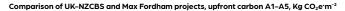
Cranmer Road, King's College

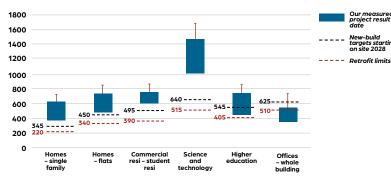
Operational performance: 71kWh.m⁻² per year Meets NZCBS target. Limits for commercial residential: (2025 new build) 75kWh·m⁻² per year (2028 new build) 70kWh·m⁻² per year

Summary

- Passivhaus
- CLT panels and slab structure
- Glazing sized for daylight no more
- Approx 200 to 300mm of EPS or XPS insulation
- Airtightness < 0.6 ach/hr at 50Pa</p>
- Triple-glazed windowsMVHR
- Low-energy lighting
- Direct electric radiators, direct electric POU hot water
- Water-efficient showers

Upfront NZCBS targets vs Max Fordham measured projects





all aspects over which the design team has influence in regard to WLC emissions of a building are addressed.

Limits need to reflect reality

Some limits set by the pilot standard will be challenging. Max Fordham is involved with some of the most environmentally ambitious projects in the UK and has an experienced WLC modelling team. However, none of our completed new-build residential projects (single family, flats or student resi) meets the upfront carbon limits set by the UK-NZCBS. This includes timber-frame dwellings.

Only one of the new-build offices we have worked on, a predominantly cross-laminated timber (CLT) building, has achieved the office new-build limits. However, we are working on several deep-retrofit and extension projects that comfortably meet the retrofit targets.

EUI targets are often the biggest retrofit challenge, and we feel more calibration of the targets is needed. The limits for new-build schools are more stringent than any of our projects have achieved. This includes a recent all-electric Passivhaus primary school. The residential EUI limits are similarly challenging and don't align

with real UK residential energy use data.

Max's House, for example, does not meet the standard even though it is a Passivhaus-verified net zero carbon home with incredibly low space-heating design (see details in this story at www.cibsejournal.com).

Nigel Banks, Octopus Energy's technical director for zero bills homes, has highlighted that the average unregulated energy use in UK homes is 35kWh·m⁻² per year, which means that – even with Passivhaus–aligned heating and hot-water demand – the probable use in homes will be 50Wh·m⁻² per year. The UK-NZCBS target is just 45Wh·m⁻² per year for single family housing and 40Wh·m⁻² per year for flats.

On the other hand, we think that the sports building energy limits aren't tough enough. The University of Portsmouth's Ravelin Sports Centre, on which we worked, has an actual energy use that would meet the limits right up until 2050.

A massive step forward

The standard is an excellent platform for the industry to address its climate impacts, setting clear limits for the big issues. There is work to do to refine and adjust specific criteria and limits, and we expect this to be the outcome of the pilot.

What we have already is a standard that sets a clear direction, is rooted in evidence, and has requirements to measure projects against.

While formal verification of a project will not be possible until Version 1 appears, I would encourage teams to assess performance against the standard. Doing so will help them understand where they will need to improve to ensure projects are compatible with a net zero future.

Read Max Fordham's Beyond Net Zero white paper at bit.ly/CJBNZMF25

 Henry Pelly is a sustainability consultant at Max Fordham



0118 9821 555



Meet us at the Annual South West SoPHE Networking Evening. Manufacturers Presentation Tables: Free Food and Drink: Entertainment - www.jung-pumps.co.uk for full details.



24 cibse Journal www.cibsejournal.com



REGISTER NOW FOR OUR FREE WEBINAR

Low-Carbon HVAC: Strategies for net-zero compliance

16 September 10:00 (BST)

To register scan the QR code or visit: bit.ly/CIBSEDAIKIN



SCAN ME





We design, you install!

Products and technical support for contractors

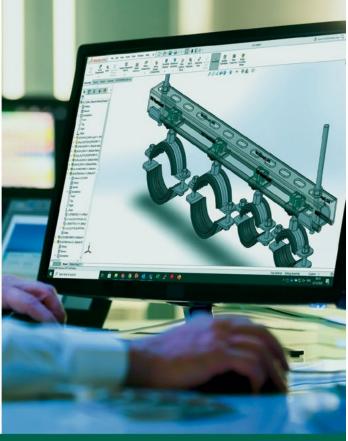
As an M&E fixing specialist we can help you deliver high quality, effective and efficient installations.

Our Projects and Technical Support Team provide product advice, on site support and designs for pipe supports, HVAC supports, rooftop installations and more.

We offer solutions for problems such as fixing to pitched roofs or surfaces, non-standard pipe sizes, corrosive environments and heavy duty installations.



Find out how we can support you!



walraven.com

walraven



college project in Niamey, Niger, has demonstrated how it is possible to create comfortable spaces using passive services design in the most extreme climate conditions.

Niger is a country of arid deserts, nomadic populations and little centralised infrastructure, where daily temperatures can climb to 45°C.

Max Fordham and architectural charity
Article 25 worked on the refurbishment of
Collège Amadou Hampaté Bâ, combining a
passive ventilation design with the high thermal
mass of the local laterite stone to achieve
internal temperatures up to 8K cooler than
external air temperatures on the hottest days.

The project team also minimised reliance on local infrastructure by using a solar-powered pump to access well water and incorporating an independent drainage and sanitation system with latrines that is emptied every six years.

The works completed at the 1,200-student school include the refurbishment of existing classrooms, water and electrical services

Project team Client: Collège Amadou

Hampaté Bâ

MEP: Max Fordham

Architect: Article 25

upgrades, two additional classroom blocks (totalling eight classrooms), new administrative facilities and sanitary latrine blocks.

The design was influenced by another Article 25 school with passive ventilation built in Burkina Faso and designed by architect Francis Kéré.

Designing for extreme climates

Ventilation was at the core of the classroom design, and the team had to address multiple environmental challenges including soaring heat, dust storms and erratic electricity supplies.

'Wherever we can, we try to push the envelope in terms of environmental performance, with a focus on local material and passive design,' says Toby Pear, senior architect at Article 25.

Pear says the dusty environment meant mechanical ventilation was not an option because of the ongoing maintenance that would be required. It also meant less reliance on an unreliable electricity system, says Lidia Guerra, senior engineer and partner at Max Fordham. 'We also didn't want to implement a system that would increase costs for the school,' she says.

Max Fordham's passive design strategy includes the use of cross-ventilation, thermal mass and a distinctive steel fly roof, which extends over the top of classroom ceilings made of laterite bricks. 'Buildings are orientated to catch prevailing north-south winds. The roof is angled to create a cavity of varying size above the classroom ceiling, increasing wind speed and removing heat. This overhangs on either side to shade the walls, preventing direct solar gain,' explains Guerra.

Creating opportunities for women

A core goal of the project was to provide vocational training, especially for young women, a group largely excluded from the construction process in the region.

With encouragement from the contractor, a cohort of recent female graduates from the school shadowed the construction team, gaining skills and confidence.

While a broader vision of female–led contracting was curtailed by the Covid pandemic, the project planted vital seeds for change.'At first the idea was laughed off, but by the end, it was a real success,' says Toby Pear.

26 cibse Journal www.cibsejournal.com



The benefits of using laterite

Laterite bricks are cut from iron– and aluminium–rich soil common in tropical regions; soft when quarried, they harden on exposure, providing a durable, low–cost and thermally stable building material.

Laterite is a hugely underused resource in Niger, according to Pear. 'The default is to use imported cement for blocks, but this has high embodied carbon.

'We wanted to use this project as an example that shows how it can be beautiful, cheap and perform well,' he says.

Each laterite block was cut by hand, then left to dry and harden in the sun for at least a month. A contractor from a neighbouring country ensured quality and trained local masons for the project, laying the foundation for future laterite–based building in the region (see panel 'Opportunities for local women').

'Louvres are included that can be opened or closed to improve ventilation and block sunlight and protect students from dust,' she adds. There are also ceiling fans in several of the classrooms to increase airflow.

Walls are constructed from laterite stone, a red-orange dense material that offers excellent thermal mass, slowing the release of heat into internal spaces during the day and helping to moderate indoor temperatures. Pear is keen to see more use of the stone in local buildings (see panel 'The benefits of using laterite stone').

Guerra says it's important not to over-rely on design principles used in temperate climates. In the UK, she says uncontrolled air leakage is a problem but in Niger, natural air movement can be a benefit. Laterite adds to this by allowing moisture to diffuse through the walls, helping regulate conditions indoors.

Lighting strategies were adapted, too. Rather than aiming for the high daylight factors The exposed laterite brick ceiling in a classroom

3D section view of the library showing the double roof



common in UK schools, the goal in Niger was to have smaller openings to maintain cooler indoor temperatures. A daylight factor range of 1–1.5 was targeted, lower than UK norms.

Pear emphasises the importance of community buy-in. 'If you don't have it, projects like this fail. We made sure proposals were co-developed with students and staff so they want to learn in those spaces.'

Guerra says she had to think differently about how things would be installed, and how people will use them. 'You don't always have to go for the solution with all the bells and whistles – consider the end user and find that balance.'

'You can't assume standard practice will work. Every detail matters,' agrees Pear. 'It's not just about the most technical solution.'

The results

Temperature sensors inside the classrooms monitor performance. Compared with older classrooms that lack a fly roof, the new structures demonstrated a significantly better thermal profile. 'Feedback was overwhelmingly positive. It's still hot, but bearable,' says Pear.

The comfortable environment was most notable later in the day, when students would return to do homework as it was cooler than home, proving the design would be well suited to continuously inhabited buildings such as hospitals or homes, says Pear.

The potential of the design for similarly extreme environments across Africa and the rest of the world was recognised when the project became the first NGO project to win a RIBA International Award for Excellence.

Al in the NHS: where every second counts

During the Covid crisis, Dr Carl-Magnus von Behr saw NHS facilities staff wasting precious time hunting through piles of guidance and compliance paperwork. His Al innovation promises faster, smarter access to information across all sectors

uilding services professionals operate under significant and increasing pressure. The drive towards net zero, more frequent extreme weather events and fast-evolving building safety regulations all demand new approaches to the design, management and operation of complex buildings.

Engineers and facilities teams are often expected to navigate multiple overlapping regulatory systems, manage detailed compliance documentation and interpret sector-specific guidance - all while responding to operational issues and delivering on sustainability goals. Accessing the right technical information at the right time is becoming a critical challenge.

This article, based on a presention at the CIBSE Technical Symposium in April, explores how an Al-driven platform is helping address critical information challenges in a particularly complex sector – NHS healthcare facilities.

While volunteering at a major hospital during the Covid-19 pandemic, I saw the amount of time wasted by frontline staff having to work through reams of paper documentation and drawings when trying to access vital facilities information. (See Figure 1 and the panel, 'On the frontline battling Covid and paperwork'.)

Overcoming AI limitations

Since the emergence of tools such as ChatGPT in late 2022, interest has grown in the potential of large language models (LLMs) to support technical work. These tools use natural language processing to answer questions, summarise documents and generate new text, and offer an alternative to traditional keyword searches or manual document trawls.

For engineers and facilities staff facing information overload, the attraction is clear. LLMs can answer queries in seconds - offering a starting point for further review or decision-making.

Generic AI tools also present challenges, however. Most do not have access to the latest technical standards or guidance; they often struggle with domain-specific terminology and acronyms; and they are prone to 'hallucinations' - confidently delivering incorrect or misleading information. In a safety-critical context, that level of risk is unacceptable.

For AI to become genuinely useful in building services, three key requirements must be met:

- Access to trusted guidance
- Sector-specific language understanding
- Integration with real workflows.

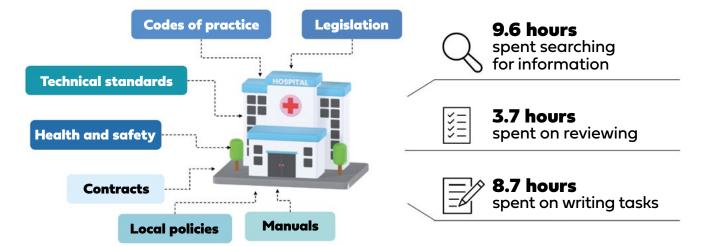


Figure 1: Weekly time allocation by NHS Estates and Facilities Management staff for information search, document review and writing tasks, illustrating the significant administrative burden impacting innovation and collaboration (324 staff)

To address these challenges, we developed a specialist Al platform, Innex, designed specifically for compliance-intensive environments such as healthcare estates.

Built around verified UK legislation and guidance, and designed in consultation with estates professionals, the system provides fast, natural-language search, writing support and document-review functions - all underpinned by verifiable sources and tuned to reflect the structure, terminology and workflows common in estates and facilities operations.

After successful pilots at Cambridge University Hospitals NHS Foundation Trust in 2024, the platform has been adopted by several NHS trusts. Staff use it to locate relevant internal policies and national standards, generate or review compliance documentation, and check draft material against current requirements.

It has proven particularly valuable for junior staff and neurodiverse professionals, supporting confidence with written tasks and enabling more consistent documentation outputs. One example is how the Al tool shows a broad view of how a ventilation policy can be assessed against relevant guidance (see screenshot on web version of this story at www.cibsejournal.com).

Applications beyond healthcare

Although initially developed for NHS estates, the platform has broader potential across the built environment. Many other sectors - such as higher education, commercial real estate and transport infrastructure - face similar documentation and compliance burdens.

The introduction of the Building Safety Act and the Building Safety Regulator are already generating new expectations for digital recordkeeping, resident engagement and accountable duty-holders in the residential sector.

Beyond day-to-day support, the tool also enables data-led insights. Analysing thousands of anonymous user queries reveals areas where guidance may be unclear or frequently misinterpreted, creating opportunities for institutions and regulators to improve clarity and consistency.

Al-assisted platforms can create feedback loops to improve guidance and standards. There is also scope to support cross-sector learning. For example, ventilation strategies proven in hospitals may also benefit schools.

Supporting professionals

Al will not replace professional judgement, but when developed responsibly, using trusted data, and designed for real workflows, it can support better decisions, faster compliance checking and reduced administrative overheads. The building

"Most AI tools do not have access to the latest technical standards"

services sector is not short of regulation - but it is short of time. Al, used wisely, can help restore that balance.

To read the paper and presentation slides, visit bit.ly/CJTSCVB25 Details of the 2026 CIBSE Technical Symposium can be found by visiting www.cibse.org/symposium

Dr Carl-Magnus von Behr is co-founder at Innex

On the frontline, battling Covid and paperwork

During the early stages of the Covid-19 pandemic, I volunteered at Addenbrooke's Hospital, Cambridge. Estates and facilities teams were working under intense pressure, adapting hospital spaces and services to meet unprecedented clinical demands.

I saw first-hand the difficulty of working from decades-old drawings and scattered paper documentation – especially when trying to locate live infrastructure details for critical systems such as oxygen supply lines delivering up to 60 litres per minute to Covid wards.

This experience informed my subsequent PhD research at the University of Cambridge, focused on how NHS Estates and Facilities Management (EFM) teams access and share technical knowledge. A survey of 324 NHS EFM professionals found that they spend more than nine hours a week simply searching for information (as illustrated in Figure 1). A further 12.4 hours are spent writing or reviewing policies, specifications and reports. That leaves just 16 hours per week – less than half a standard working week - for activities such as planning, innovation or project delivery.

While my research focused on healthcare, the same issues are present across the building services sector. The information that professionals need is often fragmented across file systems, organisational silos, proprietary standards, and ever-expanding regulations.

cibse Journal 29 www.cibsejournal.com

elemental

19-20 November 25 **Excel London**

Secure your free ticket to elementalLONDON!



Sponsored by









Supported by







































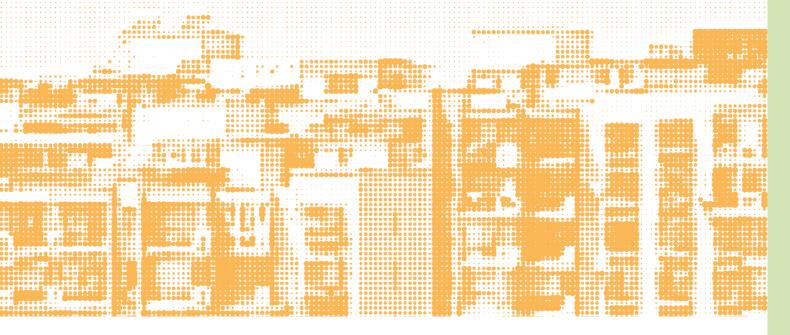






Pushing the cooling limit

The limits of passive cooling, healthy learning environments and mitigating overheating were the core subjects of a topical summer event hosted by the CIBSE Natural Ventilation Group in July. Chair **Chris Iddon** reports



oming a day after the UK experienced one of its hottest days of this year, in July, CIBSE's seminar on the challenges and limitations of passive strategies for mitigating overheating in heatwaves could not have been more topical

Organised by the CIBSE Natural Ventilation Group, the event explored how buildings can – and must – respond more intelligently to rising summer temperatures (as shown in CIBSE's new Weather Data).

Among the early critiques raised was the spatial efficiency of natural ventilation in dense urban housing. Designing for cross-ventilation in apartment blocks can compromise layout efficiency, resulting in less usable accommodation space for the same building footprint.

If comfort cooling can be delivered in a sustainable, low carbon way, it raises the question: should we rethink space-planning assumptions to prioritise resilience and comfort? This idea led naturally to a broader provocation — what, ultimately, is the purpose of buildings? When it comes to schools, for example, are we designing

purely for regulatory compliance or for optimal cognitive development and long-term outcomes?

Climate for learning

Dr Duncan Grassie, environmental public health scientist at the UK Health Security Agency, addressed this point in his presentation on the impact of indoor thermal conditions on health and cognition in schools.

Reviewing recent literature, he shared compelling evidence that high classroom temperatures impair alertness and working memory, while low temperatures reduce executive function and increase fatigue.

One notable study found a 20% improvement in performance on psychological tests when classroom temperatures were lowered from 30°C to 20°C, with optimal learning conditions observed at or below 22°C.

While the short-term cognitive impacts are well documented, Dr Grassie acknowledged that the long-term consequences remain uncertain. The risk is clear, however: if children are regularly exposed to poor thermal environments during school hours, this may lead to cumulative deficits

in concentration, comprehension and academic performance. In aggregate, these effects could reduce national educational attainment levels, with downstream impacts on workforce productivity and economic output.

No specific quantification of 'lost learning days' or cost was presented, but the takeaway was unambiguous: overheating in schools is not simply a matter of comfort – it's a barrier to learning that must be addressed through better passive design, effective ventilation strategies, and greater thermal resilience. It is also something that will only increase as the climate continues to warm.

Cooling smarter, not harder

Dr Owen Connick, director of AdvanTEC EMEA at Carrier, offered a compelling vision of how we might remain cool and comfortable in the face of intensifying heatwaves without exacerbating our energy and carbon challenges.

He opened by taking the audience on an imaginative journey to 2050, where homes are cooled using solarassisted air conditioning (AC) integrated with local battery energy storage. These systems are designed to synchronise

Cooling futures

Speakers focused on the impact of poor thermal conditions in classrooms (Grassie), air conditioning in warming climates (Connick) and carbon tradeoffs in adapting façades (Prusicka).

cooling demand with available solar supply, enabling smarter and more flexible responses to Grid conditions.

Shifting to the present, Connick highlighted the rising global dependence on air conditioning. Using case studies from Texas, USA, and India, he illustrated how external temperature increases drive sharp spikes in electricity use. Yet, as he pointed out, there are already periods – such as those revealed by dynamic-pricing platforms such as Octopus Agile – when electricity is abundant and extremely cheap. This raises an intriguing possibility: can these low-cost periods be better exploited to provide affordable, demand-responsive cooling?

Connick also drew attention to the inefficiency of many AC systems currently in use. Energy performance, he explained, is often poorest in the most commonly purchased models, with little correlation between cost and efficiency. This disconnect suggests a strong case for regulation. He proposed that legislation could be introduced to ensure only the most efficient units are available on the market, reducing long-term demand and making better use of clean energy when it's available.

However, he was clear that mechanical solutions alone will not solve the overheating crisis. Passive mitigation strategies – such as high-performance insulation, external shading and natural ventilation – must



Dr Duncan Grassie



Dr Owen Connick



Karolina Prusicka

remain central to our design approach.

These measures can reduce cooling loads significantly and help avoid the need for high-powered systems during peak times. Connick closed with a call for joined-up thinking between policy, technology and design to create built environments that are not only cool and efficient, but also resilient and future-proof.

Façade face-off

Karolina Prusicka, presented a rigorous modelling study on the carbon trade-offs involved in adapting façades to a warming climate. Using a high-rise residential building in London as a case study, her research explored the interaction between operational carbon (OC) and embodied carbon (EC) when mitigating overheating.

Using a multi-objective optimisation method (NSGA-II), Prusicka ran 2,400 simulations to analyse 14,000 façade configurations based on three performance objectives: heating, cooling and total energy use. Her assumptions included domestic occupancy patterns, air source heat pumps with an equal coefficient of performance (COP) of 3.4 for heating and cooling, and setpoints of 21°C for heating (setback 16°C) and 25°C for cooling (setback 30°C). The model accounted for future climate conditions using IPCC medium (A1B) and high (A1FI) emissions scenarios for 2050 and 2080.

The findings were nuanced. Under higher-emission scenarios, operational carbon reduced because of significantly lower heating demands, despite increased cooling loads.

In some simulations, OC savings reached up to 20tCO₂e by 2080. However, several passive mitigation strategies – such as the addition of aluminium-clad box balconies for shading – introduced considerable embodied carbon.

As EC is accounted for at the point of construction, Prusicka highlighted how sensitive results are to the assumed carbon intensity of materials and manufacturing. Yet, with Grid decarbonisation, materials such as aluminium could become nearly carbon-neutral in future, fundamentally reshaping today's carbon trade-offs.

Her conclusion was clear: decisions about façade design must be informed by long-term thinking. Operational gains that appear marginal today may be justifiable if future embodied impacts are expected to decline. Climate trajectory, electricity decarbonisation and material innovation must all be part of the equation.

The discussion spilled over into informal conversations over drinks and canapés. Attendees debated the implications of regulating AC markets, whether passive-only strategies were realistic in dense urban settings, and what role schools and public buildings should play in safeguarding health and productivity.

The provocative presentations had clearly struck a chord. ●

The CIBSE Natural Ventilation Group thanks event sponsor Passivent. For more information on the group, visit bit.ly/CJNVGP

"Gains that appear marginal today may be justifiable if future embodied impacts are expected to decline"



FOCUS ON THE NEW CITY MULTI R32 VRF YXM RANGE

Delivering market-leading performance, our enhanced and expanded range helps you plan for the future.

Mitsubishi Electric's City Multi R32 VRF range is evolving and will soon be available in system capacities from 12 to 113kW, with both Heat Pump and Heat Recovery options. We've re-engineered our popular plug and play VRF system with a new ultra-compact modular YXM chassis design, flexible piping configurations, market-leading low noise levels and BS EN 378 part 3 compliant safety measures. Incorporating a unique patented Vertical Flat Tube (VFT) heat exchanger, the new **City Multi R32 VRF YXM** range delivers high seasonal efficiencies, low operational costs and a significant reduction in whole life carbon.

Available to install from Spring 2026, if you are a Consultant and have a medium to long term specification project suitable for our new **City Multi R32 VRF YXM** range and would like to speak to a Mitsubishi Electric Account Manager, or simply to register for future updates, please visit:

info.les.mitsubishielectric.co.uk/CityMultiYXM



CITY MULTI



NEW YXM RANGE

MITSUBISI ELECTRIC



Down the plughole

Wastewater heat recovery systems can reclaim up to 60% of shower energy. With showers using 20– 30% of hot water, a new Rehva guide – summarised by **Tim Dwyer** – highlights their efficiency potential

Functioning much like heat recovery units in mechanical ventilation, WWHRS can recover up to 60% of the energy used during a shower.

These systems can be compact and durable, and are likely to contain no moving parts and be designed to require minimal maintenance. They recover heat without compromising shower performance — unlike some water–saving devices that reduce flow or temperature.

At their core, WWHRS operate as heat exchangers, transferring energy from warm wastewater, going to drain, (primary side) to colder incoming (and probably mains) water (secondary side) without the two streams mixing.

Efficiency is determined as the ratio between the actual heat transferred and the theoretical maximum recoverable heat, and is affected by the flowrates, temperature profiles and design characteristics of the heat exchanger. Most WWHRS employ highly efficient counterflow designs and are evaluated using established methods, such as the number of thermal units approach.

Shower parameters vary – typical flowrates range from six to 24 litres per minute, with outlet temperatures between 38 and 42°C, and mains (cold) water temperatures between 5 and 25°C. Drain water is typically 3–5K cooler than the outlet temperature because of in-cubicle losses. The guide presents this data alongside methods for calculating system performance under steady-state and transient conditions.

Three hydraulic connection schemes for WWHRS are described:

 Scheme A preheats incoming cold water before it reaches the inlets to the shower mixer and the local water heater. It operates with balanced flows (primary flowrate equals secondary flowrate), which enhances efficiency and makes it the most effective configuration – especially when installed close to both the shower and the heater.

- Scheme B preheats only the cold water feeding the shower mixer, resulting in an unbalanced flow. It is easier to retrofit, but limited to localised impact.
- Scheme C (as illustrated in Figure 1)
 preheats only the cold feed to the
 water heater, (so unbalanced
 conditions). This scheme is preferred
 in centralised DHW systems and
 poses a lower legionella risk.

The guide includes health and safety considerations, with particular emphasis on the risk of legionella proliferation, as water between 25°C and 50°C is particularly conducive to legionella growth, especially in stagnant conditions.

As WWHRS units preheat water, there is a potential risk in schemes

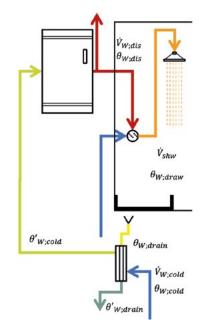


Figure 1: Sketch of wastewater heat recovery scheme C (developed from Rehva guidebook No 34)

guidebook published by Rehva considers the potential of heat recovery from wastewater, with an emphasis on shower appliances.

Rehva guidebook No 34, Instantaneous wastewater heat recovery in buildings (bit.ly/ CJWWHRS25), offers a technical reference for the integration of these systems in new and existing buildings.

It brings together analysis and practical design guidance to support the implementation of wastewater heat recovery systems (WWHRS) as a low-risk, high-yield strategy for improving energy performance.

Domestic hot water (DHW) demand in buildings remains significant – estimated at between 12 and 20kWh·m⁻² annually – and is becoming proportionally more significant as building envelopes become increasingly efficient.

A substantial share of DHW energy use comes from showers, where wastewater typically leaves the drain at around 35°C. The temperature differential between the waste and incoming cold–water supply creates an opportunity for energy recovery.

The guide introduces instantaneous WWHRS as a practical and accessible means of capturing this waste heat.

where preheated water is not further treated by a water heater. Risk-mitigation strategies include minimising the volume of vulnerable preheated water (ideally below three litres), ensuring rapid cooling below 25°C post-use, and avoiding insulation that may slow cooling.

Some WWHRS feature rapid cooldown characteristics (eg, <25°C in 45 minutes, as per German DIN 94678 Devices for heat recovery from shower wastewater), while active measures – such as automatic draining or manual flushing – are also discussed.

Scheme C is identified as presenting the lowest legionella risk because the preheated water is reheated to safe temperatures. The guide also recommends avoiding biofilm–promoting materials (typically certain plastics), favouring copper and using certified products.

Cross-contamination is considered low risk under normal operation, but safeguards such as double-walled construction and leakage alarms are recommended to address potential backflow or siphonage. Other safety topics covered include fire resistance, acoustic performance and protection against cross-contamination or leakage. The guidance notes that standard installation and commissioning practices are usually sufficient to ensure safe operation, particularly when products are certified and installed in accordance with manufacturer's guidance.

The guide includes a well-illustrated section on installation, where vertical systems are identified as typically providing the best performance and cost-effectiveness, although they require substantial installation height. These are noted as being generally maintenance-free in greywater applications.

Horizontal systems are more compact – some as shallow as less than 10cm below the tray – so may be used in many retrofit applications, though they are more prone to clogging and may require periodic cleaning. Active vertical units using a pump provide additional flexibility for layout and performance, but introduce energy and maintenance demands.

The selection of scheme and

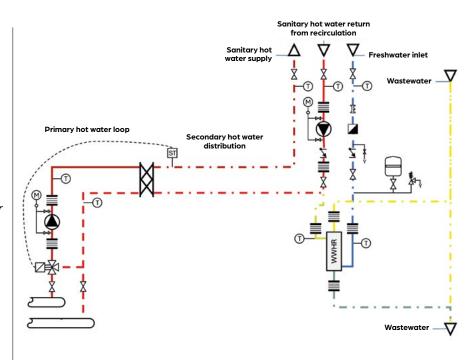


Figure 2: An example of a Scheme C WWHRS application with centralised hot–water generation (Source: Rehva guidebook No 34)

system type is closely tied to the DHW system layout, and these are discussed in the guide:

- Decentralised systems can benefit from all three schemes depending on layout. Scheme A is viable where distances are short.
- Centralised systems typically use Scheme C, illustrated in Figure 2, because of its compatibility with centralised hot-water production and presenting a lower health risk. Larger systems may use multiple WWHRS units, with bypasses to manage peak flows or clogging. Hybrid approaches combining Scheme C and Scheme B can offer cascade benefits.
- Buildings with fixed-temperature DHW systems (such as leisure centres) may favour Scheme B or A with large-diameter exchangers.
- High-rise buildings may require zoning and multiple schemes to accommodate pressure and layout constraints.

Independent greywater drainage is noted as offering more flexibility and system options. Where greywater and blackwater are combined, WWHRS compatible with blackwater (usually vertical coil-on-pipe systems) are required. These involve greater installation effort and are more clog-prone, but can be used as part of soil stack replacement.

The level of intervention in a building project significantly affects what is feasible:

- Shallow renovations can incorporate plug-and-play horizontal systems (typically Scheme B) with modest efficiencies (~40%) and minimal plumbing changes.
- Medium renovations, such as full bathroom refits, allow for horizontal or active vertical systems.
- Deep renovations and new builds provide the best opportunities for optimal WWHRS integration, especially passive vertical systems serving multiple showers, ideally located in dedicated service zones.

These systems can offer opportunities for significant savings without impacting the users' showering experience, and can be integrated across a wide range of building types and renovation scales. The guidebook is a valuable resource for building services engineers exploring the application of this technology into carbon-conscious building design.

Real-time Passivhaus design

A new integrated simulation tool for the Passivhaus design methodology aims to close the gap between architectural form–making and environmental performance at the early design stages, as Beyond Carbon Associates' founding director **Joel Callow** explains

n the early design stages of large and complex construction projects, architects are often required to make rapid decisions about building form and spatial arrangement. These decisions have long-term implications for energy use, occupant comfort and carbon emissions, but are typically made with limited technical input on environmental performance. A new generation of simulation technology aims to address this by enabling rapid, integrated analysis of multiple factors within a single digital workflow.

This article focuses on software for buildings designed using the Passivhaus methodology, which aims to integrate analyses of Passivhaus performance, daylighting and overheating risk at an early design stage.

The challenge of early-stage design

Environmental consultants, when appointed, are frequently siloed into separate domains, or appointed to verify an existing design approaching a planning application, rather than shape an emerging one to optimise the building (see Table 1).

Each aspect is typically analysed using discrete software tools, often with little or no integration, or with integrated tools that are too large and slow to respond to the fast iteration of early design. Yet these parameters are deeply interconnected, and the main factors influencing success are fixed early in RIBA Workstage 2. For

example, increasing glazing to improve daylighting can simultaneously increase solar gains and overheating risk. Without a unified approach, buildings are often optimised for one metric at the expense of others, or simply not optimised at all.

This lack of optimisation is partly down to the timing of consultant appointments, but also inadequate software solutions and a focus on regulatory compliance rather than design excellence. Such fragmentation is particularly problematic when designing to the Passivhaus standard, which demands rigorous control over heating demand, airtightness and thermal comfort. Passivhaus tools, such as the Passivhaus Planning Package (PHPP), are poorly integrated with mainstream industry software, especially for daylight and overheating analysis of UK dwellings.

The need for integrated, real-time simulation

To achieve optimal environmental outcomes, tools are needed that can simultaneously assess daylight, overheating, heating and cooling, and at a speed that allows real-time guidance for evolving architectural proposals. Where relevant, they also need to align with, but not be restricted by, regulation.

At the same time, advanced standards such as Passivhaus need to be supported for large and complex projects. While many excellent tools exist, they are either siloed, too slow, or

do not include Passivhaus. This gap in the market has led to the development of a novel software platform by Beyond Carbon that integrates these analyses into a single workflow.

Project goals and performance targets

The target was to enable a meaningful response to an architectural proposal across all key disciplines in less than three working days. Achieving this would be a significant leap forward in design capability, allowing for rapid iteration and informed decision–making at the earliest stages of design.

Technical barriers and solutions

Currently, Passivhaus calculations are performed in Excel using PHPP, having generally extracted geometry and window shading from a SketchUp plugin called DesignPH. PHPP is complex, with interdependent variables and third-party inputs. To circumvent this bottleneck in rapid prototyping, we rebuilt the PHPP logic for heat demand and heat load within the Grasshopper/Ladybug ecosystem, and then validated the outputs against PHPP with a tolerance of ±2%.

The Grasshopper/Ladybug ecosystem is a visual programming and simulation platform that enables architects and engineers to model and analyse environmental performance such as weather data, sun paths, radiation and climate-based metrics

Factor	Consultant	Standard	Appointed	Challenge
Natural daylight	Daylight and sunlight consultant	BRE BR209 (2021)	Typically in RIBA 2, to verify designs for planning	Early, holistic design input needed for building optimisation
Summer thermal comfort	Sustainability consultant	Building Regulations Part O (2021)		
Winter heating demand	N/A – assumed to be covered by regulation	Building Regulations Part L (indirectly)		
Summer cooling demand	N/A – assumed to be covered by regulation			

Table 1

directly within 3D design workflows.

Custom extensions, such as Beyond Carbon's integration of PHPP and Part O logic, enable rapid, multi-metric feedback during early design stages, supporting better decision-making and holistic optimisation.

At the same time, we developed a custom algorithm within Ladybug Tools to calculate solar shading factors dynamically. Validation against DesignPH showed agreement within ±3%, using real project geometries.

At present, these tools are only useful in the early stages of work and must still be confirmed separately at a later point by exporting to Passivhaus Institute-approved tools. The team is working towards certification by the Passivhaus Institute, which would allow the tool to be used by other consultants and projects globally at any design stage, and as a route to formal Passivhaus certification.

Overheating and Part O compliance

UK Building Regulations Part O sets limits on solar gains and internal temperatures in residential buildings. However, it is not widely supported outside the UK and is rarely integrated with other performance metrics in a single building model at concept stage. To provide full integration with Passivhaus, Part O requirements were codified into an existing overheating engine, EnergyPlus, incorporating occupant profiles, window-opening schedules and internal gains.

Outputs were benchmarked against IES Virtual Environment, achieving agreement within ±5%. As a

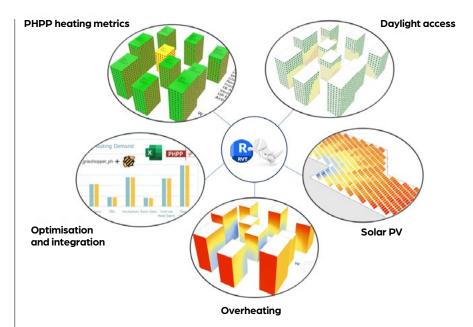


Figure 1: Comparison of PHPP Excel outputs and Grasshopper simulation results

result, from a single source of design information, the software can run Passivhaus overheating and daylight results (the latter from existing scripts) in short order.

Implications and future development

This integrated approach offers several benefits:

- Faster design iteration: architects can test multiple options without waiting for separate consultant reports
- Better outcomes: designs are optimised across all key metrics, not iust one
- Lower carbon: by reducing heating and cooling loads, buildings can achieve net zero targets more easily.

Towards truly holistic design

Integrated simulation tools accelerate sustainable building design. By unifying daylighting, overheating and energy demand analysis, engineers and architects can make better-informed decisions earlier in the design process.

This approach aligns with the goals of CIBSE, RIBA and the UK Green Building Council in promoting low carbon, high-performance buildings, and closely dovetails with the objectives of the London Plan from the Greater London Authority. The tool has been tested extensively on complex London sites with multiple buildings. As we move towards net zero and climate resilience, such tools will be essential in enabling collaboration and best outcomes.



www.cibsejournal.com cibse Journal 37





THE FIRST CHOICE FOR HYBRID HEATING



EVOMAX 2

Market-leading commercial condensing boiler



clade-es.com

ELM

Natural refrigerant commercial heat pumps





GET A QUOTE TODAY

idealcommercialheating.com







5

leat pumps



Continuing professional development (CPD) is the regular maintenance. improvement and broadening of your knowledge and skills to maintain professional competence. It is a requirement of CIBSE and other professional bodies. This Journal CPD programme can be used to meet your CPD requirements. Study the module and answer the questions on the final page. Each successfully completed module is equivalent to 1.5 hours of CPD. Modules are also available at cibseiournal.com/cpd

The pros and cons of various hybrid heat pump heating systems

This module looks at ways in which air source heat pumps can be combined with traditional heating systems

he drive to reduce building-related emissions is leading to an uptake in the use of heat pumps to generate low carbon heat in commercial buildings. Heat pumps are one of the most cost-effective options to reduce carbon emissions from new buildings, when acting as the sole heat generator.

Heat pumps alone, however, may not always be the most appropriate or cost-effective means of providing all the heat for new build and existing buildings undergoing refurbishment or upgrade. A well-established method for building occupiers or owners to transition to a lower-carbon heating solution cost-effectively, and without compromising on comfort, is a hybrid or bivalent solution, where heat pumps are combined with traditional heating systems.

This CPD outlines some of the ways an air source heat pump (ASHP) can be combined with a traditional heating system, and the pros and cons of each option.

What is a hybrid system?

A hybrid heat pump system combines two or more heat sources. Typically, this involves pairing an ASHP with a secondary heat source, most commonly a gas-fired boiler, but it can also be an electric or oil-fired boiler, or even a connection to a district heating system.

Hybrid systems can be retrofitted on any scale of building, from domestic to industrial, where they are often implemented as an intermediate or transitional stage from an all-fossil to an all-renewable heating solution. Drivers for hybrid systems include reducing



Figure 1: Heat pump systems can be used in conjunction with other heating sources in retrofit projects

capital expenditure in meeting high peak heat demands and resilience.

In a hybrid heating system, the heat pump typically handles the majority of the building's heating demand, with a secondary heat source stepping in only when needed. This secondary source may activate for a variety of project-specific reasons. For example, to avoid the capital expenditure of sizing the heat pump for peak demand, or to minimise the use of electricity at peak tariff. In 'cold weather assistance' mode, it switches to the secondary heat source when outdoor temperatures fall below a set threshold.

The secondary source can also serve as a 'backup' if the heat pump is out of action, or meet extra demand during periods of unusually high heating requirements – such as in buildings with variable occupancy. This approach allows the ASHP to be sized smaller, since the boiler can provide additional heating on the coldest days.

In some less common configurations, the heat pump is dedicated to space heating while the boiler continues to supply domestic hot water (DHW), separating the two functions entirely.

There is no one-size-fits-all solution – the system should to be configured for each project and budget.

The design of hybrid systems

In a hybrid system, it is important to manage how the heat pump and boiler interact with the rest of the heating system. Ideally, these two heat sources should be hydronically decoupled. This means that they should not share the same circulation loop but should still be thermally connected so that both can contribute heat effectively.

One common way to achieve this is by using a buffer tank to decouple the heat pump. The buffer acts as a thermal store, allowing the heat pump to operate in longer, more efficient cycles while helping to smooth out fluctuations in heating demand.

The boiler is typically connected via a low-loss header, which is usually a short, large-diameter pipe. This hydraulically separates the boiler circuit from the rest of the system. It allows water to circulate freely within each loop without creating unwanted flow or pressure imbalances. It ensures the boiler can add heat to the system when needed, without interfering with the operation of the heat pump or the buffer tank.

Together, the buffer tank and low-loss header

enable the system to be balanced and controlled. The heat pump can efficiently meet the base heating load, while the boiler can step in to cover peak demand or provide backup.

In some hybrid systems, particularly where full hydraulic separation is required, plate heat exchangers may be used to transfer heat between the heat pump circuit and the main heating system. These allow thermal energy to pass from one loop to another without mixing the water, which can be especially useful when the heat pump operates on a different pressure or fluid quality regime than the rest of the system. Heat exchangers can also provide an added level of protection by isolating sensitive equipment from legacy systems that may contain older pipework or have water treatment issues.

The main hybrid system configurations

Ultimately, selecting the most appropriate hybrid heating system configuration depends on the specific needs and constraints of the project. These may include budget limitations, carbon reduction targets, system compatibility, and the acceptable balance between upfront capital costs and ongoing operational expenses.

A key concept in the design and operation of hybrid systems is the bivalent point. There are two main ways to define the bivalent point. The first is based on heat demand and system capacity. As outdoor temperatures fall, the heat loss from the building increases. If the heat pump has been deliberately sized slightly

below peak demand – which is common to reduce capital cost – there will be an ambient temperature threshold at which supplementary heating is required.

The second approach is based on system operating parameters, particularly in weather-compensated systems. In these systems, the flow temperature of the heating circuit increases as the external temperature drops. Eventually, the required flow temperature may exceed the maximum temperature that the heat pump can deliver. At this point, the system switches to or adds the secondary heat source. This temperature is also considered the bivalent point.

Hybrid systems can be broadly grouped into two categories. The first category includes **mono-energetic** and **parallel modes**. These configurations are suitable where the flow temperatures remain within the operating range of the heat pump, even down to the design external temperature.

Mono-energetic mode

This configuration applies to one type of hybrid, where boilers supply additional temperature or capacity (typically 45–60°C, but can be up to 85°C). However, the heat pump is slightly undersized, and an additional heat source is activated at or below the bivalent point (the point where the heat pump alone cannot meet demand). This secondary source can use the same form of energy as the heat pump (for example, an electric boiler with an electric heat pump). The heat pump is often undersized because the period when the additional source is needed might only be

4–5% of the year, making the capital expense of a larger heat pump unjustified.

Parallel mode

In this setup, the heat pump is slightly undersized, similar to the mono–energetic system. In the parallel configuration, as with all hybrid systems, the system is designed so that the heat pump can operate for a much of the year as possible. This may require upgrades to the heat emitters to allow for lower flow temperatures.

The system requires the emitters (for example, radiators) to be compatible with the lower flow and return temperatures delivered by the heat pump. This implies that emitters may have to be changed or upgraded to suit the operation of the heat pump. The secondary heat source provides the remainder of the peak load, limiting its contribution. For example, a 200kW building might have a 150kW heat pump and a 50kW boiler

Building Regulations

Where a heating system has been fully replaced, both mono–energetic and parallel systems will have to meet the maximum flow temperature requirements stated in Part L of the Building Regulations.¹

Paragraph 5.10 of the 2021 Approved Document states that where a wet heating system is either newly installed or fully replaced in an existing building, including the heating appliance, emitters and associated pipework then:

'All parts of the system, including pipework and emitters, should be sized to allow the space heating system to operate

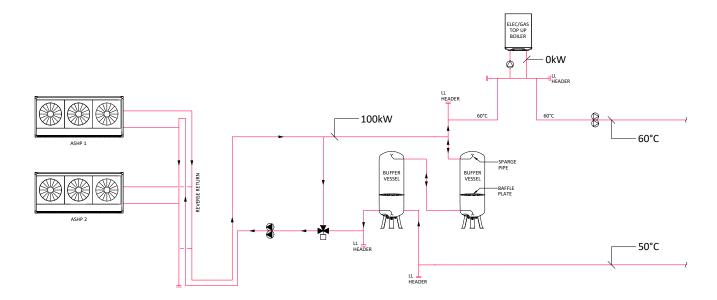


Figure 2: Schematic of a hybrid heating system configured for weather–compensated switch mode for a legacy system, with maximum flow and return temperatures of 80°C/70°C. Below the bivalent point, the ASHPs are capable of raising the system temperature from 50°C to 60°C, so the boiler will have no input

effectively, and in a manner that meets the heating needs of the building, at a maximum flow temperature of 55°C or lower. To maximise the efficiency of these systems, it would be preferable to design to a lower flow temperature than 55°C.'

Where it is not feasible to install a space heating system that can operate at this temperature (for example, where there is insufficient space for larger radiators), then the document says the space heating system 'should be designed to the lowest design temperature possible that will still meet the heating needs of the building'.

The second category of hybrid systems includes **switch mode** and **partially parallel mode**. These are typically used in legacy systems where the existing emitters have not been changed, and higher flow temperatures are required during colder weather. In such systems, the heat pump may operate only part of the time, with the boiler taking over when demand exceeds what the heat pump can efficiently supply.

Switch mode

This mode is applicable for legacy systems requiring higher flow temperatures than heat pumps alone cannot consistently deliver—for example, where existing heat emitters are retained. When the external temperature reaches a predefined bivalent point, the heat pump is stopped and the secondary heat source (for example, a boiler) takes over the entire heat load. The switch point is determined by the flow temperature and building load (see Figure 2).

Partially parallel mode

This mode is also used for legacy systems retaining existing emitters and requiring higher flow temperatures. This mode aims to maximise the heat pump's contribution. Instead of stopping the heat pump at the bivalent point, the system monitors return temperatures. If the return temperatures are still within the heat pump's operational envelope, the heat pump is used to preheat the system and the secondary source (boiler) then provides the additional boost to reach the required higher flow temperature. This allows both sources to work in parallel for a segment of the load curve.

The importance of controls logic

Hybrid heating systems can be set up to switch automatically between the two heat sources based on certain triggers – for instance, energy tariff or ambient temperature. The controls logic needs to be right to ensure the most appropriate heat source is selected and to prevent the heat generation methods fighting against each other, often at the expense of the high temperature source taking over

The pros and cons of the four main configurations for hybrid systems:

Mono-energetic mode

Pros:

- Not oversizing the heat pump for rare peak demands can save on costs while still aiming for a high proportion of renewable energy use.
- It can be a step towards decarbonisation.

Cons:

• Still requires electrical infrastructure to support both heat pump and electric top-up

Parallel mode

Pros:

- Maximises the heat pump's contribution to the total load and, consequently, it can significantly reduce carbon emissions compared with standalone fossil fuel systems.
- Offers flexibility and scalability, as both generators can run together with the boiler assisting the ASHP.
- Addresses situations where there might not be enough space for a full heat pump system or where there are electrical constraints, since the gas top-up will not require more electrical power.

Cons

- Often requires changes or upgrades to existing emitters within the building, which can incur higher costs and disruption.
- Requires careful design to prevent the different heat sources from 'fighting' each other, which can lead to reduced system efficiency.
- The primary flow temperature and differentials must be suitable for both technologies.²

Switch mode

Pros

- Allows for heat pumps to be integrated into buildings with legacy heating systems that require high temperatures without needing to change existing emitters.
- Often preferred by private investors focused on running costs, as the boiler will operate when heat pump efficiency drops significantly, usually as the consequence of high system temperature requirements from low ambient temperatures.

Cons:

- The heat pump ceases to operate entirely when temperatures fall below the bivalent point, meaning less contribution from the renewable source compared with partially parallel mode (see below).
- The boiler will cover a larger portion of the annual energy demand and will need to be sized for the full peak heating load.

Partially parallel mode

Pros:

- Maximises the input from the heat pump resulting in greater CO₂ emission reductions.
 As a consequence, this mode is often preferred by local authorities or clients whose main driver is to reduce CO₂ emissions.
- Allows heat pumps to operate for longer periods at lower external temperatures while still contributing to high flow temperature systems.

Cons

- Can lead to higher running costs if electricity prices are significantly higher than those
 of gas, as the heat pump operates more frequently under conditions where its
 efficiency might be lower (though still better than the boiler).
- \bullet Requires a boiler sized for the full peak load.

and impacting system efficiency.

The key to avoiding this conflict and to optimise the performance of the system is to ensure plant is sized appropriately, the controls are properly considered and the hydronic design is correct from the outset.

© Andy Pearson, 2025.

www.cibsejournal.com cibse Journal 41





Module 251

September 2025

1.	Wł	nich statement best describes a 'hybrid heat pump		D	Partially parallel mode		
	he	ating system'?		Ε	Low-loss header mode		
	Α	A system that uses multiple heat pumps operating	_				
	at different temperatures		5.	Which of the following is a key disadvantage of			
	В	A combination of an air source heat pump and a		pa	rtially parallel mode?		
		secondary heat source such as a boiler	Ш	А	It prevents the boiler from providing backup during		
	С	A heat pump with a built-in thermal store but no			peak demand		
		other heating source		В	It stops the heat pump when external		
	D	Any heating system that uses both heating and			temperatures are low		
		cooling functions		С	It can lead to higher running costs if electricity is		
	Е	A fossil-fuel boiler connected to underfloor heating			much more expensive than gas		
				D	It requires replacing all emitters in the building		
2.		a parallel hybrid system, what is typically required		Ε	It cannot be used with high flow temperature		
	for	the system to operate effectively?			systems		
	Α	No changes to existing emitters					
	В	Emitters compatible with lower flow temperatures					
		delivered by the heat pump					
	С	An electric boiler operating in place of the heat					
		pump in winter					
	D Flow temperatures maintained above 80°C for		Nan	Name (please print)			
		efficiency	Job	title			
	E Direct mixing of boiler and heat pump water loops						
		without separation	Org	anisa	tion		
3.	Wł	Vhat is the bivalent point in the context of hybrid		Address			
	heating systems?						
	A The point at which both the heat pump and boiler						
		are delivering equal amounts of heat					
	B The temperature at which the heat pump reaches		Postcode				
		maximum efficiency	Emo	ail 			
	C The outdoor temperature where the heat pump		Are you a member of CIBSE? If so, please state your membership				
		can no longer meet the full heating demand	num	ber:			
	D	The average flow temperature for hybrid operation	The	e CIE	SSE Journal CPD Programme		
	Ε	The set point for the domestic hot water system	By participating in this CPD module, you consent to sharing your details with				
4.	\A/k	Which by brid hosting configuration is designed so the		ldeal Heating – Commercial Products. Ideal Heating – Commercial Products may contact you via email and/or telephone with further information and			
→.		Which hybrid heating configuration is designed so the			nsight on its services. You have the right to opt out from such		
	boiler takes over the full heating load once the			munio	ations at any time.		
	outdoor temperature drops below a set threshold, with the heat pump switching off completely?			I understand that I will receive marketing communications from Ideal Heating			
		Mono-energetic mode	– Commercial Products after completing this module (please tick here).' \Box				
	A	-		Go to www.cibsejournal.com/cpd to complete the module online. You will receive notification by email of successful completion, which can be used to			
	В	Parallel mode	valid	late y	our CPD records. Alternatively, complete this page and post it to:		
\Box	С	Switch mode	N LL	udov 4	TIRSE 91_9/ Saffron Hill I ondon EC1N 90D		

References:

¹Approved Document L of the Building Regulations

- bit.ly/CJSep25CPD21.

 2 CIBSE Journal, November 2022, CPD module 205,

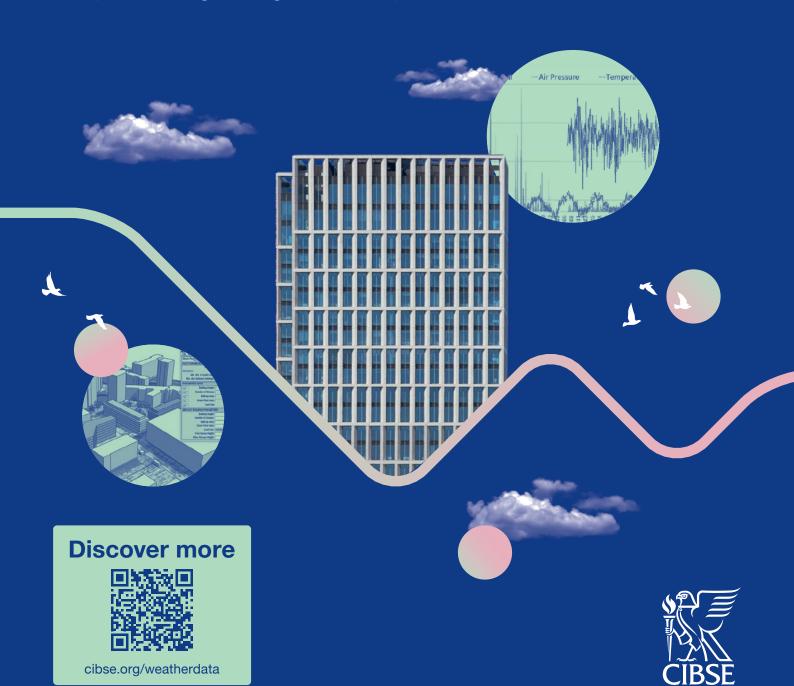
'Bivalent heat pump systems for heating and hot water'

- bit.ly/CJSep25CPD22.

New future-ready weather files for accurate, efficient building performance modelling.

Members of CIBSE receive 10% off.

Our new Weather Data Selection Tool makes finding and purchasing the right files simpler than ever.









FCUs for residential and commercial buildings



Fan coil solutions for residential and commercial spaces need to meet occupants' requirements for comfortable levels of heating and cooling, while offering high energy efficiency and exceptional acoustic performance. These solutions need to be reliable, flexible to configure and offer intelligent, easy to operate controls.

When selecting fan coil solutions for your next development, think Ability fan coils.



Ease of installation



Improved efficiency



Reduced footprint for duty point



Multiple control and connection options



Commercial benefits

Discover what makes Ability the UK's leading fan coil unit manufacturer.

See how your project can benefit from our solutions' versatility, cost benefits and added value, through compact sizes, high energy efficiency, reduced carbon footprints and lower noise levels.









More info on our Fan Coil Units here

Design considerations for fan coil units with low-temperature heat sources

This module explores basic design considerations when using fan coil units with a lower-temperature heating system

an coil units (FCUs) are a widely adopted solution for providing heating and cooling in commercial buildings, such as offices and hotels. In the UK, FCUs first became popular in the mid-1970s, when the majority of commercial heating systems were based on gas-fired boilers connected to low-pressure hot water (LPHW) heating circuits running at 82°C flow/71°C return.

More recently, the growth in the use of electric heat pumps and the expected future growth in low-temperature heat networks means that LPHW systems often now run at much lower temperatures, often 45°C flow/40°C return. This CPD will outline the basic design considerations when using FCUs with a lower-temperature heating system.

FCUs condition the air in a building using a water-to-air heat exchanger and a fan. The fan draws air across the heat exchanger, which is served by either low-temperature hot water or chilled water at any one time. This either heats or cools the air before it is supplied to the room.

FCUs are sometimes used in conjunction with a central air handling unit to supply conditioned outdoor air for ventilation, with the FCU recirculating and further conditioning the room air. The FCU's function – that is, cooling or heating and, possibly, ventilation – is controlled to meet the thermal demands of the area being supplied. This makes them particularly suited to commercial office applications, where different areas may have varying occupancy and load requirements.

Various configurations of FCU are available, including: horizontal units designed to be concealed in ceiling voids; horizontal units intended to remain exposed for a more industrial aesthetic; horizontal units for installation beneath raised floors; and vertical units (either concealed or exposed), which are suitable for refurbishments and spaces with low floor-to-ceiling heights.

Whether for new build or retrofit, a key benefit of using fan coils is that the energy required to meet the heating and cooling demand is transferred to the conditioned space via water flowing within a pipework system. This medium requires significantly less space and transport energy than would be the case if the same amount of heating or cooling was being transferred using air.

Heat exchanger

FCU heat exchangers are typically formed from a coil of copper pipe that passes backwards and forwards through the airflow. The pipework forms the primary heat transfer surface. The copper tube is then expanded onto aluminium fins, which form the secondary heat-transfer surfaces. The fins increase the surface area over which heat can be transferred to the gir.

FCUs can be either 2-pipe or 4-pipe systems.

- A 2-pipe fan coil has a single heat exchanger coil that can provide either heating or cooling at any one time. Such systems often incorporate a changeover to switch the supply for the entire building or zone from heating mode to cooling mode, or vice versa. Changeover is typically manual (for example, in autumn and spring), so unusual weather patterns might make the point of changeover difficult to determine.
- A 4-pipe system has two separate coils one dedicated to heating and one to cooling, allowing both services to be available concurrently. This system is common in the UK because of variable weather patterns (see Figure 1).

Practically, the copper coils of both coils are often housed in the same single-block heat exchanger, where they can share the aluminium heat-transfer fins to make the unit more compact. Only one of the

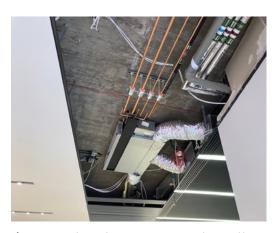


Figure 1: A 4-pipe horizontal FCU concealed in the ceiling void (Source: Ability Projects)



CPD programme Fan coil units



Continuing professional development (CPD) is the regular maintenance. improvement and broadening of your knowledge and skills to maintain professional competence. It is a requirement of CIBSE and other professional bodies. This Journal CPD programme can be used to meet your CPD requirements. Study the module and answer the questions on the final page. Each successfully completed module is equivalent to 1.5 hours of CPD. Modules are also available at cibseiournal.com/cpd coils would be active at any one time, with a narrow control 'dead band' between the modes, where neither the heating nor cooling coil is active.

While the primary purpose of a FCU is to provide cooling, it can also provide heating. Heat is required when ambient temperatures drop below the desired comfort level for the space, typically during the winter. FCUs can also be used to preheat a space prior to occupancy.

In the past, the heating medium was provided by a gas- or oil-fired boiler. A more recent development is the use of electric heat pumps and low-temperature heat networks to provide low carbon heat.

Growth in low-temperature heat sources

The primary driver behind the growth of low carbon heat sources is the UK's commitment to achieving net zero emissions by 2050. This goal necessitates a significant shift away from fossil fuelbased heating systems, such as gas—and oil–fired boilers, and a shift towards the use of electric heat pumps and low-temperature heat networks.

Take-up of heat pumps is also being driven by businesses looking to future-proof their heating, to reduce their carbon footprint and, potentially, their energy bill.

Historically, heating systems in commercial buildings were designed to operate at a temperature of 82°C flow and 71°C return, with a temperature differential (Δ T) of 11K. Generally, air

source heat pumps using common refrigerants produce water at a maximum temperature of between 55° C and 60° C at -5° C ambient temperature.² However, as the technology continues to evolve, output temperatures are increasing, with the use of CO₂ and R290 (propane) refrigerants, for example.

The availability of low carbon heat for the built environment will increase with the introduction of heat network zoning, expected later this year following the introduction of the Energy Act 2023.³ A heat network usually comprises the flow and return pipes that convey heat from a heat source (usually an energy centre) to the customers, and can include both communal and district heating. The Act mandates that certain existing buildings and low carbon heat sources within a designated zone connect to a local low-temperature network.

To ensure heat networks meet a minimum level of performance and reliability, a Heat Network Technical Assurance Scheme⁴ is scheduled to launch in 2026. This builds on CIBSE's Code of Practice CP1, which aims to ensure that heat networks meet a minimum level of performance and reliability.

CP1 is focused on third-generation heat networks, typically fuelled by gas combined heat and power engines or boilers. These supply heat at 90–60°C with a return temperature at around 50–40°C. In the future, district and community heating is expected to move towards lower carbon, lower-temperature

heat networks in order to use a higher contribution from renewable energy and waste heat.

The code of practice describes low-temperature fourth-generation heat networks as supplying heat at around $60\text{-}45^{\circ}\text{C}$, with a wider Δ T and return temperatures at around $30\text{-}15^{\circ}\text{C}$. Similarly, it describes ultra-low-temperature fifth-generation systems as those supplying at $<45^{\circ}\text{C}$, with return temperatures at around $25\text{-}15^{\circ}\text{C}$.

Impact on FCU heating performance

The move away from fossil fuels to electric heat pumps and low-temperature heat networks is likely to lead to a reduction in the overall temperature of heating systems. This demands that internal heating systems, such as FCUs, operate effectively with much lower emitter temperatures.

Typical heating system flow and return temperatures could be as low as 45°C and 40°C, respectively. At this lower system temperature and reduced temperature differential, the heat output from a FCU heating coil will be significantly less.

To compensate for the FCU's reduced heat output, a design could incorporate a greater number of FCUs or it could use much larger FCUs. An alternative solution would be to use an FCU with a heat exchanger designed specifically for use with low-temperature heating circuits.

Heat pump-ready FCUs

To address the need for an increased heat output from a standard FCU, some manufacturers are now producing FCUs that incorporate heat pump-ready heat exchangers.

To enhance the heat output from a heat exchanger, the number of dedicated heating tubes in the heat exchanger coil are increased. For example, a conventional coil of 36 tubes might have only had four dedicated to heating, while a heat pumpready heat exchanger might feature more heating tubes to increase the coil surface area by 50% or more.

Adding to the number of heating tubes will increase the heat exchanger's surface area, which will increase the unit's heat output from lower-temperature inputs, without the need to increase the volume of air passing over the coil. This should ensure the size of the FCU and its acoustic performance remain broadly similar.

Impact on heating performance

Heat pump-ready heating coils can provide significantly enhanced heating capacity at lower system temperatures compared with traditional coils (as illustrated in Figure 2).

Case study: One Glass Wharf

At One Glass Wharf in Bristol, the heating system was upgraded by replacing an 82/71°C boiler–fed system with a 45/35°C heat pump system. The change aimed to reduce carbon emissions and improve efficiency. To enable effective operation at the lower water temperatures, the existing FCUs were replaced with Ability Evo FCUs, incorporating low–temperature heating coils. These were specifically designed to deliver the required comfort levels without the need to increase fan size, airflow or noise levels.

Testing confirmed that cooling performance was maintained. The switch to smaller FCUs designed for low-temperature operation reduced embodied carbon by 6.2%, as verified using the TM65 methodology, compared with larger conventional units. Electrical consumption was reduced by 24% by lowering the air volume requirements, and the air volume was cut by 18% with no loss of cooling output or acoustic performance.

Further testing showed that the new units provided up to 150% more heating capacity at $60/30^{\circ}$ C and 108% more at $45/40^{\circ}$ C, without reducing cooling performance. Pressure drops were reduced by up to 80%, lowering system resistance and pump energy demand, compared with typical conventional fan coils. The specific fan power was measured at $0.15\text{W}\cdot\text{L}^{-1}\cdot\text{s}^{-1}$, compared with $0.16\text{W}\cdot\text{L}^{-1}\cdot\text{s}^{-1}$ for larger traditional fan coils in low-temperature applications.

This project shows that low–temperature heat pump systems can be successfully integrated into existing commercial buildings without compromising comfort or acoustic performance. It also indicates that careful selection of terminal units for low–temperature operation can deliver embodied and operational carbon savings, alongside improved heating capacity and reduced pumping energy.

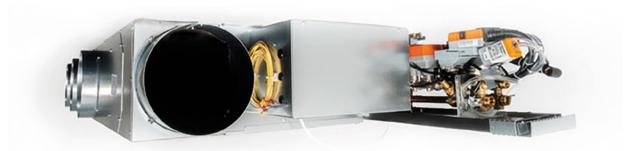


Figure 3: FCU controls can be fully integrated with a BMS using open protocols (Source: Ability Projects)

It is important to ensure that any enhancements to the heat exchanger heat output are not at the expense of the unit's cooling performance.

Increasing the number of passes in a heat exchanger block, however, has the potential to increase the hydraulic pressure drop across the heating coil, increasing pump energy. With careful design, using an increased number of heating tubes and a contraflow setup, it is possible to design the coil to ensure no increase in system hydraulic resistance and no increase in pump energy. The corresponding lower pump-energy usage can result in reductions in system electrical consumption by up to 24%, compared with a traditional FCU used with a low-temperature heating circuit.

In addition to enhanced hydraulic efficiency, it is possible, with careful coil design, to maintain a similar airflow pressure drop across the coil.

FCU controls

The control of heat pump-ready FCUs is typically achieved by first adjusting the heating or chilled water flowrate through the heat exchanger (water-side control). then by adjusting the airflow through, by altering the fan speed (air-side control).

An increasing number of FCUs are now fitted with electronic pressure-independent valves (EPIVs) for water-side control. Unlike traditional pressure-independent control valves (PICVs), which suffer from hysteresis, EPIVs use ultrasonic flow meters and intelligent actuators to continuously modulate water flow, and do not suffer from hysteresis.

EPIVs can operate at much lower pressures (typically 15 to 1kPa) compared with PICVs, which usually require a minimum differential pressure of 30kPa to operate. The fine control available from an EPIV can be integrated into a building management system (BMS), reducing system pressure requirements and. consequently, the pump energy consumption for the entire system.

Modern FCUs typically use electronically commutated DC fan motors, which are significantly more efficient than older motors, particularly at reduced fan speeds. The motors also make it simple to control the fan speed. Fan speed turndown in FCUs is typically limited to no lower than 70% of design speed, to maintain effective air distribution patterns and avoid issues such as the 'dumping' of cold air onto room occupants.

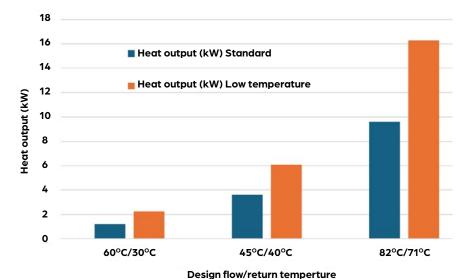


Figure 2: Comparison of the heat output of conventional vs heat pump-ready heat exchangers

BMS integration

FCU controls can be fully integrated with a BMS, often using open protocols such as Modbus and BACnet,6 enabling controls equipment from different manufacturers to work with each other (see Figure 3). This allows for centralised management of global functions, such as time schedules and optimum start/stop, and enables remote monitoring and control.

The BMS can incorporate weather compensation and learning capabilities to optimise preheating/cooling periods, regardless of whether the heat source is traditional or low-temperature - although lower-temperature heating systems may need a slightly longer preheat period.

Commissioning a FCU involves verifying the communication and data exchange between the FCUs and the BMS, ensuring that the pre-programmed control logic for both heating and cooling functions is set correctly, and that desired set points are achieved efficiently. This also includes checking the 'dead band' settings to prevent simultaneous heating and cooling, which would waste energy.

Future-proofing considerations

FCUs specifically designated 'heat pump-ready' are particularly suited for use on higher-temperature applications where a gas-fired boiler is currently in use to supply heat, but where the boiler is expected to be replaced by a heat pump in the future. The unit's ability to achieve the required heating outputs without requiring replacement or significant reconfiguration will help reduce project costs, minimise rework and combat waste.

The development of heat pump-ready FCUs will support the move away from fossil-fuel boilers towards heat pumps. thereby contributing to the UK's net zero ambitions. It also allows for futureproofing building designs, enabling a smooth transition to heat pumps later, without needing to replace or reconfigure existing FCUs, which saves costs and supports sustainability objectives. © Andy Pearson, 2025.

cibse Journal 47 www.cibseiournal.com



Module 252

September 2025

1.	Wh	nich of the following is a valid design approach to		D	25°C-15°C			
	mo	nintaining heating performance in FCUs operating		Ε	15°C-10°C			
	wit	h low-temperature heat sources?						
	А	Increasing the speed of the fan beyond its design limit Using FCUs with heat exchangers designed for	5.	WI	nat is the primary challenge when using traditional			
				FCUs with heat pumps operating at 45°C flow/40°C				
	В			return temperatures?				
		low-temperature systems						
	С	Relying on higher return temperatures	Ш	А	The fan speed cannot be adjusted to			
		to compensate			meet demand			
	D	Decreasing the number of FCUs per floor to boost		В	The cooling capacity is too high for most			
_	_	output per unit			commercial spaces			
Ш	Е	Using a heat exchanger with a smaller surface area		С	The acoustic performance of the unit			
_	How do /host numb woody/ FCHs in an area hosting				becomes unacceptable			
2.		w do 'heat pump-ready' FCUs increase heating		D	The reduced temperature differential significantly			
		pacity at lower system temperatures without reasing airflow volume?			lowers heat output			
	A	By using electric resistance backup coils		Ε	The reduced temperature differential increases			
	В	By recirculating air through the coil multiple times			heat output			
	С	By increasing the number of dedicated heating			·			
		tubes in the coil						
	D	By increasing the fan diameter to move more air	Nam	ne (pl	ease print)			
		over the coil	Job title					
	E By reducing the number of dedicated heating		Organisation					
		tubes in the coil						
			Address					
3.	Wh	nat is a key advantage of using electronic						
	pre	pressure-independent valves (EPIVs) in modern						
	FC	U systems?	Postcode					
	Α	They work only with traditional gas boiler systems		 .::				
	В	They require high differential pressures to operate	Email					
	С	They use ultrasonic flow measurement to control		Are you a member of CIBSE? If so, please state your membersh number:				
		water flow accurately						
	D They are limited to manual operation without		The CIBSE Journal CPD Programme					
_		BMS integration			-			
Ш	Е	They are more affordable		By participating in this CPD module, you consent to sharing your details with Ability Fans. Ability Fans may contact you via email and/or tele–phone with				
			furth	er inf	ormation and technical insight on its services. You have the right to opt			
4.		According to CIBSE's CP1 Code of Practice, what is			uch communications at any time.			
	the typical supply temperature for a fourth-		I understand that I will receive marketing communications from Ability Fans					
	generation low-temperature heat network?			after completing this module (please tick here). \square				
	A B	90°C-80°C 82°C-71°C		Go to www.cibsejournal.com/cpd to complete the module online. You will receive notification by email of successful completion, which can be used to				
	С	60°C-45°C	validate your CPD records. Alternatively, complete this page and post it to: N Hurley, CIBSE, 91–94 Saffron Hill, London EC1N 8QP					
_	$\overline{}$	55 C -5 C	14 MU	. iey, t	SINGL, 7 I-74 GUITOII FIIII, LOIIGOII EU IN OUP			

References:

¹ bit.ly/CJSep25CPD11

² CIBSE AM17 Heat Pump installations for large non-domestic buildings, CIBSE 2022.

³ bit.ly/CJSep25CPD12

⁴ bit.ly/CJSep25CPD13

⁵ CIBSE Heat Networks: Code of Practice for the UK, CP1 CIBSE 2020.

⁶ CIBSE TM43 Fan Coil Units, CIBSE 2008.

Gutteridge becomes sales head for Siemens' southern region

Siemens has appointed Mark Gutteridge as area sales manager – South for its building product sales and business development.

Gutteridge (pictured) has been with Siemens for more than 10 years, most recently in the company's digital industries business, where he was the solutions partner manager.

In his new role, he will be responsible for the Fire and Comfort divisions, which fall under Siemens' Buildings portfolio.

Gutteridge commented: 'I understand Siemens' solutions-orientated philosophy very well from my previous roles. I look forward to applying that same commitment to finding optimal solutions to provide safer, more comfortable and more energy-efficient environments for buildings'

● Visit www.siemens.co.uk/buildingtechnologies



Gilberts top of the class with new eco solution

Gilberts is helping deliver net zero educational and commercial buildings with its Mistrale Fusion Deo MFS-HR hybrid ventilation and heat recovery system.

SIEMENS

Since its launch 18 months ago, the MFS-HR has exceeded sales targets by 250%, the firm says, and been shortlisted for two industry awards. Its standard

65% heat recovery reduces construction and operating costs, and could help make buildings carbon negative. Independent tests show up to 20% energy savings, a 7% cut in required solar/heat pump output, air leakage below $3\text{m}^3\cdot\text{h}^{-1}\cdot\text{m}^{-2}$ and a U-value of less than 1.0 W·m⁻²·K⁻¹. Designed and made in Britain, the MFS-HR has adjustable airflow and noise levels, and integral CO₂ monitoring to meet Department for Education IAQ standards.

Visit bit.ly/3UBb0FV





Product drop-in session offered by Pump Technology

Jung Pumpen believes seeing a physical product allows the specifier to visualise its size, build quality and functionality.

For this reason, Pump Technology offers to bring a Jung Pumpen wastewater or sewage pumping system to prospective customers to discuss.

This is not a CPD, but rather a practical opportunity for engineers to examine a product, ask questions and understand its benefits.

● To arrange a product drop-in, email davidj@pumptechnology.co.uk or visit www.jung-pumps.co.uk

Vent-Axia tackles overheating with two-in-one system

The Lo-Carbon Sentinel Econiq-Cool (KERS) two-in-one system offers an energy efficient way of producing renewable hot water and cooling in new-build homes.

It monitors comfort temperatures defined by the user via the Vent-Axia app and, with high temperatures, automatically signals the heat pump to activate cooling.

The system is designed to minimise noise, remove allergens and particulate matter, and reduce heating and cooling costs, and is made to last.

● Call **0344 856 0590** or visit **www.vent-axia.com**





Hamworthy website improves user experience

A new website to help customers find the right heating, hot water or low carbon solution has been launched by Hamworthy Heating.

Featuring case studies that highlight the versatile application of products, the site also includes a technical library that provides detailed product specifications, guides and technical data. There is also a knowledge portal with the latest industry news, trends and developments.

For customers seeking expert advice, the website offers a streamlined contact process to connect users with the right team members.

Visit www.hamworthyheating.com



Ideal Heating kits out sailing club

Hayling Island Sailing Club, Hampshire, has upgraded its heating and hot-water systems to aid the main clubhouse's busy shower facilities.

Installing three Evomax 2 120kW wall-mounted condensing boilers from Ideal Heating Commercial in cascade has helped meet the varying demands throughout the year.

The Evomax 2 model has up to 99% full-load efficiency and up to 110% part-load efficiency. It can operate at up to 30° ΔT and features a high turndown of 5:1.

Visit www.idealcommercial heating.co.uk

www.cibsejournal.com cibse Journal 49



Winner of the CIBSE ASHRAE Graduate of the Year 2024 **Helen Meutermans** reflects on her journey and shares advice for the next generation

Helen Meutermans, graduate mechanical engineer at AtkinsRéalis, was named CIBSE ASHRAE Graduate of the Year at the CIBSE Young Engineer Awards (YEAs) 2024. She offers her advice to other young engineers on building confidence in presenting, managing workloads sustainably, and seeking support through mentoring.

What inspired you to apply for the YEAs?

I went to watch the awards in 2023 and was really impressed by the calibre of the graduate presentations – they looked like TED Talks! I'm not naturally comfortable with public speaking, so I felt it was out of reach for me. However, my line manager and mentor encouraged me to go for it. When we started the application, they helped me see where I'd gone above and beyond in my role, which gave me the confidence to keep going.

What was your presentation about?

My presentation was titled 'What are the implications for building performance of changing demographics, lifestyles, and the need to keep people safe, healthy, and productive?' My firm had presented roadshows on neurodiversity, menopause and mental health, and it struck me how challenging it can be for people to thrive in open-plan offices with hot-desking.

I became passionate about inclusive building design and ensuring it is woven into fundamental design criteria, not just an afterthought. I wanted to share that with the audience, to show that inclusive design isn't just a nice-to-have, it can really improve building performance and how people feel in them.

What did winning the award mean to you?

Winning has been a tremendous confidence boost. I've always been hesitant about public speaking, so standing in front of a large audience



and delivering a presentation was a significant milestone. It reflects the incredible support I've received from my mentors, colleagues and team – I couldn't have accomplished this without them.

Professionally, being named Graduate of the Year has opened doors. One highlight was attending the ASHRAE Winter Conference in Orlando, which was filled with inspiring talks.

At AtkinsRéalis, the recognition has given me a platform to support other early-career engineers. Alongside other Next Generation Engineers representatives, we launched a lunchand-learn series, which has been rewarding in helping others grow.

Do you have any tips for other young engineers on presenting?

There are three key lessons that were shared with me while preparing for the awards – and they've stuck with me ever since.

Every presentation is a story; know your message and believe in it. Even if you forget your script, you will have something to fall back on, understanding your message helps you handle questions confidently.

Practise in conditions as close to the real thing as possible. Replicate the presentation setup as closely as possible, rehearse introductions, exits and timing; if those go smoothly, the rest often follows.

Finally, I watched Amy Cuddy's TED
Talk on power posing — tricking your
brain into feeling more confident
through body language. It definitely
helped me manage last—minute nerves!

What have been the biggest lessons so far as a young engineer?

Learning to recognise when I'm taking on too much and saying no has been key. Early in my career, I accepted every opportunity to grow and prove myself. Now, I ask for help sooner and manage workloads to maintain quality, avoid burnout and sustain productivity. This shift has positively influenced my professional output and wellbeing.

How can the industry inspire the next generation?

As graduates and apprentices join the workforce, providing robust early guidance is vital.

Mentoring isn't just limited to senior engineers, those at earlier career stages can also contribute valuable insights and support professional growth. Fostering an environment where individuals feel comfortable seeking assistance and engaging in meaningful conversations is key, promoting knowledge sharing and a culture of continuous learning.

Looking ahead, what are your ambitions for the future?

A laim to continue my technical development and work towards achieving chartership within the next few years, gaining experience across various projects to meet the necessary competencies and strengthen engineering judgement.

I'm passionate about supporting newcomers. I'd love to see the lunch-and-learn sessions develop and spread to other offices. I hope to be a mentor to others, in the same way my mentors supported me, helping them build confidence. Creating space for others to grow and feel supported is something I really value.





Table booking now open

CHARLES AND THE REAL PROPERTY OF THE PROPERTY



Sponsored by:







FLOWGRID AIR VOLUME SENSOR

- · Accurate average air volume measurement
- · Multiple differential pressure sensing points
- · Averaging velocity pressure tank
- · Suitable for bi-directional volume measurement
- Low velocity detection from 0.5 m/s
- Frame made in galvanised metal or stainless
- Standard mounting flanges 20-30-40 mm
- · Height manufactured in 100mm increments
- · Width manufactured in 50mm increments
- · Length 300 mm to fit the CMR Dampers
- Sizes 3000 x 3000mm have been manufactured
- · Custom made sizes can be manufactured
- 35 Years field application experience



CMR FLOWGRID

The FGG Flowgrid has been designed to measure air volume in ventilation ducts. The Flowgrid consists of a standard duct section with a length of 200 and 300 mm and is available with a 20-30 or 40mm duct connection flange to suit standard duct work

The CMR sensing probes are fitted across the internal duct frame area in predefined spacing. Each probe has a number of pressure inlet points to measure the impact and static pressure at the same time and provide an average velocity measurement.

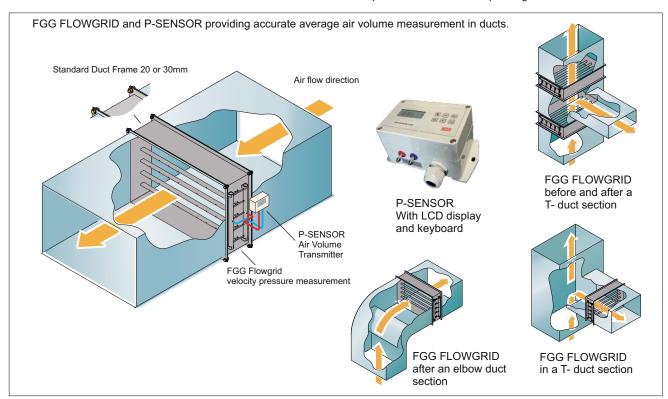
The result is a velocity pressure which ultimately provides a total air volume measurement. Both static and impact pressure have an independent pressure averaging tank which provides a smooth pressure signal of the whole measured area.

Another great advantage of the FGG Flowgrid is, that it can measure bi-directional as it is manufactured equally on both sides. This means, the air flow is measured in one direction and should there be a reverse flow, this can be detected and measured when using the CMR P-SENSOR.

The Flowgrids are manufactured in standard height increments of 100mm going up to a maximum height of 1200mm. Custom sizes can be made 3000 x 3000mm

The Flowgrids are installed in many projects such as

Commercial Buildings - Industrial Production Plants - Pharmaceutical Production - Validated Monitoring Systems Hospital Isolation Rooms - Operating Theatres - Data Centres



CMR is ISO 9001 and UKAS accredited



