

# **CIBSE** **JOURNAL**

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February 2024

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SHOWS PAY RISES EASING  
AWARD-WINNING XCO2 ON  
CROSSING OUT CARBON  
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## **HEAT OF THE MOMENT**

**Government heat pump research seminar reveals  
barriers and opportunities for burgeoning technology**



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## Pump action



Heat pumps are undoubtedly the technology of the moment, with the government recently giving them its full backing as a replacement for gas boilers in new premises from 2025. Ministers' commitment to the technology was further evidenced by Lord Callanan last month, when he called out the misinformation being spread about heat pumps by those with vested interests.

The challenge now is to ensure the government's mass rollout of heat pumps – targeted at 600,000 a year by 2028 – is not undermined by performance gaps and larger-than-expected energy bills.

The Department for Energy Security and Net Zero held a heat pump research seminar last month, to identify the barriers and opportunities around heat pump deployment. Speakers concluded that all house types have the potential to be upgraded to heat pumps, but that more work is needed to ensure that design and installation optimises the technology (page 25).

At the seminar, held in conjunction with the International Energy Agency (IEA), UCL's Dr Peter Mallaburn summarised an IEA Heat Pump Technologies project on retrofitting heat pumps in commercial buildings. He said there was a dearth of evidence for large heat pumps in operation and he is keen to hear from consultants who have looked at the pros and cons of different heat pump configurations.

The transition to heat pumps at National Trust and Historic England properties is the ultimate retrofit. The National Trust risked the ire of *Daily Telegraph*-reading members by revealing that Kingston Lacy, in Dorset, had become the first property to be fitted with a high-temperature heat pump.

In a webinar hosted by Historic England (page 23), Max Fordham's Andrew McQuatt discussed a report on the viability of ground source heat pumps in historic buildings. He concluded that they could be used, but care had to be taken in controlling humidity levels in sensitive areas when specifying heat pumps.

In December, the government published a Heat Network Zoning consultation. On page 31, Baxi and Buro Happold comment on what the carbon-emission limit should be for new heat networks. A higher limit would allow hybrid heat networks using gas to supplement heat pumps, while lower limits would be tougher to meet, but would ensure all-electric networks.

Some buildings will have to connect to new heat zones from 2025, but Baxi says housing developers are increasingly opting for heat networks over individual heat pump systems, even for retrofits. It's heartening to hear industry take the lead when a rapid transition from fossil fuels in buildings is key for our planet's future.

**ALEX SMITH, EDITOR** [asmith@cibsejournal.com](mailto:asmith@cibsejournal.com)

### Editorial

**Editor:** Alex Smith

**Tel:** 01223 378034

**Email:** [asmith@cibsejournal.com](mailto:asmith@cibsejournal.com)

**Tel:** 01223 378048

**Technical editor:** Tim Dwyer

**Reporter:** Molly Toohar-Rudd

**Designer:** James Baldwin

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### Advertisement sales

**Display and sponsorship** Jim Folley

[jim.folley@redactive.co.uk](mailto:jim.folley@redactive.co.uk)

**Tel:** +44 (0) 20 7324 2786

**Products & services** Daniel Goodwin

[daniel.goodwin@redactive.co.uk](mailto:daniel.goodwin@redactive.co.uk)

**Tel:** +44 (0) 20 7880 6217

**Recruitment advertising**

[cibsejournaljobs@redactive.co.uk](mailto:cibsejournaljobs@redactive.co.uk)

**Tel:** +44 (0) 20 7880 6215

**Advertising production** Jane Easterman

[jane.easterman@redactive.co.uk](mailto:jane.easterman@redactive.co.uk)

**Tel:** +44 (0) 20 7880 6248

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## CONTRIBUTORS



### Hywel Davies

What the latest section of the Building Safety Act coming into force means for the golden thread



### Anastasia Mylona

Why CIBSE is updating its tools for calculating overheating risk in new homes



### Louise McHugh

How one manufacturer is tackling the challenge of obtaining embodied carbon data



### Tim Dwyer

This month's CPD covers security risk management processes for building services applications



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## FOR CIBSE

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

CIBSE, 222 Balham High Road,  
London SW12 9BS  
Tel: +44 (0)208 675 5211  
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## IN BRIEF

### HSE launches new asbestos campaign

The Health and Safety Executive (HSE) has launched a new campaign, Asbestos: Your Duty, to improve understanding of what the legal duty to manage the hazardous mineral involves. Businesses and organisations responsible for premises built before the turn of the century – and especially those built between 1950 and 1980, when use of asbestos in construction peaked – must carry out the necessary checks and understand their legal responsibilities. Updated information, new templates and explanatory videos can be found on the HSE's website to help those who are unsure of their legal duties or who need to refresh themselves on what they need to do.

### Voters back energy efficiency

A majority of voters in England's key marginal constituencies would be more likely to back a political party that has pledged to support home energy efficiency upgrades, according to a new poll. New research – carried out by former Downing Street pollsters J.L. Partners, for pump manufacturer Grundfos, in 10 so-called bellwether seats – says 60% of respondents were more inclined to vote for a party that emphasised energy efficiency in domestic settings, rising to 78% among undecided voters. More than three-quarters of those surveyed (77%) in the bellwether seats said they want more government support on energy efficiency.

# Social landlords face strict time limits to tackle mould

## Awaab's Law death will force landlords to swiftly address dangerous hazards

Social landlords will have a new legal requirement to carry out emergency repairs within 24 hours under new legislation being proposed by the government.

The Awaab's Law consultation, launched by Housing Secretary of State Michael Gove on 9 January, sets out strict new time limits to force social housing providers to take swift action to address dangerous hazards such as damp and mould.

The consultation proposes new legal requirements for social landlords to investigate hazards within 14 days, start fixing within a further week, and make emergency repairs within 24 hours.

Those landlords who fail to do so can be taken to court, where they may be ordered to pay compensation to the tenants.

The new law has been drawn up in response to the furore sparked by a coroner's ruling in November 2022 that two-year-old Awaab Ishak died because of a severe respiratory condition triggered by prolonged exposure to mould in his family's social housing flat.

The consultation states that mould in homes must not be pinned on 'lifestyle choices'. It says cooking, having a shower and putting clothes out to dry are part and parcel of living in a home.



## Hywel Davies to retire from CIBSE



CIBSE's chief technical officer Hywel Davies HonFCIBSE is to leave CIBSE next month after more than 25 years working for the Institution.

He was the technical director from 2007 until September 2023, after 10 years at the BRE and 10 years as an independent consultant. He was awarded an Honorary Fellowship by CIBSE last year – the first to be given to a serving member of staff.

Hywel headed up the expert group responsible for reviewing the use and structure of Approved Documents following the Grenfell Tower tragedy and advised on CIBSE's Covid-19 pandemic response. He is a former chair of the Building Regulations Advisory Committee and member of the Health and Safety Executive's Building Advisory Committee, where he will continue to serve as a member.

CIBSE appointed Anastasia Mylona as technical director in September. Chief executive Ruth Carter said: 'I am confident the foundations Hywel has created and the world-class output that he has led will remain strong.'

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## HIGH-TEMPERATURE HEAT PUMP FOR STATELY HOME

The National Trust has installed its first high-temperature ground source heat pump system. Comprising 6,000m of underground pipes, 32 vertical boreholes and four high-temperature heat pumps, the system has been installed at Kingston Lacy in Dorset. Replacing the stately home's existing boiler will save an estimated 30,000 litres of oil and 57 tonnes of carbon a year. The trust hopes the new heat pump will improve conservation of the mansion's art collection by stabilising temperatures and humidity levels.



Kingston Lacy, Dorset

## 'Vested interests funding heat pump misinformation'

**Energy minister says electrification is future for heating homes**

Energy minister Lord Callanan has accused vested interests of spreading misinformation about heat pumps.

Speaking on *The Climate Show* on Sky News, Lord Callanan said: 'A lot of the information is nonsensical. Some people with vested interests are funding campaigns of misinformation.'

He cited the public being told that UK temperatures are too low for heat pumps to work effectively when the highest number of installations in Europe is in Norway.

Lord Callanan said: 'It's clear the majority of decarbonisation will be through electrification. That will be the primary means of heating our homes in the future.'

However, he added that the transition from gas will not happen overnight: 'It will roll out over years and decades. We will still be using gas predominantly for 10 to 15 years.'



Lord Callanan

'We've managed transitions in our fuel mix before. I'm sure we can manage it again.'

Lord Callanan said heat pump prices were falling and applications to the government's Boiler Upgrade Scheme had more than doubled since the grant was increased from £5,000 to £7,500.

Manufacturers are also stimulating demand with cashback deals. Last month, Worcester Bosch announced a Clean Heat Cashback Pledge, giving homeowners and landlords £2,500 towards a Bosch heat pump from 1 April 2024.

Lord Callanan's remarks followed a joint Department for Energy Security and Net Zero/International Energy Agency heat pump symposium last month, when the latest research was shared with leading experts (see page 25).

- Twelve projects that aim to provide financing for home energy funding have been given £16m by the government through the Green Home Finance Accelerator.

## More insulation not essential for heat pump installation

Improved insulation is not an 'essential' prerequisite for installing heat pumps, according to a new report.

*Insulation impact: how much do UK houses really need* ([bit.ly/CJNestainHP](https://bit.ly/CJNestainHP)), published by innovation thinktank Nesta last month, says the claim that the UK's housing stock must be much better insulated before heat pumps can be installed is 'largely untrue'.

While better insulation is 'always beneficial' with any kind of heating system, it is 'not an essential prerequisite for getting a heat pump', and households should 'not be discouraged' from buying one of the devices if their home is poorly insulated.

It says the 'key factors' affecting a heat pump's efficiency are how the heating system is designed and whether the radiators are adequately sized.

A well-designed heating system with correctly sized heat emitters, which enable a lower flow temperature, is the 'most important factor' behind a heat pump's efficiency.

The report proposes a 'pragmatic' approach to insulating homes in the UK alongside a heat pump rollout. While the UK should insulate many more homes, it is 'not cost-effective' to insulate every home to a high standard.

Nesta recommends aiming to improve around 13 million homes to reach the equivalent of Energy Performance Certificate C standard or equivalent by 2030, which would cost an estimated £60bn, prioritising properties with easy-to-treat cavity wall and loft insulation over hard-to-treat homes.

## Rules for historic homes retrofits set to be streamlined

'Confusing' rules surrounding energy efficiency works on historic buildings can be 'streamlined', according to a new government report.

A cross-departmental review of the barriers to adapting heritage homes for energy efficiency and low carbon heating, published last month, says there is confusion among the public about the types of approval needed to install such measures.

It says the government is 'keen to take further action' to make it easier to carry out energy efficiency and low carbon heating works, and the system 'can be streamlined further'. It is committed to taking a range of actions, including consulting on changes to permitted development rights for heat pumps in England.

The report *Adapting historic homes for energy efficiency: a review of the barriers* is available at [bit.ly/42CJisEE](https://bit.ly/42CJisEE)

## IN BRIEF

## Inner London boroughs face higher heat risk

Buildings in inner London boroughs face a higher heat risk than those on the outskirts of the capital, according to a new study by Arup. The report, *Properties vulnerable to heat impacts in London*, was commissioned by the capital's mayor and was published on 23 January. Arup found a direct correlation between a higher heat risk and areas that are most socio-economically vulnerable, the report states.

## Attacks threaten materials inflation

Escalating attacks on shipping in the Red Sea threaten to fuel building materials inflation, Construction Products Association chief executive Peter Caplehorn has warned. Container prices have quadrupled since early December as attacks by Houthi rebels have forced ships to divert around Africa, adding around 20 days to the typical journey from the Far East to Europe.

## ARUP BACKS BIRMINGHAM WITH OFFICE MOVE

Arup has celebrated the official opening of its new Midlands base in Birmingham's One Centenary Way, which is now one of the consultancy's largest global hubs, with nearly 800 staff.

The office is all-electric and has smart technology to optimise energy consumption.

Arup says the move into the centre of Birmingham will help reduce its travel emissions by more than 60% and save more than 1,100 tonnes of CO<sub>2</sub> a year from staff commutes.

The Arup office features a public-facing 'gallery' on the ground floor.



Arup's new central Birmingham office at One Centenary Way

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## Housing association hit by high-rise safety costs

**Remediation expenses will not be passed on to leaseholders, says Thames Valley Housing Association**

One of England's largest housing associations (HA) has revealed a £105m hit to its balance sheet this year because of fire and building safety works costs.

In a trading update for the London Stock Exchange, released on 16 January, Thames Valley Housing Association said the estimated costs of a five-year programme of fire-safety works to leaseholders' properties will be 'fully provided' for in the current financial year.

The association, which owns and manages around 57,000 homes, will be writing down the value of its operating surplus for 2023-24.

As part of the same review, Thames Valley has written down the value of its buildings facing a 'materially reduced' future expected life.

The trading update says the association will seek to mitigate the £105m cost to its balance sheet by recovering cash from third-party contractors 'wherever possible'. In the previous year, Thames Valley reported an operating surplus of £109m.

The group announced last April that it would not be passing on the costs of any remediation works – which it is required to carry out under the government's new building safety regime – to leaseholders living in five-storey-plus blocks.

- The Building Safety Regulator will focus its initial inspections on blocks still clad with the aluminium composite material (ACM) used at Grenfell Tower and built using large panel systems (LPS). A spokesperson for the watchdog, which has been set up to regulate the safety of high-rise accommodation, said it will prioritise blocks still clad with ACM and fast-track LPS blocks built between 1957 and 1973 that have not been remediated and have gas systems.





## IN BRIEF

### Black and White's 50th graduate

Black & White Engineering (B&W) has appointed the 50th graduate to its Global Graduate Pathway Programme. The two-year programme is designed to offer a structured career path at B&W, with graduates integrated into specific teams, such as the data centre team. They are also seconded to different teams so they can broaden their experience and learn about new disciplines. B&W specialises in sustainable MEP design services and operates in 44 countries, with UK offices in Edinburgh, Newcastle, Manchester and London.

### ChapmanBDSP opens office in Saudi Arabia

Andrew Morris has been appointed director for the Middle East & North Africa region of ChapmanBDSP, as the company opens a new office in the Saudi Arabian capital, Riyadh. Morris, whose 40 years of industry experience includes 15 in the Middle East, will be based in Dubai. The office in Riyadh, which was previously served from the United Arab Emirates, will be led by Andrew Russell, ChapmanBDSP's regional director in the kingdom. Morris previously led the growth of Hoare Lea in the UAE and Qatar, delivering several notable projects, including key elements of Dubai Expo 2020 and the Al Rayyan football stadium, one of the locations for the 2022 FIFA World Cup in Qatar.

### BESA training for heat network engineers

The Building Engineering Services Association (BESA) has launched an industry-wide training scheme for heat network engineers, backed by government funding. It is being delivered through BESA's Training Academy and the content is aligned with CIBSE *CPI Heat networks: Code of practice* and the sector's developing technical standards. The programme includes a one-hour introductory foundation course, followed by nine modules on installation and maintenance. It concludes with a practical session delivered by Worcester Bosch and Baxi at training centres in Dartford, Wakefield, Warrington and Worcester. The programme includes 100 places on an installer course, to boost the existing skills of building services engineers.

# Building services' salary rise below industry average

## Hays annual survey reveals increase of 2.5% over the past 12 months

The average buildings services engineer received a 2.5% salary increase last year, half the level that was awarded during the previous 12 months, according to the latest Hays/*CIBSE Journal* annual salary and benefits survey.

The survey, published on page 16, shows that the average pay increase for building services dropped from the 5% recorded by the recruitment consultancy in 2022.

This was a sharper decline than recorded across the construction and property sector as a whole, which had a year-on-year fall in average salary increases from 4.4% to 2.9%.

This year's survey also shows that job security has dropped down the rankings when it comes to the factors building services engineers consider important in a new role.

In last year's Hays survey, it was rated by 26% of engineers as the most important consideration

when weighing up other roles, second only to pay. This year, however, the proportion citing job security has dropped to 15%, behind 'challenging role or projects' (26%) and 'career development and CPD' (20%).

More than half (54%) of the building services engineers surveyed gave their work-life balance a positive rating, an increase on 44% last year.

The survey also showed that 68% of building services engineers are positive about their career prospects, an increase on the 63% figure recorded last year.

Across construction and property, Hays' survey also shows that 82% of employers intend to take on staff over the coming 12 months, which is no change from the previous poll.

In addition, 81% of construction and property employers increased salaries in 2023, the same percentage who did so in the previous year, according to Hays.

# M&E inflation to fall to 4.6% in 2024

M&E inflation is set to ease this year, according to the latest survey of the sector's contractors by Gardiner & Theobald (G&T).

Published in January, the survey says that MEP contractors anticipate package inflation will be an average 4.6% in 2024 - down from 5.3% last year.

Recent improvements in component inventories and easing demand has softened price inflation, according to G&T. This means that, although improvements vary 'wildly' by component, the general pricing outlook has improved compared with 2022.

However, MEP can be prone to 'sudden price spikes', G&T adds, because many critical materials and engineered components are manufactured outside the UK. This means greater exposure to currency movements, worldwide political events, and competition from international demand.

According to surveyed contractors, workloads in the sector are holding up, supported by the decarbonisation agenda, a push toward renewables, plant replacement in end-of-life buildings, and rapidly evolving building technologies.

Almost all contractors that responded expect turnover to grow and input costs to ease, but there are concerns that certain workflows may become quieter in 2024.

## IN BRIEF

### Who deserves a CIBSE Medal in 2024?

Nominations are now open for this year's CIBSE Gold, Silver and Bronze medals.

The medals recognise members who have raised the profile of the Institution and the profession.

- **Gold medal:** for exceptional service of typically at least 25 years, and/or achieving a position of eminence; this is the highest award of the Institution.
- **Silver medal:** for outstanding service of typically at least 15 years.
- **Bronze medal:** for distinguished service of typically at least 10 years.

Using the online form, you can help us to honour those who tirelessly advance and inspire the world of engineering by nominating a member who has inspired you. The deadline for proposals is 31 March 2024. Find out more at [www.cibse.org/proposals](http://www.cibse.org/proposals)

### Call for trainers

CIBSE Training is recruiting more trainers on an ongoing basis, to write and deliver online and face-to-face training for groups of up to 25 paying delegates on public and corporate courses.

If you are an expert in building services engineering and have experience in delivering training, complete the application form at [www.cibse.org/get-involved/become-a-cibse-trainer](http://www.cibse.org/get-involved/become-a-cibse-trainer)

### Book now for Building Performance Awards

Celebrate the industry's outstanding achievements and find out who has triumphed at the CIBSE Building Performance Awards, which take place on 29 February at the Park Plaza Westminster Bridge, London.

The awards recognise the people, products and projects that demonstrate engineering excellence in the built environment, and are the only industry awards that focus on actual, measured performance outcomes.

The shortlist for the 2024 Awards has been announced, so book your seat to celebrate with them: [www.cibse.org/bpa](http://www.cibse.org/bpa)

# CIBSE ANZ recognises young engineers' talent

## Regional chair announces two new award categories for 2024

Three young engineers were recognised for their achievements at the Australia and New Zealand (ANZ) Young Engineers Awards at the end of last year.

**Max Eppelstun** (Northrup Consulting Engineers and Australian National University) won the Mark Griffin Student of

the Year Award, **Vanessa O'Brien** (Arup) the Haris Moraitis Graduate of the Year Award, and **Deejan Ferrao** (Green Building Council of Australia) the Jack Pirie Young Engineer of the Year Award. They all demonstrated exceptional skill, dedication, and creativity in their work. Graduate of the Year runners-up were Jerry Zhang (Beca) and Steven Lam (Mott MacDonald).

A keynote address was delivered by environmental scientist, author and broadcaster Rob Gell AM. He shared insights on the pivotal role of young engineers in shaping a sustainable future, emphasising the importance of innovation and collaboration in building services.

ANZ chair Phil Senn praised the growth of and support for the event, and announced two new categories for 2024: Graduate Development Programme of the Year and Young Engineer Champion of the Year.

- For more on the ANZ Region and awards, visit [bit.ly/CIBSEANZ](http://bit.ly/CIBSEANZ)



From left to right: Jerry Zhang, Aurecom's Laurelle Bird (sponsor), Vanessa O'Brien and Steven Lam

# Officer, Board and Council nominations and appointments

New CIBSE officers, Board members and Council members take office each year from the AGM in June. The Board is CIBSE's governing body, and comprises seven officers – President, president-elect, three vice-presidents, honorary treasurer and immediate past president – plus five Board members.

CIBSE's by-laws and regulations require that all candidates for officer and Board member vacancies arising at the AGM be considered by the Nominations Panel. All sections of the Institution are invited to suggest candidates for consideration.

The panel seeks to reflect Charity Commission guidance by nominating a range of candidates with the skills and experience required to fulfil the Board's role as the governing body of a significant registered charity. It also seeks to ensure that the Board includes a balance of representation from different industry sectors. Having considered the advice of the Nominations Panel, the Board then nominates candidates for president-elect and Board member vacancies.

The Board's nominated candidates for vacancies arising at the AGM in June 2024 are: **President-elect: Vince Arnold CEng FCIBSE; Honorary treasurer: Les Copeland FCIBSE. Members of the Board: Ted Pilbeam IEng FCIBSE and Vincent Ma CEng FCIBSE.**

The Board also appoints three vice-presidents to take office at the next AGM. These appointments are normally made from those who serve, or have served, on the Board, and all those listed below are current or past officers or Board members. The Board's appointments to take office in these roles from the June 2024 AGM are: **Vice-presidents: David Cooper CEng FCIBSE; David Stevens CEng FCIBSE; and Mike Burton CEng FCIBSE.**

The Council is a larger consultative body that advises the Board on CIBSE policy. It includes representatives of Regions, Societies, Groups, Networks, Standing Committees, and elected members, who serve a three-year term. Two corporate positions and one non-corporate position are available for election each year. The Board, having considered the advice of the Nominations Panel, nominates the following for vacancies arising at the June 2024 AGM: **Members of Council: Geraldine O'Farrell and Jon Belfield (corp); Jennifer Cox (non-corp).**





CIBSE President Adrian Catchpole presents Lynne Jack with her Silver medal.



Four project awards went to Ramboll for the Misk Art Institute

## IN BRIEF

### Call for submissions for *BSER&T* special

The *Building Services Engineering Research and Technology Journal (BSER&T)* is inviting articles for a special issue on sustainable technologies and systems for net zero carbon buildings and communities.

This special issue aims to present articles demonstrating real insight and practical application of sustainable technologies and systems for the delivery of net zero carbon buildings and communities around the world.

*BSER&T* would like to hear from you if you have research or practice that could be suitable to feature and you are able to produce a robust research paper, technical note, case study, or review article.

For more information, visit [bit.ly/CIBSE24](https://bit.ly/CIBSE24). CIBSE members can read the *BSER&T* for free at [www.cibse.org/knowledge](https://www.cibse.org/knowledge)

### Heat networks training grants

CIBSE Training has secured grant funding from the Department for Energy Security and Net Zero. Each delegate can get £500 off the cost of a CIBSE heat networks training course – either the one-day Introduction to Heat Networks and Code of Practice or the two-day Heat Networks Code of Practice (CPT) full course – see [www.cibse.org/training](https://www.cibse.org/training). The grant will be awarded on a first come, first served basis and is only available to delegates who live in England. To apply, email [training@cibse.org](mailto:training@cibse.org) and provide proof of address.

# Perfect 10: Ramboll wins big at CIBSE UAE Awards

## Consultancy takes home individual, innovation and project accolades

Engineers, projects and companies were recognised at the CIBSE United Arab Emirates (UAE) Region Awards in December.

Now in their fifth year, the awards had 23 categories, including individual ones for sustainability engineer, electrical engineer and plumbing engineer of the year, plus project categories and those for consultancy, manufacturer and MEP contractor of the year.

CIBSE President Adrian Catchpole and CEO Ruth Carter attended the event, as more than 250 MEP professionals came together to celebrate the outstanding achievements.

Ramboll was the big winner on the night, with 10 awards. It took home four of the seven project awards for the Misk Art Institute, and won the Embodied Carbon Initiative and Best Digital Innovation awards.

Ramboll's Michael Rimmer won Executive of the Year, while Rishi Jain and Faaizah Faisal Mohamed, also from Ramboll, won Plumbing Engineer and Graduate of the Year respectively.

Finishing Ramboll's winning streak, Bindia

Harish was Young Engineer of the Year.

CIBSE past president Lynne Jack was presented with a CIBSE Silver medal on the night, in recognition of her outstanding contribution to the Institution and the industry. Imran Shaikh, chair of CIBSE UAE, also presented the Appreciation Award to Carter and Catchpole for their leadership and support for the UAE Region.

The awards not only highlighted individual and collective triumphs, but also underscored CIBSE's unwavering commitment to cultivating careers in building services. The Institution continues to have an impact by fostering collaborations, facilitating the exchange of transnational knowledge, acknowledging high achievers, and mobilising global stakeholders for sustainable transformation.

In the Middle East, where new constructions abound and existing structures seek technology-driven optimisation, the ambitious regional roadmap of CIBSE UAE is indeed a reason for celebration.

● For more information about the UAE awards and the UAE Region, visit [bit.ly/CIBSEUAER](https://bit.ly/CIBSEUAER)

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# A proactive approach in a warming climate

As global temperatures rise, CIBSE is looking to update its tools for calculating overheating risk in new homes. Dr Anastasia Mylona explains how work on TM59 and weather files aims to increase buildings' resilience

The latest Intergovernmental Panel on Climate Change report (2023) finds that there is a more than 50% chance that global temperature rise will reach or exceed 1.5°C between 2021 and 2040 across emissions scenarios. Under a high-emissions pathway – the one on which the global greenhouse gas (GHG) emissions are currently – the world may hit this threshold even sooner, between 2018 and 2037.

With the current 1.1°C of global temperature rise, changes to the climate system are now occurring in every region of the world, with rising sea levels, extreme weather events, and rapidly disappearing sea ice. Even if we managed to reduce our global emissions to zero tomorrow, we are already destined for a certain level of climate change – because of the GHG emissions already released into the atmosphere – by the middle of this century.

What the above is clearly telling us is that, while we are committed to reducing our carbon emissions towards a net zero future, it's imperative that we also build resilience in all sectors of human activity, including the built environment, where most of us spend most of our lives.

The main areas in which climate change will impact the built environment are thermal comfort and energy



use, structural integrity, and water management. Warmer winters may reduce the need for heating, but keeping cool in summer without increasing energy use will present a key challenge. The industry will also have to address the impact of extreme storms and having too much water (floods) and too little (droughts).

CIBSE tools and resources are widely used by policy and industry to inform adaptation strategies. For example, in 2022, CIBSE's TM59 *Design methodology*

for the assessment of overheating risk in homes was introduced as one of the methods to show compliance with the Building Regulations on overheating in England: Approved Document O.

For the first time, the requirement to increase the resilience of buildings (new homes) to the impacts

**"It's imperative that we build resilience in all sectors of human activity, including our built environment, where most of us spend most of our lives"**

**DR ANASTASIA MYLONA** is technical director at CIBSE

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of a changing climate (increasing temperatures) was introduced in national policy (in England).

TM59 provides a consistent methodology to assess overheating. It standardises occupancy profiles, internal gains, the treatment of blinds and shading, and the use of weather profiles.

CIBSE is in the process of revising TM59 to coincide with the release of the Future Homes Standard, currently under public consultation. As part of the process, the authoring team debated the use of future weather (2020s: 2011-40) against historic weather profiles (1983-2013) in the assessment of overheating, to allow for mitigation solutions that would work both now and in the future.

As the life expectancy of an average home is at least 100 years, it has been decided that a future weather profile should be required to investigate the thermal performance of domestic properties.

## Design Summer Years

CIBSE's Design Summer Years (DSY) are annual weather profiles selected to represent three types of hot event: DSY1 – moderately warm summer; DSY2 – short, intense warm spell; DSY3 – long, less-intense warm spell.

DSYs are available for 14 locations in the UK, and there are two extra DSYs for London to capture the intensity of the urban heat island. The DSYs are also available for three future timelines: 2020s (2011-40), 2050s (2041-70) and 2080s (2071-2100), based on the UK Climate Projections 2009. CIBSE is now revising DSYs based on the latest UK Climate Projections released in 2018.

The revision of TM59 is focusing on two key elements: the revision of the night-time criterion and the implementation of the 2050s DSY1 as the minimum required weather profile to assess overheating in homes.

Existing studies have shown that the current criterion overestimates the risk of overheating (Lomas *et al*, *BSER&T*, 2023). The current UK bedroom threshold of 26°C is based on one small study, which is now more than 45 years old.

CIBSE is working with 20 organisations from industry and academia to look at a higher threshold. Early results have shown that the relaxation of the night-time criterion will better represent the risk of overheating and the effectiveness of mitigation options in the future.

While increasing the challenge presented by the warmer 2050s weather profile, overall it shows similar levels of overheating as the current TM59 methodology.

There is still a lot to be done to adapt our buildings to the rising temperatures and extreme hot events. We need to better understand the comfort and health thresholds of vulnerable people. We also need to promote more sustainable cooling systems (reversible heat pumps might be a solution), especially for homes, to avoid the mass uptake of air conditioning, which will undermine our carbon-reduction efforts.

Lastly, but most importantly, we need to focus on making our cities greener; if we tackle increasing temperatures and heatwaves at city level, then our homes and buildings will be less vulnerable to such weather events.

## Cities should be looking to heat pumps to replace gas connections

### Decarbonising Bradford's heat

Bradford Council has a target to be net zero by 2038. The proposed Bradford district heating network ('Coming to street near you', *CIBSE Journal*, January 2024) will ensure that it cannot be achieved.

The developer estimates 25% of the heat on the proposed heat network will come from gas. This means, even by the time the network is built, new buildings would not be able to connect to it, because it will be too high-carbon. The Future Homes and Buildings Standards (FHBS) consultation is clear that new buildings would not be able to connect to fossil-fuel heat networks.

This is a common issue for clients where we are working on their corporate net zero targets. They are often required to connect to heat networks, even though they would like to build all-electric.

The quote for the carbon intensity of the heat network is 59g CO<sub>2</sub> per kWh of heat and this assumes green electricity contracts, (which have issues of their own). This would be about as low carbon as resistance heating under the FHBS.

Accepting this would be expensive to run, put it through a heat pump achieving a coefficient of performance of 2.5 and you have a carbon intensity of 27g CO<sub>2</sub> per kWh. That is just for the period up to 2030; the heat pump will continue to decarbonise to zero, while the gas boilers lock in their carbon intensity for decades.

As for the issue that certain properties cannot use heat pumps directly, that has been proven false on many occasions, including most recently by the Energy Systems Catapult report, which found that all housing types are suitable for heat pumps.

The article says that the heat network will be 30% cheaper than individual systems on a whole life basis. Putting aside the subjective factors that can be used in these assessments, surely this will depend on factors that vary over years, including a switch of levies from electricity to gas? Also, it isn't a like-for-like comparison; the network is not heat pump-based – it is a hybrid system with gas. Comparing that to individual heat pump retrofits is not a fair comparison. It should be with a 100% heat pump heat network, plus losses.

From what the article says, £20m of taxpayer money has been given to an investment that, by its own claim, will lock in fossil fuels for decades, fail Building Regulations for new buildings from day one, and, as a bonus, emit air pollution in the middle of a city.

**Barry Evans, director at Turley**

### Response from Bradford Energy Network

*Thank you for raising your concerns. We would value an opportunity to discuss the points you raised, and to correct some of the misconceptions in your contribution about heat networks and the Bradford Energy Network in particular. The great thing about heat networks is that they are technology agnostic, and can continue to connect new sources of low carbon heat over time, as demonstrated internationally, continually driving down costs and carbon. Heat networks are much more efficient, and bring additional benefits to the city, as compared to individual building solutions.*

*CIBSE Journal welcomes readers' letters, opinions, news stories, events listings, and proposals for articles.*

*Please send all material for possible publication to: editor@cibsejournal.com or write to: Alex Smith, editor, CIBSE Journal, CPL One, 1 Cambridge Technopark, Newmarket Road, Cambridge CB5 8PB, UK.*

*We reserve the right to edit all letters.*

# Grasp the thread

The final sections of Part 4 of the Building Safety Act have come into force, covering the golden thread and safety case requirements. Dr Hywel Davies explains the implications for building managers and accountable persons

The Building Safety Act 2022 (Commencement No 6) Regulations 2024 came into force on 16 January. These bring fully into effect many sections of Part 4 of the Building Safety Act 2022, including: requirements for building assessment certificates; identifying and managing risks and preparing safety case reports; and maintaining information, the ‘golden thread’. They also require information to be shared with residents and regulators. So, what must an accountable person (AP) do?

The objective of Part 4 is for every higher-risk building (HRB) to be managed competently, with a proper risk identification, assessment and management process formally established. It requires that the information needed to manage the building safely and to demonstrate safe management is brought together in a robust digital record of the building, and that this is maintained.

The Higher-Risk Buildings (Keeping and Provision of Information etc.) (England) Regulations 2024 introduce the regulatory framework for the golden thread. The act requires the golden thread to be stored digitally throughout the life-cycle of the building, so that the information is accessible and can be quickly updated and handed over when assets change owner. This will drive a shift to treating building information as ‘belonging’ to the building itself, and not to the owners. Golden thread information must be:

- Kept digitally and securely
- A ‘single source of truth’
- Available, in a readily usable form, to people who need it to do a job, including emergency services
- Proportionate (taking into account the stage the building is at in its life)
- Explicit about how building safety risks are being assessed and managed.

The golden thread information will support the safety case and safety case report, required to support the AP’s application for a building assessment certificate. This is the legally required means to gain regulatory approval to occupy a residential HRB. This requires the AP to identify building safety risks – fire and structural – and to explain how these are being eliminated, mitigated and managed.

Section 85 of the act requires that the ‘Principle



**“This will drive a shift to treating building information as ‘belonging’ to the building itself, and not to the owner”**

Accountable Person’ (PAP) for an occupied HRB prepares a ‘safety case report’ containing: ‘(a) any assessment of the building safety risks made under section 83 by an Accountable Person for the building; and (b) a brief description of any steps taken under section 84 by an Accountable Person for the building’.

Building safety case reports should be a clear summary of the information that the Building Safety Regulator needs to see to determine whether the building is safe to occupy, and to demonstrate that the golden thread is in place and properly managed and maintained.

Each safety case report must include at least the following information:

- Details of all APs and responsible persons for the building
- A description of the location, shared facilities (if any), and nearby buildings and transport routes
- Details of how the PAP and other APs have assessed building safety risks, the findings of those assessments, and any follow-up actions or recommendations
- An explanation of the safety management system, including emergency management and evacuation procedures
- How identified building safety risks are being managed and mitigated to ensure resident safety and keep the whole building safe

- References to other key documents and supporting building safety information that the regulator may reasonably need

The PAP must maintain and revise the safety case report ‘as necessary or appropriate’ and notify the regulator of all updates (with a copy, if requested).

These regulations mark the conclusion of the process of implementing and introducing the new building safety regime for HRBs in occupation. Triggered by the Grenfell Tower tragedy, they are intended to improve standards in HRBs and to re-establish trust in the sector following the revelations that emerged at the inquiry. Now to deliver across 14,000 HRBs. The real work starts here.

- Higher-Risk Buildings (Keeping and Provision of Information etc.) (England) Regulations 2024 - [bit.ly/3SvGxZC](https://bit.ly/3SvGxZC)

**DR HYWEL DAVIES**  
HonFCIBSE  
is chief technical  
officer at CIBSE  
[www.cibse.org](http://www.cibse.org)



# A call for clarity

In the ever-evolving landscape of construction, the traditional single-stage tender process for design and build contracts faces scrutiny. calfordseaden's Jonathan Harris delves into the practicality of a design-then-build approach

There has been much said about the future of design and build (D&B) as a solution to procuring higher-risk buildings (HRBs) since the introduction of the Building Safety Act – so here's my view.

Over the past few years, with various clients, I have had the opportunity to lead the process to redraft their standard suite of employer's requirements (ERs). Whenever I start the process, I explain to stakeholders that they should view their existing ERs as if they were a busy room where everyone is speaking at the same time – clauses added over time, often causing contradiction and lack of clarity.

Rather than trying to untangle the client's existing document – which would be like stepping in to break up a pub brawl in Albert Square – I look to create a new room (my template) and, one by one, invite clauses from the existing, unruly room to justify their place.

My point? For so long, clarity has been missing from the D&B process and it starts at the beginning of the golden thread with the ERs!

D&B contracts are mostly procured under a single-stage tender process, passing risk to the contractor as soon as possible. Tenderers are often given three months to understand and appraise the tender documents and design, obtain subcontract prices, and provide the contractor's proposals and a fixed-contract sum, which the tenderer and their supply chain must frequently stand by for more than two years.

Some clients have governance processes that require up to 12 months added time between tender return and commencement of the contract – this is approaching three years of crystal-ball pricing.

Contractors then start the works swiftly, often forcing construction to begin in parallel with design, which has consequences for the clarity of design, build and record information.

Regardless of whether the tenderer wins with an unnecessarily high-risk allowance, or underprices and spends the next two years cutting corners, the employer is not the winner.

Given recent global and national economic challenges, it's no wonder that so many contractors who have 'won' single-stage tenders in better times are now struggling to digest the commercial realities of these contracts.



**"I can't see the commercial justification for procuring a D&B contract for a HRB via a single-stage tender"**

Adopting a two-stage process would shorten the gap between locking in the price and commencement of works, allowing the contractor and their team to understand the site better and to decipher the ERs before launching the project. This can provide a better platform for true value for money to be the star of the show. I encourage my clients to pursue this process on projects that merit its inclusion, but this is a culture change for the industry.

D&B contracts have been used and abused as a design *while* you build solution. For HRBs, however, the Building Safety Act introduces the legal obligation to obtain Gateway 2 approval (realistically a design and procurement freeze) before starting work on the site. This is the perfect opportunity for D&B contracts to be used as intended – design and then build.

Let me be as bold as to say I cannot see much commercial justification for procuring a D&B contract for a HRB via a single-stage tender. I believe the combination of a two-stage tender and a D&B contract is entirely congruous with the intentions of the Building Safety Act (see panel, 'Looking at the advantages').

D&B is here to stay and should be viewed as a good contracting solution to deliver the intentions of the Building Safety Act – but only if it is procured in the correct way.

**JONATHAN HARRIS** is equity partner at calfordseaden

## LOOKING AT THE ADVANTAGES

### Benefits of a two-stage D&B tender:

- 1) Single-point responsibility for the design and the build (where the principal contractor should also be the principal designer).
- 2) A platform to conclude the Gateway 2 process before the works and associated contractor's site costs commence.
- 3) A golden thread with minimal opportunity for frayed edges.

### Advice to clients regarding two-stage procurement:

- 1) Have a suitably skilled and resourced quantity surveyor to implement a second-stage tendering protocol to drive value into the trade package procurement process.
- 2) Consider whether the financial assessment criteria at first-stage return should reward the tenderer who provides the lowest 'on cost' – how about a 'race to the middle' for these first-stage costs? Preliminaries and overhead and profit probably account for only 25-30% of the eventual contract sum (the rest is procured at the second stage), so there is a benefit to ensuring the contractor is resourced to design, procure and build the works in such a way that true value for money is optimised.

# ENGINEERING RESILIENCE

While the construction sector faces economic headwinds, building services engineers are forging ahead as demand for skills related to decarbonisation grows. **David Blackman** reports on findings from the 2024 Hays Salary Survey

**T**he construction sector looks set for a bumpy ride in 2024, as the economy teeters on the brink of a recession. However, continuing skills shortages and the drive for decarbonisation mean buildings services engineers are in high demand.

Across the industry, firms are bullish, with 82% of employers intending to take on staff in the next 12 months. One major building services engineer is looking at a 5% increase in headcount.

According to the annual industry salary survey carried out by recruitment consultancy Hays for *CIBSE Journal*, more than half (54%) of construction and property employers cite the economic climate as their main external challenge over the next 12 months. Feedback from contractors is that this year looks a 'bit tougher', says Tomás Neeson, managing partner at Cundall.

The downturn in the commercial and residential markets, compounded by uncertainties surrounding implementation of the government's Building Safety Act and the looming general election, mean things are 'slowing down a bit', says John Lewis, head of building engineering for UK & Ireland at Aecom. However, he is 'cautiously optimistic' about growth.

While sensing a 'tiny bit of nervousness' about prospects for later this year, Ben Styles, a senior business director at Hays, says the offices he visits remain 'really, really busy'. 'Their order books and workflow have not dropped off,' he adds.

Alex Hill, managing director of Whitecode, says the Kent-based

engineer is still receiving 'strong' levels of inquiries and orders.

Any nerves about growth are not showing up in firms' hiring intentions. That 82% of employers across construction and property intend to take on staff over the coming 12 months shows no change on last year's survey results.

The same seems to be true in building services, judging by *CIBSE Journal's* straw poll of leading firms in the sector. Lewis, at Aecom, says he is projecting a headcount increase of around 5%, while Cundall has a target to recruit 62 graduates over the next year, without taking into account other avenues, such as apprenticeship schemes.

The buoyancy of building services engineering is partly explained by the fact that construction sectors that have been



**2.5%**

average salary increase for building services engineers



worst hit by the economic situation, such as volume housebuilding, have relatively little call for the discipline's skills.

The impact of any downturn is also likely to be mitigated by ongoing skills shortages across the industry. Hays reports that the proportion of construction employers reporting shortages over the past 12 months is down, but only slightly, at 93% compared with 95% in last year's survey.

The impact of these shortages on firms is increasing, with 47% saying skills shortages have affected their ability to deliver projects, up from 40% last year.

There's a 'big shortage' of engineers with a couple of years' experience, says Styles. However, competition is greatest for mid-level grades, typically engineers with 10 to 15 years' experience, partly because of people taking up opportunities overseas or returning to their home countries.

Phil Jackson, Hays' construction director for UK and Ireland, says: 'There is a desire by companies to hold onto their staff rather than having to let people go.' This means opportunities for those who do lose their jobs, he adds. 'I don't know anybody who's been on the market very long. If they've been made redundant, somebody's taking them on because they're seeing an opportunity to snap up a good person.'

Building services is also benefiting from the wider push to decarbonise the built environment, according to Styles. 'Sustainability and energy management are in the headlines, and the driving force of that is building services. Heat pumps, new boiler systems and new lighting schemes have all got to be designed,' he says.

Sustainability services are the 'fastest-growing part' of Cundall's business, according to Neeson, who says: 'We're ramping up rapidly there.'

Lewis agrees. 'Anything related to sustainability is a hot market still. In the past two to three months, we probably had our strongest hiring months in the building engineering business on record.'

This strong recruitment partly reflects how the market has cooled compared with this time last year, when a lot of staff were moving, increasing the pool of available people. 'That's coincided with a steady drop in attrition throughout the year. We're >>>



of employers intend to take on staff within 12 months

## "Increasingly, people want to work for businesses that have a really strong offer when it comes to sustainability, net zero and diversity"

### Consultants: Associate

Region	Typical salary 2024	Min salary 2024	Max salary 2024
East Midlands	£70,000	£60,000	£75,000
East of England	£65,000	£55,000	£70,000
London	£82,000	£70,000	£85,000
North East England	£50,000	£43,000	£52,000
North West England	£68,000	£60,000	£72,000
Northern Ireland	£65,000	£60,000	£70,000
Scotland	£62,500	£57,000	£67,000
South East England	£72,000	£65,000	£75,000
South West England	£70,000	£68,000	£73,000
Wales	£68,000	£68,000	£73,000
West Midlands	£72,000	£60,000	£75,000
Yorkshire and the Humber	£62,000	£49,000	£65,000
<b>National average</b>	<b>£67,208</b>	<b>£59,583</b>	<b>£71,000</b>
<b>% increase year on year: 3.8%</b>			

### Consultants: CAD technician

Region	Typical salary 2024	Min salary 2024	Max salary 2024
East Midlands	£30,000	£26,000	£35,000
East of England	£35,000	£29,000	£40,000
London	£38,000	£32,000	£45,000
North East England	£28,000	£23,000	£29,000
North West England	£33,000	£25,000	£38,000
Northern Ireland	£28,000	£25,000	£30,000
Scotland	£28,500	£24,000	£32,000
South East England	£34,000	£31,000	£36,000
South West England	£33,000	£30,000	£38,000
Wales	£31,000	£30,000	£38,000
West Midlands	£32,000	£26,000	£35,000
Yorkshire and the Humber	£30,000	£22,000	£32,000
<b>National average</b>	<b>£31,708</b>	<b>£26,917</b>	<b>£35,667</b>
<b>% increase year on year: 2.3%</b>			

### Consultants: Director

Region	Typical salary 2024	Min salary 2024	Max salary 2024
East Midlands	£80,000	£70,000	£85,000
East of England	£85,000	£70,000	£90,000
London	£110,000	£90,000	£140,000
North East England	£57,000	£46,000	£59,000
North West England	£75,000	£70,000	£80,000
Northern Ireland	£75,000	£70,000	£80,000
Scotland	£73,000	£62,000	£87,000
South East England	£82,000	£75,000	£85,000
South West England	£75,000	£70,000	£79,000
Wales	£73,000	£70,000	£79,000
West Midlands	£82,000	£65,000	£85,000
Yorkshire and the Humber	£75,000	£70,000	£80,000
<b>National average</b>	<b>£78,500</b>	<b>£69,000</b>	<b>£85,750</b>
<b>% increase year on year: 3.4%</b>			

### Consultants: Intermediate design engineer (M&E)

Region	Typical salary 2024	Min salary 2024	Max salary 2024
East Midlands	£40,000	£32,000	£40,000
East of England	£47,000	£38,000	£51,000
London	£45,000	£40,000	£50,000
North East England	£33,500	£28,000	£38,000
North West England	£35,000	£30,000	£40,000
Northern Ireland	£36,000	£32,000	£40,000
Scotland	£39,500	£33,000	£46,000
South East England	£39,000	£35,000	£40,000
South West England	£50,000	£47,000	£55,000
Wales	£47,000	£47,000	£55,000
West Midlands	£40,000	£32,000	£41,000
Yorkshire and the Humber	£32,000	£30,000	£40,000
<b>National average</b>	<b>£40,333</b>	<b>£35,333</b>	<b>£44,667</b>
<b>% increase year on year: 1.6%</b>			

### Consultants: Junior design engineer (M&E)

Region	Typical salary 2024	Min salary 2024	Max salary 2024
East Midlands	£30,000	£26,000	£32,000
East of England	£29,000	£23,000	£32,000
London	£35,000	£30,000	£38,000
North East England	£24,000	£19,500	£25,000
North West England	£28,000	£22,000	£32,000
Northern Ireland	£28,000	£26,000	£30,000
Scotland	£31,500	£26,500	£34,000
South East England	£32,500	£25,000	£33,000
South West England	£35,000	£31,000	£38,000
Wales	£34,000	£31,000	£38,000
West Midlands	£31,000	£26,000	£32,000
Yorkshire and the Humber	£28,000	£20,000	£30,000
<b>National average</b>	<b>£30,500</b>	<b>£25,500</b>	<b>£32,833</b>
<b>% increase year on year: 1.9%</b>			

### Consultants: Professional quantity surveyor

Region	Typical salary 2024	Min salary 2024	Max salary 2024
East Midlands	£55,000	£50,000	£60,000
East of England	£60,000	£55,000	£65,000
London	£75,000	£55,000	£90,000
North East England	£46,000	£38,000	£48,000
North West England	£50,000	£40,000	£58,000
Northern Ireland	£48,000	£45,000	£55,000
Scotland	£42,500	£37,000	£52,000
South East England	£75,000	£63,000	£80,000
South West England	£60,000	£57,000	£65,000
Wales	£57,000	£57,000	£65,000
West Midlands	£55,000	£45,000	£60,000
Yorkshire and the Humber	£52,000	£40,000	£55,000
<b>National average</b>	<b>£56,292</b>	<b>£48,500</b>	<b>£62,750</b>
<b>% increase year on year: 1.9%</b>			

» in a very good place on both the hiring and the attrition side at the moment,' says Lewis.

This slight cooling in labour-market churn perhaps explains why the level of salary increases reported in this year's survey is lower than 12 months ago.

Overall, construction and property saw a 2.9% average salary increase over the past year, compared with 4.4% in 2022. The drop was even sharper for building services engineers: 2.5% compared with 5%. Nevertheless, the overwhelming majority (81%) of construction and property employers increased salaries for their staff in 2023, the same percentage that did so in the previous year, according to Hays.

Cundall awarded an average pay rise last year of 7%. 'Our pay rises were really good because a key thing for us is making sure that we're buying best in class,' Neeson says.

Just more than a quarter (26%) of building services engineers say they have received a specific cost-of-living payment over the past 12 months. Cundall, however, chose instead to increase salaries, says Neeson: 'We've put it on salary, not cost of living, because people benefit from it in the long term, rather than just a one-off payment.'

While Whitecode awarded a 5% increase, employees' expectations have tempered, says Hill: 'Across the company, we haven't seen a massive jump in what people are demanding. If you're good, you can walk out of a job in this industry and walk in anywhere you want. The difference is, those people who are not that good are not quite as demanding.'

Greater caution on pay is being seen more broadly across the industry, says Jackson: 'Although there's still a huge demand for people, companies are having to watch the pennies. They're not necessarily prepared to break the bank like they were a year



of firms say skills shortages have affected their ability to deliver projects



of building services engineers say an organisation's purpose is important to them

Consultants: Revit/BIM technician

Region	Typical salary 2024	Min salary 2024	Max salary 2024
East Midlands	£40,000	£35,000	£45,000
East of England	£43,000	£32,000	£49,000
London	£55,000	£40,000	£65,000
North East England	£39,500	£31,000	£41,000
North West England	£42,000	£35,000	£45,000
Northern Ireland	£38,000	£34,000	£40,000
Scotland	£37,000	£26,000	£42,000
South East England	£50,000	£44,000	£56,000
South West England	£44,000	£41,000	£49,000
Wales	£42,000	£41,000	£49,000
West Midlands	£42,000	£35,000	£45,000
Yorkshire and the Humber	£40,000	£31,000	£44,000
<b>National average</b>	<b>£42,708</b>	<b>£35,417</b>	<b>£47,500</b>
% increase year on year: 1.5%			

Consultants: Senior design engineer (M&E)

Region	Typical salary 2024	Min salary 2024	Max salary 2024
East Midlands	£55,000	£45,000	£58,000
East of England	£55,000	£48,000	£62,000
London	£60,000	£50,000	£70,000
North East England	£49,500	£41,000	£51,000
North West England	£55,000	£45,000	£58,000
Northern Ireland	£52,000	£45,000	£58,000
Scotland	£52,000	£43,000	£58,000
South East England	£58,000	£55,000	£63,000
South West England	£55,000	£51,000	£58,000
Wales	£53,000	£51,000	£58,000
West Midlands	£54,000	£45,000	£60,000
Yorkshire and the Humber	£49,000	£40,000	£50,000
<b>National average</b>	<b>£53,958</b>	<b>£46,583</b>	<b>£58,667</b>
% increase year on year: 1.6%			

Consultants: Sustainability consultant

Region	Typical salary 2024	Min salary 2024	Max salary 2024
East Midlands	£48,000	£42,000	£55,000
East of England	£54,000	£43,000	£62,000
London	£60,000	£45,000	£75,000
North East England	£46,000	£38,000	£48,000
North West England	£50,000	£30,000	£60,000
Northern Ireland	£50,000	£45,000	£55,000
Scotland	£48,000	£38,000	£53,000
South East England	£46,500	£43,000	£48,000
South West England	£50,000	£46,000	£54,000
Wales	£48,000	£46,000	£54,000
West Midlands	£50,000	£42,000	£55,000
Yorkshire and the Humber	£50,000	£45,000	£55,000
<b>National average</b>	<b>£50,042</b>	<b>£41,917</b>	<b>£56,167</b>
% increase year on year: 2.6%			

Contractors: CAD technician

Region	Typical salary 2024	Min salary 2024	Max salary 2024
East Midlands	£33,000	£27,000	£35,000
East of England	£31,000	£28,000	£35,000
London	£50,000	£40,000	£60,000
North East England	£29,000	£23,500	£29,500
North West England	£31,000	£25,000	£35,000
Northern Ireland	£40,000	£38,000	£45,000
Scotland	£26,500	£23,500	£28,000
South East England	£43,000	£37,000	£45,000
South West England	£34,000	£33,000	£37,000
Wales	£32,000	£30,000	£36,000
West Midlands	£32,000	£26,000	£34,000
Yorkshire and the Humber	£28,500	£24,000	£29,500
<b>National average</b>	<b>£34,167</b>	<b>£29,583</b>	<b>£37,417</b>
% increase year on year: 1.1%			

Contractors: Contract quantity surveyor

Region	Typical salary 2024	Min salary 2024	Max salary 2024
East Midlands	£60,000	£50,000	£65,000
East of England	£62,000	£48,000	£70,000
London	£70,000	£65,000	£95,000
North East England	£48,500	£43,000	£53,000
North West England	£57,000	£42,000	£58,000
Northern Ireland	£60,000	£55,000	£65,000
Scotland	£48,500	£40,000	£50,000
South East England	£70,000	£65,000	£73,000
South West England	£58,000	£56,000	£64,000
Wales	£53,000	£50,000	£62,000
West Midlands	£55,000	£45,000	£62,000
Yorkshire and the Humber	£46,000	£42,000	£52,000
<b>National average</b>	<b>£57,333</b>	<b>£50,083</b>	<b>£64,083</b>
% increase year on year: 3.8%			

Contractors: Directors

Region	Typical salary 2024	Min salary 2024	Max salary 2024
East Midlands	£75,000	£65,000	£85,000
East of England	£85,000	£70,000	£90,000
London	£110,000	£90,000	£130,000
North East England	£58,500	£52,000	£64,000
North West England	£80,000	£70,000	£80,000
Northern Ireland	£85,000	£80,000	£90,000
Scotland	£64,000	£54,000	£68,000
South East England	£80,000	£75,000	£83,000
South West England	£75,000	£70,000	£80,000
Wales	£73,000	£68,000	£77,000
West Midlands	£77,000	£65,000	£85,000
Yorkshire and the Humber	£63,000	£62,000	£68,000
<b>National average</b>	<b>£77,125</b>	<b>£68,417</b>	<b>£83,333</b>
% increase year on year: 2.2%			





Alex Hill, Whitecode



Tomás Neeson, Cundall



John Lewis, Aecom



Ben Styles, Hays

or 18 months ago – maybe because there’s not as much margin in projects and they are a bit worried about the future.’

This has driven a ‘more sensible approach’ to salary negotiations than last year, when five-figure increases were being dished out to some individuals, he says: ‘We’re not seeing as much of that now.’

Increasingly, companies are finding ways of holding onto staff that don’t involve hefty salary increase, says Styles. ‘We have seen a number of companies being a bit more flexible with certain things to make up for the salary,’ he says.

‘If you’re working from home, you don’t need to travel as much and you save a bit of money from not going in [to work]. A lot of clients have managed to keep hold of their staff by offering that flexibility, which is a lot better than having to offer big pay rises.’

Whitecode’s ‘very flexible’ approach to allowing people to work from home as and when they need to makes good business sense, says Hill. A competitor company that blocked working from home, even during Covid, has paid the price in terms of staff losses, he adds: ‘It’s counted against them quite dramatically.’

Meanwhile, what engineers want from their roles is changing. Job security was rated by building services engineers as the most important factor, aside from salary, when considering a new role in last year’s Hays survey. That figure has now dropped to 15%. Rated as more important this year were a challenging role or projects, cited by 26%, followed by career development and CPD (20%). This possibly reflects a lower level of nervousness about job security than last year, when the shock of the Covid-19 pandemic was longer, says Styles.

An organisation’s purpose, meanwhile, is important to 84% of building services engineers when considering a new role.

‘Working with an organisation with a green agenda, a good work-life balance and social purpose is important for everybody, but maybe particularly for building services engineers,’ says Styles.

‘Increasingly, people want to work for businesses that have a really strong offer when it comes to sustainability, net zero and diversity.’

Lewis agrees: ‘It’s more and more important for people that they believe the organisation has principles.’

Building services engineering is ‘ahead of some other parts of the industry’ on this score, says Style. ‘It’s quite an attractive sector to get involved in, with some really good environmental stuff,’ he adds.

Perhaps this sense of purpose helps to explain why 68% of building services engineers reported being positive about their career prospects in this year’s survey, up from 63% last year.

‘It’s a great place to be,’ says Lewis. ‘There’s a lot going on and building services are absolutely key to the whole net zero drive. Generally speaking, it’s a good time to be a building services engineer.’ **C**

**Contractors: Estimator**

Region	Typical salary 2024	Min salary 2024	Max salary 2024
East Midlands	£50,000	£45,000	£55,000
East of England	£58,000	£50,000	£65,000
London	£65,000	£55,000	£70,000
North East England	£43,000	£36,000	£46,000
North West England	£44,000	£38,000	£45,000
Northern Ireland	£50,000	£45,000	£55,000
Scotland	£46,000	£37,500	£47,000
South East England	£72,000	£60,000	£80,000
South West England	£53,000	£50,000	£60,000
Wales	£48,000	£45,000	£60,000
West Midlands	£49,000	£40,000	£60,000
Yorkshire and the Humber	£41,000	£34,000	£44,000
<b>National average</b>	<b>£51,583</b>	<b>£44,625</b>	<b>£57,250</b>
<b>% increase year on year: 2.9%</b>			

**Contractors: Project engineer**

Region	Typical salary 2024	Min salary 2024	Max salary 2024
East Midlands	£42,000	£38,000	£45,000
East of England	£54,000	£48,000	£60,000
London	£65,000	£60,000	£75,000
North East England	£38,500	£33,000	£43,000
North West England	£43,000	£35,000	£45,000
Northern Ireland	£40,000	£38,000	£45,000
Scotland	£44,500	£34,000	£46,000
South East England	£55,000	£50,000	£56,000
South West England	£45,000	£43,000	£47,000
Wales	£42,000	£40,000	£44,000
West Midlands	£44,000	£33,000	£48,000
Yorkshire and the Humber	£39,500	£36,000	£46,000
<b>National average</b>	<b>£46,042</b>	<b>£40,667</b>	<b>£50,000</b>
<b>% increase year on year: 2.7%</b>			

**Contractors: Project manager**

Region	Typical salary 2024	Min salary 2024	Max salary 2024
East Midlands	£55,000	£50,000	£60,000
East of England	£60,000	£50,000	£67,000
London	£80,000	£70,000	£90,000
North East England	£49,000	£45,000	£55,000
North West England	£52,000	£40,000	£55,000
Northern Ireland	£48,000	£45,000	£52,000
Scotland	£49,500	£35,000	£55,000
South East England	£70,000	£65,000	£75,000
South West England	£54,000	£52,000	£57,000
Wales	£45,000	£45,000	£55,000
West Midlands	£55,000	£45,000	£60,000
Yorkshire and the Humber	£53,000	£45,000	£55,000
<b>National average</b>	<b>£55,875</b>	<b>£48,917</b>	<b>£61,333</b>
<b>% increase year on year: 2.7%</b>			

**Contractors: Senior contracts manager**

Region	Typical salary 2024	Min salary 2024	Max salary 2024
East Midlands	£60,000	£52,000	£65,000
East of England	£71,000	£60,000	£75,000
London	£80,000	£70,000	£95,000
North East England	£48,000	£39,000	£51,000
North West England	£58,000	£50,000	£70,000
Northern Ireland	£65,000	£60,000	£70,000
Scotland	£52,000	£43,000	£53,000
South East England	£75,000	£70,000	£77,000
South West England	£63,000	£58,000	£65,000
Wales	£60,000	£56,000	£63,000
West Midlands	£62,000	£52,000	£70,000
Yorkshire and the Humber	£45,000	£42,000	£52,000
<b>National average</b>	<b>£61,583</b>	<b>£54,333</b>	<b>£67,167</b>
<b>% increase year on year: 2.5%</b>			

XCO2 staff at the consultancy's Farringdon headquarters



# THE X FACTOR

CIBSE Building Performance Award Winner XCO2 was set up to provide MEP and environmental engineering, which has enabled a holistic approach to building design, focusing on passive design and 'barely there' services. **Andy Pearson** speaks to co-founder **Tom Kordel**

## SHORTLIST FOR 2024 AWARDS

XCO2 has been shortlisted for the 2024 CIBSE Building Performance Awards on 29 February, at the Park Plaza Westminster Bridge, London.

The company has grown in size to more than 55 employees in the past year so is on the shortlist for Building Performance Consultancy of the Year (51 to 300 employees). The other shortlisted companies are:

- ChapmanBDSP
- Design2Occupancy
- Harley Haddow

■ For more information on the 2024 Awards and to book your place to see who wins, visit: [www.cibse.org/bpa](http://www.cibse.org/bpa)



**X**CO2 is thriving. The engineering and environmental consultancy was formed in 2008 as a team of five architects and engineers, with a shared focus on reducing carbon emissions in the built environment. Since then, it has grown into a dynamic and diverse multidisciplinary practice of 55 staff split between its head office in London and satellite office in Singapore.

When it won the Building Performance Consultancy of the Year (up to 50 employees) at the CIBSE Building Performance Awards 2023, the judges said the consultancy was a good example of a 'developing practice', adding that they were impressed by the entrant's 'incredible' focus on net zero carbon and by its demonstration of diversity, inclusion and equality.

'Our USP has always been a focus on cutting carbon; the clue's in our name – we're all about crossing out [X] CO<sub>2</sub>,' says Tom Kordel, a director of the practice and one of its co-founders. 'While cutting carbon is not new now, 15 years ago it was novel to have a business whose sole focus was to reduce carbon emissions within the built environment.'

From inception, the practice was set up to provide environmental consultancy and MEP design. That is still the case now, Kordel says, although, over time, it has added more strings to the environmental side of the business, such as daylight consultancy and

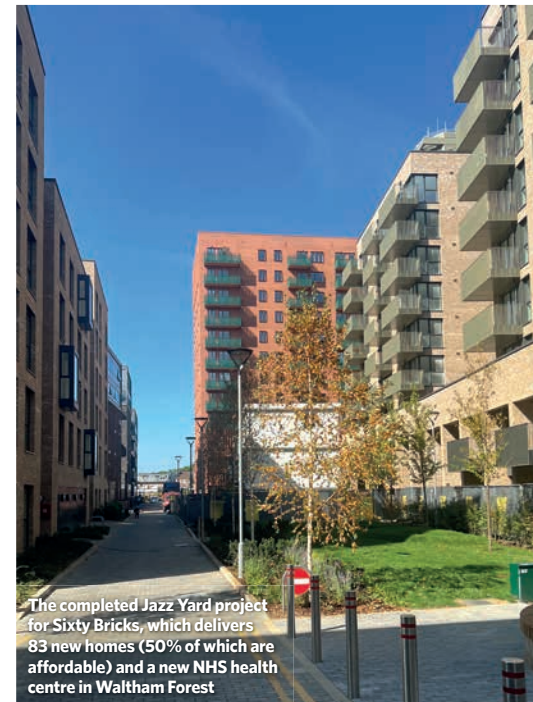
overheating assessments, to provide 'a more holistic service'.

Similarly, its MEP services now include energy audits and post-occupancy evaluations, services that Kordel says help its engineers gain an insight into how buildings operate in reality. 'Without understanding how a building works in operation, engineering designs will never improve,' he adds.

It is the business's focus on cutting emissions and on environmental issues that has made it attractive to engineers and







The completed Jazz Yard project for Sixty Bricks, which delivers 83 new homes (50% of which are affordable) and a new NHS health centre in Waltham Forest

consultants with a passion for environmental building design and low carbon engineering.

Their skills give the practice the ability to look at buildings holistically, which means influencing the architecture to exploit passive design and making designs intuitive to use and operate. 'If you're going to focus on driving down energy use and CO<sub>2</sub> emissions, I think the best designed buildings are often the ones with the least amount of building services and that are simplest for people to use,' says Kordel.

Many of those attracted to work for

**"We have always looked to have a diverse workforce because it brings ideas and creates an open, innovative culture" – Tom Kordel**

the practice are women; almost half of its current workforce is female, making XCO2 unusual among engineering consultancies, where, on average, women make up only 14.5% of the staff. 'We want the background of our team to reflect the society in which we operate, so that balance is important, as is a balance between technical disciplines,' says Kordel.

XCO2's attraction as an employer is no doubt helped by a progressive approach to enabling its employees to achieve a healthy work/life balance. They have the option of working from home three days a week, but, more radically, staff work a nine-day fortnight, with alternate Fridays off.

Kordel says the policy of working fewer hours was introduced pre-pandemic, initially

as a trial to ascertain its impact on business efficiency – but the scheme proved so popular that it has been retained. 'It gives people the opportunity to do their life admin without having to use their weekend, which has helped a lot in terms of staff retention,' says Kordel.

Perhaps less unusual in a sector struggling to attract talented engineering students, the business is also culturally diverse, with many of its overseas employees recruited to the business from university Master's courses. 'We have always looked to have a diverse workforce in terms of gender and ethnicity, because it brings a lot of ideas and creates a friendly, open, innovative culture within the business – and it does help to win work, because the businesses we work with tend to be culturally very diverse,' Kordel explains.

Two of the key business sectors in which XCO2 is particularly strong are social housing and luxury resort hotels. On the face of it, these businesses – catering for the opposite ends of the wealth spectrum – would appear to have little in common, but, according to Kordel, both have a vested interest in low energy operation and low CO<sub>2</sub> emissions.

'Social housing is very focused on eliminating fuel poverty, so having low energy and efficient buildings is really, really important, while luxury hotel developers and operators tend to keep assets for a long time, so they too have a vested interest in keeping energy use low,' he explains.

The creation of more affordable housing >>





» ‘chimes with what we want to do as a business’, adds Kordel. However, it was the company’s hotel work in Southeast Asia that led to it opening an office in Singapore in 2016. ‘We have a strong reputation with hotel operators in the area, and we felt that being closer to architects and developers based in Hong Kong and Singapore was really important,’ he recalls.

Many of the hotels and resorts that XCO2 work on in the region tend to be located on remote islands, without access to an electrical grid or mains water, so its net zero design is a practical necessity rather than a nice-to-have solution. ‘To have a holistically sustainable development, circularity around water, waste and energy is important, as is solar energy generation,’ Kordel explains.

XCO2 is also involved in charitable work in the region, including with the Hemis Monastic School in Northern India. Here, it is working pro bono on the design of a new school for Buddhist monks, located next to a 17th-century Buddhist monastery. The scheme is designed to use predominantly passive means to achieve thermal comfort in a cold, high-altitude desert with annual temperature swings of 60°C.

Key to the success of the school’s challenging design is dynamic thermal modelling. This has been used from the earliest design stages to test and fine-tune a variety of measures – such as Trombe walls – to improve the building’s performance. Computational fluid dynamics have also been used to design and size the building’s solar latrines, which feature dark-painted solar chimneys to passively ventilate the toilets.

The use of digital tools and digital innovation are seen as potential growth areas for the business – an opportunity that



Site photo from Hemis Monastic School, a new residential school for 500 trainee monks in Northern Ladakh, 13,000ft up in the Himalayas



The new solar installation at the back-of-house facilities at the Soneva Jani luxury eco resort in the Maldives

has led to the company setting up the XCO2 Lab, to help it identify problems and time-intensive processes ripe for automation. The lab is intended to encourage interdisciplinary collaboration and is led by Aidan Kelly, technical lead for the CIBSE Society of Digital Engineering steering group and contributor to *CIBSE Journal*.

In addition to contributing articles for publication, XCO2 shares knowledge by making time for its engineers to get involved with industry initiatives such as LETI and, more recently, the UK Net Zero Carbon Buildings Standard. So what’s next for the developing practice?

‘Now that we’re post-pandemic, we want to push towards growing the business, our client base, and the scale of projects we work on,’ says Kordel.

‘Alongside the interesting, much smaller, more bespoke projects that we enjoy doing, we’re now working on schemes with thousands of homes where we can have an even bigger impact.’ **CJ**

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



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## Ground source heat pumps able to preserve the past

**Historic England says technology is viable for historic buildings**

An ongoing study for Historic England has found that ground source heat pumps (GSHPs) are a viable option for decarbonising heating in historic buildings.

An interim report from *The viability of ground source heat pumps in historic buildings* stated that the technology could be applied successfully without major heating or fabric upgrades, as long as the building's heating strategy aligned with conservation goals.

In a recent webinar, Historic England shared findings of a study of five GSHP projects by consultant Max Fordham. Researcher Andrew McQuatt, principal engineer at Max Fordham, noted that performance issues often stemmed from integrating existing heating systems rather than technology flaws with heat pumps.

'Historic buildings and their contents can be extremely sensitive to environmental conditions,' McQuatt said. 'It's crucial to

prevent extremes and rapid swings in relative humidity (RH) that can cause damage. Heat pumps are ideal as the temperatures that make them efficient avoid rapid RH swings.'

McQuatt discussed the dual objective of providing comfort to some building areas, such as those used for commercial purposes, and heat to control RH in sensitive spaces.

Conflicts arise because the heating system design water-flow temperatures required to maintain appropriate humidity levels are often lower than those needed for comfort. McQuatt said if a heat pump is installed to serve both areas, it is required to produce water at the higher of the two temperatures, which means locking the heat pump out from the efficiency gained from producing cooler water for conservation areas.

He said an alternative would be to install separate heat pumps for each conservation and comfort area. Heat pumps could then be sized to satisfy individual loads, allowing them to work at optimal efficiency, though this method will have higher capital costs.

## European Parliament approves F-gas Regulation reforms

The European Parliament has given its final approval to amendments that set out new controls and restrictions on HFCs in heating and cooling systems.

The revisions mark the last step in the reform of the EU F-gas Regulation, originally agreed in October last year. They were backed by 457 MEPs, while 92 members voted against the changes. If the amendments are approved by the European Council later this month, the revised legislation will be published in the *Official Journal of the European Union* to become law.

The changes commit to a complete phase-out of HFCs in heating and cooling systems by 2050, aligning with environmental goals. Industry bodies have expressed concerns about the tight timeline and the need for enhanced engineering standards to adopt alternative refrigerants safely and efficiently.



## Victorian find could transform ventilation

McGill University researchers have uncovered a 19th-century ventilation system used for Montreal's Royal Victoria Hospital, which offers insights that they believe could transform modern temperature control and ventilation.

The study, published in *iScience*, highlights the early use of buoyancy ventilation heat recovery in the hospital. Researchers launched an investigation into the fluid mechanics of heat recovery with buoyancy ventilation, where interior spaces are arranged in an open thermal loop, with heat exchange through partition walls.

The findings challenge the assumption that heat recovery is a 20th-century invention. By revamping this lost technique, researchers suggest it is possible to lessen the need for extensive ductwork and fans, achieving heat recovery through partition walls and floors.

## Commercial heat pumps need more limelight

The co-author of a new guide to retrofitting large heat pumps says there needs to be more focus on non-domestic heat pumps.

'Commercial heat pumps are a hidden problem,' said Dr Peter Mallaburn, principal research fellow at UCL. 'They don't get much of the limelight. There is a lack of information out there for those deploying heat pumps.'

Mallaburn is working on *Annex 60: Retrofitting heat pump systems in large non-domestic buildings*, a project for the International Energy Agency's (IEA's) Heat Pump Technologies programme. For more on IEA heat pump projects, turn to page 25.

## Condair launches podcast on mitigating humidity

A podcast to address the impact of static issues caused by drops in humidity levels in commercial and manufacturing premises has been launched by Condair.

The company's sales director, Dave Marshall-George, sheds light on the causes of static buildup in low-humidity environments. He highlights the seasonal nature of the problem, with winter bringing heightened challenges, such as materials sticking together, repulsion, and electrostatic sparks.

Marshall-George advocates maintaining indoor humidity at around 45% RH to combat these issues effectively. Studies indicate that higher humidity levels reduce static charges significantly.



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# CRITICAL JUNCTURE

The government's heat pump research seminar revealed opportunities to roll out heat pumps for all building types, but studies suggest there is still work to do to ensure optimised performance. **Alex Smith** and **Molly Tooher-Rudd** report

**T**he government's annual heat pump research seminar demonstrated the growing potential for heat pumps in all types of building, while sharing new data and analysis on heat pump performance.

The symposium, held in conjunction with the International Energy Agency (IEA), was opened by Oliver Sutton, low carbon heat technical lead at the Department for Energy Security and Net Zero (DESNZ). He remarked how awareness of heat pumps had mushroomed in recent years, particularly among the general public.

There had been significant progress in the development of heat pumps, Sutton added, but there was still a lot to do in terms of everyone benefiting from a high-performance heat pump.

Consultant Roger Hitchin gave an overview of research projects being carried out by the IEA's Heat Pump Technologies Technical Collaboration Programme (HPT TCP). The UK is one of 20 member countries of

the HPT TCP, which is based at the Heat Pump Centre in Sweden.

HPT TCP acts as a forum for the dissemination of UK government-backed research. Sutton is the UK representative on the programme's executive committee while Hitchin is the UK's alternate delegate.

There are a number of current heat pump research projects – known as annexes – aimed at enhancing performance and addressing barriers to growth (see panel, 'Heat Pump projects'). One being driven by the UK is *Annex 60: Retrofitting heat pump systems in large non-domestic buildings*.

Dr Peter Mallaburn is the project manager for Annex 60 and a principal research fellow at UCL, seconded to DESNZ. He told delegates that it was a big challenge to meet 2050 heat pump targets, especially for non-domestic buildings.

'Commercial heat pumps are a hidden problem,' he said. 'They don't get much of the limelight and there is a lack of information out there for those deploying heat pumps.'

The aim of the annex is to provide

guidance about different systems for those deploying heat pumps. A web-based tool will analyse the requirements of the building owner and offer configurations that would be worth looking at first.

'It's complex for decision-makers. There are many complications and issues making it difficult for them to take action, such as capital costs, decisions over energy saving vs carbon saving, compliance, disruption, and risk to reputation,' said Mallaburn.

The project has gathered 60-70 case studies and the team is looking at how decisions are made during procurement. The guidance will be suitable for all HPT TCP member countries, and will need to look at comparative costs between systems.

## Taking the temperature

Vincenzo Rossi, field data coordinator at DESNZ, spoke about the impact of the UK government's Help for Households advice to reduce boiler flow temperatures and cut energy bills. The strategy aimed to achieve a 9% saving on bills if the boiler was set to 60°C. >>

» The study aimed to find out if householders would be willing to accept lower temperatures and, therefore, be open to making their homes suitable for low-temperature heat pumps.

To understand if the campaign message hit home, Rossi evaluated the variation of the distribution of boilers with a flow temperature setpoint below, equal to or above 60°C between winter 2021/22 and winter 2022/23. The study revealed that, for a sample of 4,503 boilers over two years, the proportion of households that set their flow temp to 60°C doubled, from 3% to 6%.

It is predicted the campaign may have impacted more than 400,000 dwellings in England, possibly saving more than £26 million in winter 2022/23.

After the results were collected, a heat map was drawn up to look at the distribution of temperatures, which showed that most of the boilers were set at 72-75°C. It was found that 10% of combi boiler users reduced their setpoint temperature for the entire heating

season. The average peak setpoint was reduced from 74 to 70.

Although flow temperature was probably adjusted to deal with colder or warmer temperatures, this is not true for households that opted to set their boilers to 60°C. 'These results can be really useful for heat pump consideration. We can look at behaviour, and how willing people are to live with a system below 60°C,' said Rossi.

The findings suggest that, while many users were willing to reduce their temperature from above 60°C to a minimum of 55°C, fewer were willing to lower their thermostats further.

### Suitable for the switch

UCL doctoral researcher Laurence Childs revealed that existing heating systems may be more suitable for heat pumps than previously thought. He analysed data from 4,600 boilers while on secondment at the DESNZ and found that heating systems may be able to operate at lower flow temperatures.

Measurements for the boilers were used to predict if radiator or fabric upgrades were needed for a heat pump to provide the same level of heat as set by the occupants.

When averaging extracted heat demand over six hours, 31.5% of dwellings could operate at 55°C or less without radiator upgrades. This is three times the amount that was estimated using surveys, suggesting that the costs and disruption of a heat pump could be lower than previously thought, with fewer radiators needing to be replaced.

Childs noted that averaging heat demand over longer time periods can reduce the requirements for radiator upgrades, which demonstrates the value in changing heating patterns. He said peak flow temperatures were only necessary for a small proportion of the year, which indicates the potential for the installation of small supplementary electric heaters or hybrid heat pumps to reduce the burden of radiator and fabric upgrades.

The findings could be significant, Childs said, because entire heat distribution systems can cost up to £7,500, creating a significant market barrier to heat pump adoption.

Daniel Logue, adviser at Energy Systems Catapult, was the technical lead on the government's Electrification of Heat Demonstration Project. Part of the study looked to the technical and practical feasibility of a large-scale rollout of heat pumps across a representative range of housing types and social groups.

In the project, 742 air source, hybrid and ground source heat pump systems were installed in a range of homes. Only 15% of these homes required a fabric upgrade to enable the heat pump solution, though 93% did have at least one radiator change.

The seasonal performance factor (SPF) of each system was calculated. While the overall results were positive, Logue said quite a large variation was seen across all heat pump types, indicating that, while many people reported that the systems provided a comfortable temperature, too many were getting a poor-performing system.

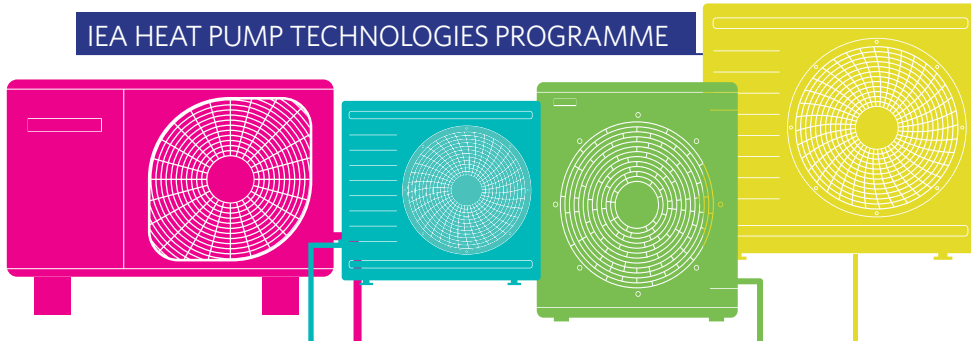
Logue suggested that the heat pump model may be one of the reasons for the variation, with newer models, running on R290 refrigerant, outperforming old models running on R410A. However, he highlighted other potential contributory factors, including the quality of the installation and design.

The study found that heat pumps performed worse if they had a higher flow temperature, but there was no difference in performance between different house types or the age of a property.

'All of the homes were deemed suitable for a heat pump. Looking at the results, we

»

## IEA HEAT PUMP TECHNOLOGIES PROGRAMME



### Annex 56: Digitalisation and IOT for heat pumps

Report showing comparisons between more than 40 connected heat pump projects. A webinar and slideshow from October 2023 is available.

### Annex 57: Flexibility by implementation of heat pumps in multi-vector energy systems and thermal networks

The potential for the use of heat pumps in district heating and cooling, and how they can offer flexibility for electricity grids.

### Annex 58: High-temperature heat pumps

Overview of technologies with analysis of case studies. One of the report's focal points is technologies that can provide process heat above 100°C, a critical requirement for many industrial applications. European statistics show that 67% of the demand between 100°C and 200°C was directly covered by fossil fuels. The first part of the project looking at technologies was published in August.

### Annex 60: Retrofit heat pump systems in large non-domestic buildings

Led by the UK, this project aims to provide high-level guidance for buildings owners and other decision-makers. Report due in late 2024.

### Annex 61: Heat pumps in positive energy districts

Investigating heat pump solutions for groups of buildings as positive energy districts. Existing clusters will be monitored and evaluated. Report due in 2025.

### Annex 62: Heat pumps for multi-family residential buildings in cities

Focusing on heat pump solutions for new and retrofit multi-family houses in high-density cities. Eleven case studies have been added to the website, including four from the UK. The annex is a follow-up to Annex 50 Heat, which has more case studies and was completed in November 2022.

### Annex 63: Placement impact on heat pump acoustics

Following on from Annex 51, this project will look at removing acoustic market barriers to heat pumps and will look at acoustics as more heat pumps are used for cooling in a warming climate.

Details of all the projects can be found at [heatpumpingtechnologies.org](https://heatpumpingtechnologies.org)



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about  
decarbonising  
heating

*\*Graham Jones,  
Customer Service  
Manager* →



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» can't say that, because you have an old home, your heat pump won't run effectively. If the design is done well, there is no reason why they shouldn't run effectively,' said Logue, who nevertheless expressed concerns.

'Almost all heat pumps performed below what was predicted. Some performed better, but there is a systemic disparity in performance across all of the heat pumps. We saw no correlation between what a customer was told they would get and what was actually achieved, and there was no way of telling which of the heat pumps would perform better', he said.

Padraic O'Reilly, engineer at Technological University of the Shannon: Midlands Midwest, reported on the performance of heat pump retrofits installed as part of the Irish Superhomes 2030 project, a joint venture between Electric Ireland and Tipperary Energy Agency. In two research projects, O'Reilly said that heat pumps generally performed well, but he told delegates there were some variations between predicted and actual performance.

In one project looking at the actual performance of 40 heat pumps compared

with that predicted in the Irish Building Energy Rating (BER), the team found that, for space heating, the heat pumps produced an average of 12% more thermal energy than had been predicted, while the SPF was 17% lower than had been predicted.

It was a different story for domestic hot water (DHW), with heat pumps using 51% less thermal energy than predicted. The efficiency was also higher. One theory for the DHW performance was that BER software overestimated DHW use.

O'Reilly said one reason for disparities in performance was the lack of a handover to end users, who often don't understand how to optimise heat pumps. It is essential the skills are in place before embarking on a mass rollout of heat pumps, he added.

### Breaking the sound barrier

Etienne Bailey, senior research officer at DESNZ, summarised the findings of the government's *Independent review of air source heat pump noise emissions, permitted development guidance and regulations*.

Current planning standards put restrictions on the placement, size and noise emissions

from heat pumps, but Bailey said the research team felt the evidence for these was limited and that the restrictions may act as a barrier to heat pump uptake.

'We found that noise complaints are relatively infrequent compared with the number of installations in the UK, with poor installation a key factor,' says Dr Antonio Torija Martinez, reader in acoustic engineering at the University of Salford.

Several policy implications were drawn from the research, with recommendations for changes to Microgeneration Installation Standard 020 which will be published shortly. One recommendation is to scrap the rule requiring heat pumps to be positioned one metre away from a neighbour's wall.

There is an opportunity for consultants to contribute to Annex 60, which is due for completion in late 2024. Researchers are interested in speaking to consultants who have examined the pros and cons of different configurations of retrofit heat pump systems for non-domestic buildings. To find out more, contact Peter Mallaburn at [peter.mallaburn@ucl.ac.uk](mailto:peter.mallaburn@ucl.ac.uk) or Roger Hitchin at [roger.hitchin@hotmail.com](mailto:roger.hitchin@hotmail.com). **CI**

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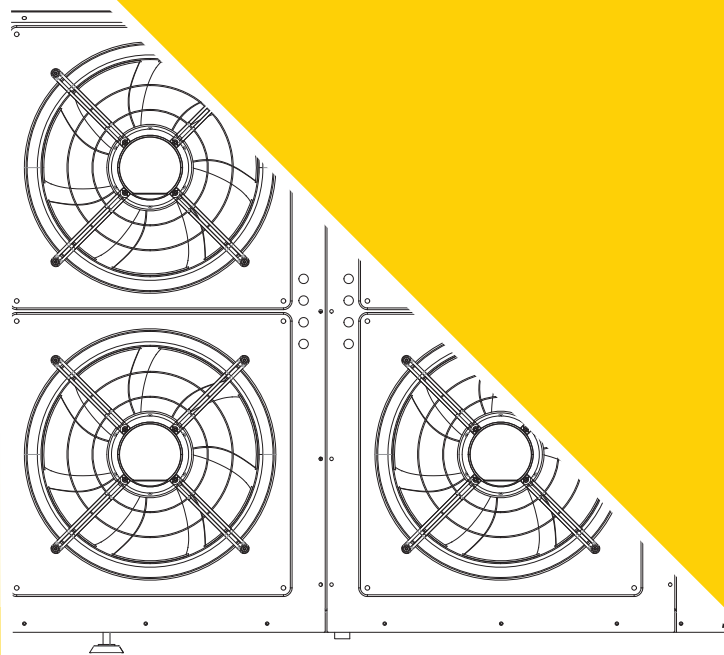


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# ZONING IN

The government is aiming for 11% of heat in the UK to be supplied by heat networks within newly designated heat zones. **Alex Smith** looks at the routes to connection in the new Heat Network Zoning consultation

**T**he government has published Proposals for Heat Network Zoning ahead of plans to introduce heat network technical standards and mandate the connection of certain buildings by 2025.

The proposals, published in December, are intended to bring heat networks into the mainstream and create a viable route for occupiers to decarbonise their properties.

Identifying the lower-cost solution to decarbonising heat will lift the barriers to sector investment, the government says.

Justin Etherington, energy consultant and UK lead for the London energy team at Buro Happold, agrees that cost is key: 'Heat networks will only succeed if they are competitive on cost and carbon compared with the customer's alternative solutions.'

Other government initiatives around heat networks will also be vital, says Etherington. 'Technical standards, policy support and standardisation of approach – as well as the introduction of Ofgem as the regulator – are all key elements in creating confidence.'

## The proposals

The government is advocating the creation of a new Heat Network Zoning Authority (Central Authority), which will oversee all heat networks and coordinate zones in England, and Zoning Coordinators, which will implement zoning policy, and work with local authority planning departments (see panel, 'Central to heat zones').

To encourage investment, the government is proposing that certain buildings in zones connect to a heat network. These will be: new buildings that receive planning permission after designation of a zone; pre-existing communally heated buildings; and other non-domestic buildings that meet certain criteria.

The proposals state that zoning should encourage local authorities and other public bodies to connect their estates to heat networks because it is a cost-effective way to decarbonise.

Baxi sales director Stephen Hart says it is notable that some housing developers are already choosing community heat networks for larger estates where it is financially more attractive than installing individual heat pumps and associated hot-water cylinders.

'It would be even more attractive to connect these developments to larger heat networks,

where they exist, as the developer can avoid the need to install and operate a local low carbon energy centre,' he says.

Pre-existing homes with individual heating systems will not have to connect, but Hart says it can make financial sense. 'Heat networks could prove popular in low-rise, low-density upgrade projects as a cost-effective alternative to individual heat pumps,' he adds.

## Emissions limits

The government is proposing that heat networks in zones will be required to comply with national emissions limits from 2030, and is seeking views on three proposals for this limit – 44g, 83g or 147g CO<sub>2e</sub>/kWh.

Etherington would opt for the stricter limit: 'The 44g figure seems a reasonable number for new networks that have the opportunity to start with low carbon sources.'

Baxi would advocate for the highest possible carbon intensity at the outset, but with a reducing intensity threshold over time, says Hart, who notes that the current maximum carbon intensity for schemes to qualify for funding under the government's Green Heat Network Fund is 100g CO<sub>2e</sub>/kWh. This allows for hybrid energy centres with a low carbon primary heat source, such as heat pumps, to be combined with a boiler to satisfy peak demand.

Gas-burning boilers in hybrid systems could migrate to hydrogen or direct electric as technology evolves and the electricity grid is reinforced and expanded, adds Hart.

The government estimates that heat zones could supply 11% of UK heat under its preferred policy option. This means that 70% of buildings that are not required to connect to a heat network in a zone will have to connect voluntarily. For this to happen, the government will have to win hearts and minds, says Etherington: 'There will need to be significant education and engagement with customers to ensure they are confident in connection to heat networks in zones.' **C**

## CENTRAL TO HEAT ZONES

The Central Authority will develop a standardised national methodology to identify heat network zones across England. It will assess the relative scale, value for money, project deliverability, and other such factors of different opportunities.

The zoning methodology consists of two states: a mapping exercise to identify potential heat network zones across England; and a refinement stage, in which local Zone Coordinators will review and refine the outputs with input from local stakeholders. The Central Authority will establish a pipeline of opportunities, looking 10 to 15 years ahead.

The government envisages that local enforcement will be carried out by the Zone Coordinator. This will include issuing compliance notices, investigating non-compliance, imposing penalties, and providing for an appeals process. The Zone Coordinator will issue a penalty notice requiring the relevant person to rectify the breach or pay a fine.

Building owners may apply to the Zone Coordinator for exemptions from connection. These will include incompatible heating systems and buildings tied to existing heating supplier contracts.

# ELTA

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# AIR TO THE THRONE

Ahead of this month's CIBSE Building Performance Awards, we look at the six shortlisted entries for the Product or Innovation of the Year - Air Quality award

**S**ix companies will be in contention for CIBSE's top accolade for air quality products and innovations at this month's Building Performance Awards. A diverse array of products is on the shortlist for the Product or Innovation of the Year - Air Quality award, open to entries that significantly enhance the air quality aspect of building performance.

The judges said the entries not only showcase a breadth of innovation, but also reveal a keen understanding of the importance of application flexibility while adhering to stringent regulatory standards.

They were impressed by the calibre of the shortlist, saying 'the range of innovations demonstrates that the product doesn't have to be epic to be influential and beneficial'.

The CIBSE Building Performance Awards will take place on 29 February 2024 at the Park Plaza Westminster Bridge Hotel in London. To book your place visit [bit.ly/CIBSEbpa24](https://bit.ly/CIBSEbpa24). **CJ**



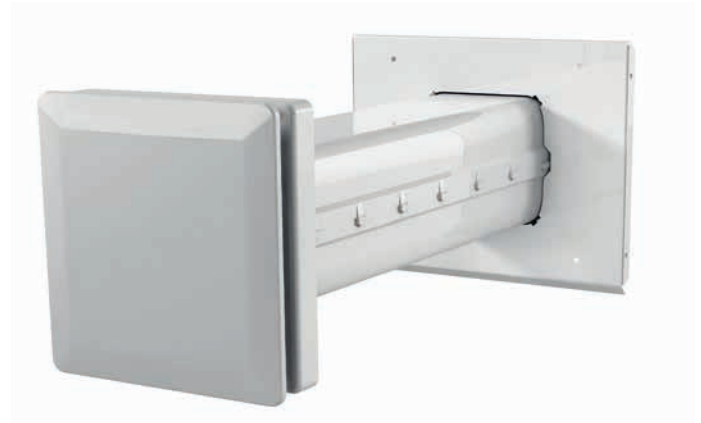
## Vent-Axia: Sentinel Apex

Vent-Axia's Sentinel Apex commercial heat recovery unit provides fresh, filtered air, combating indoor air pollution and removing pollutants such as moisture and CO<sub>2</sub>.

With up to 93% energy recovery, the unit efficiently uses waste heat, achieving a market-leading 93% thermal efficiency (EN308 tested). Key features include an automatic summer bypass, motor efficiency equivalent to better than IE5 efficiency class, demand control for optimising IAQ, and ultra-low sound levels.

The system was designed for adaptability, energy conservation, and personalised comfort. Vent-Axia's in-house testing facility and market research informed the unit's development, focusing on low specific fan power, efficiency, and low sound levels.

The unit, which has been specified but not yet installed, is expected to deliver high performance in diverse climates, addressing the demand for sustainable, energy-efficient building solutions.



## Stiebel Eltron UK: VLR 70 L Trend

Stiebel Eltron UK introduced its VLR 70 L Trend, a decentralised ventilation unit, in response to the need for landlords and property owners to implement measures to deliver good air quality in social housing and commercial properties.

This fully automated unit improves indoor air quality, reduces moisture, and recovers up to 92% of heat, in spaces up to 100m<sup>2</sup>.

Installed in pairs – either in one or adjoining rooms with good airflow between them – one unit will extract while the other brings in fresh air. The units switch several times a minute between each other to allow the heat exchanger to capture energy from the outbound air, which is then picked up by the incoming air. The unit incorporates smart sensors to account for occupancy, humidity and air quality.

With a comprehensive filter system, including F7 filters, the VLR 70 L reduces pollutants, allergens and virus particles.



## Glazpart: Link Vent 4000

The Link Vent 4000, a trickle vent for windows and doors to facilitate passive airflow in dwellings, has received excellent feedback for its simple, user-friendly design.

An equivalent area of 4,000mm<sup>2</sup> is delivered through a 167mm x 13mm slot, reducing routing machine times and waste materials generated. Further increasing its versatility, the Link Vent 4000 can cool a house when overheating or moderate temperatures through smart ventilation when properties become cold and heating is turned on. The closing action allows more control over draughts by directing air away from occupants, and the split closure plate enables partial opening.

The system was created to address the need for ventilation in smaller rooms and aligns with the 2022 legislative changes.

Fully compliant with the Building Regulations, the vent enhances air quality and prevents overheating, and received positive feedback from industry leaders.





» **Daikin: VRV 5 Heat Recovery**

Daikin's VRV 5 Heat Recovery system is a sustainable and efficient HVAC solution for commercial buildings.

Its three-pipe heat recovery technology allows simultaneous cooling and heating, enhancing efficiency with a low condensing temperature. The system includes Daikin's Shīrudo technology, which uses the integration of a sensor, shut-off valves and alarm to detect and isolate potential leaks. Daikin says this enables rooms to be tackled as small as 10m<sup>2</sup> without additional calculations or measures.

Daikin also offers embodied energy assessments for the system based on the TM65 calculation methodology. It shows a decrease of up to 53% in embodied carbon.

Case studies, such as the University of Lincoln and BBC Earth Experience, showcase successful installations, highlighting the environmental considerations and energy efficiency.

**Kampmann UK: WZA – Decentralised Scholl Ventilation Unit**

This unit, introduced to the continental European market in late 2021, enhances air quality and minimises virus concentration. It is designed to improve indoor air quality in classrooms, where research has found that elevated CO<sub>2</sub> levels can hinder concentration.

With a maximum airflow of 280l/s, the WZA unit features automatic airflow control based on CO<sub>2</sub> levels, ensuring it stays below a programmed concentration. Equipped with an enthalpy counterflow plate heat exchanger, the unit efficiently recovers thermal energy and optimises humidity levels, which is particularly beneficial in winter. Operating on mixed-air ventilation principles, it introduces supply air without draughts.

The company focuses on minimising whole life carbon, and the WZA materials are designed to be easily taken apart and separated for recycling.



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This holistic air purification solution, integrated with BlockDox building management systems, takes a novel approach to combine indoor air quality and building performance. By pairing the HA800 air purification technology with BlockDox's IoT-enabled platform, the solution optimises spaces for health, comfort, and energy efficiency.

The HA800's multi-layered filtration system captures pollutant particles as small as 0.3 microns, ensuring clean, healthy air. Its closing action controls draughts, and a split closure plate enables partial opening for enhanced user control.

By integrating real-time data from the air purifiers and other building systems, BlockDox's platform empowers precise and responsive management of environments.

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SCAN ME

# COLD STORAGE

Research on the application of phase change material heat exchangers for space cooling during summer found that significant cold energy could be stored or released. LSBU's Professor **Yunting Ge** discusses the findings

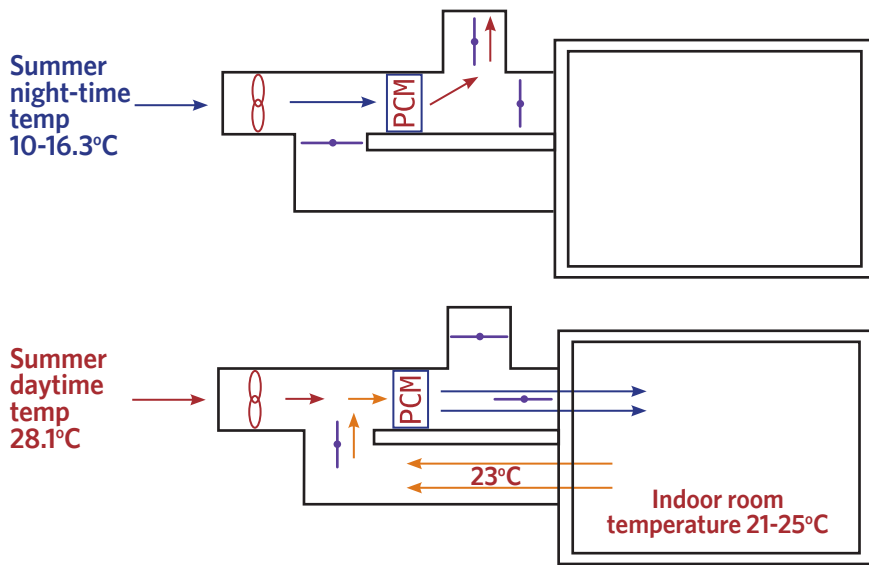


Figure 1: PCM charging and discharging process schematics

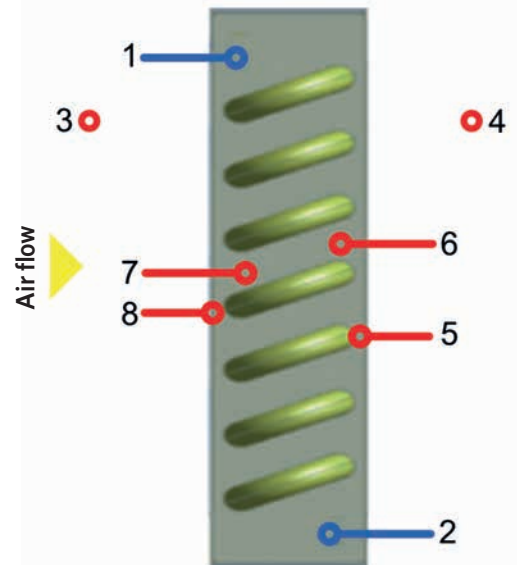


Figure 2: Schematic highlighting locations of experiment thermocouples

**A**s an efficient technology, thermal energy storage (TES) using phase change material (PCM) can be applied to decrease peak loads, and shift loads, enhance system efficiency, and reduce the size of cooling plants, while maintaining occupant thermal comfort.

In this research, the performance of a latent heat storage unit comprised of organic paraffin PCM enclosed in a finned-tube heat exchanger was evaluated and analysed to determine its viability as a free cooling facility to condition a space during summer in the UK.

While widely used in refrigeration and heat pump systems, finned-tube PCM heat exchangers are seldom applied in TES with PCMs.

A prototype was tested and modelled with computational fluid dynamics (CFD) for the application of night-time cold storage and daytime space cooling during summer. The internal and external design conditions of a typical building were used to determine the type of PCM and the PCM's operating temperature range required for space cooling.

Extensive measurements were conducted on the PCM heat exchanger at different operating conditions and for both PCM charging and discharging processes. To validate the experimental measurements, a 3D CFD model for the PCM heat exchanger was developed and validated.

The combination of the CFD model and experimental investigation determined the performance of the PCM heat exchanger at various operating and design conditions.

## Phase change materials

PCMs can be classified as organic, inorganic, or eutectic. Organic PCMs, such as paraffins, have the advantages of being non-toxic, non-corrosive,

- 1 Internal PCM thermocouple sensor
- 2 Internal PCM thermocouple sensor
- 3 Air inlet thermocouple sensor
- 4 Air outlet thermocouple sensor
- 5 External surface pipe thermocouple sensor
- 6 External surface fin thermocouple sensor
- 7 External surface pipe thermocouple sensor
- 8 External surface fin thermocouple sensor

and chemically stabilised materials at low temperatures<sup>1</sup>.

The melting points of paraffins range from -30°C to 120°C<sup>2</sup>. They have a high latent heat of fusion, but drawbacks include a lower thermal conductivity of about 0.2W·m<sup>-1</sup>·K<sup>-1</sup>, low density, and less stability at high temperatures<sup>3</sup>. Inorganic materials mainly consist of salt hydrates, metallics, and their mixtures, and they cover a wide temperature range similar to that of organic PCMs.

## Experimental investigation

### Test rig setup and measurements

The experiment was conducted with an air conditioning laboratory unit that had been modified to contain a PCM finned-



tube heat exchanger. The heat exchanger was enclosed in a 250x250mm extension duct that was bolted to the outlet of the air conditioning rig.

To facilitate the energy charge or discharge of the PCM heat exchanger, up to four 1kW electric heaters and a refrigerant cooling coil modulated and controlled the incoming airflow parameters to the PCM heat exchanger.

The airflow parameters of temperature and humidity at the heat exchanger inlet and outlet were measured using dry and wet bulb thermometers (Figure 2). To ensure accurate measurement of airflow velocity for the PCM heat exchanger, it was determined that only the minimum and maximum fan speeds would be set and applied.

**PCM temperature and material selection**

The PCM selected was an organic hydrocarbon PlusIce A17. CIBSE Guide A was consulted to determine the most common summer internal thermal comfort range, which is between 21°C and 25°C in the UK.

The frequency of occurrence method was used to determine the external daytime summer conditions. The dry and wet bulb temperatures of 28.1°C and 19.2°C were chosen using a frequency of occurrence of 0.4 %. London was selected as the extreme outlier.

CIBSE Guide J was used to estimate the temperature range for PCM charging during the summer night-time. Between the hours of 19:00 and 06:00 in July, the average overnight temperature was measured. This implies that the solidification/melting temperature of PCM must be higher than 16.3°C. A 2-5K subcooling is acknowledged to be required to ensure adequate PCM solidification.

**PCM charging and discharge processes**

At night, when ambient temperatures are lower, an inlet fan forces 10-16.3°C airflow to pass through a duct containing a PCM heat exchanger.

The cold air travels across the heat exchanger, cooling the PCM material, which changes the PCM phase from liquid to solid. This procedure, namely PCM charging, is carried out at night. Because it is not necessary to condition the area at night, the air will be expelled into the atmosphere.

The summer daytime outdoor temperature is 28.1°C. Recirculation will be used to cool down the air flowing to the PCM heat exchanger, ensuring the PCM

cooling lasts longer and the PCM selection is closer to, and lower than, the internal thermal comfort range.

The 28.1°C outdoor air is mixed with the 23°C return air. This makes the mixing airflow temperature 23.51°C. The PCM heat exchanger cools incoming airflow, lowering its temperature. Latent heat is transferred as the PCM changes phase to liquid.

The experimental design was intended to replicate the above-mentioned conditions. Figure 1 visually presents the charging and discharging processes. Figure 3 depicts the PlusIce PCM A17 discharge and charging phase processes using the external temperature expected in the UK during the summer. Region 2 is represented by latent energy storage/release occurring at a phase change temperature of 17°C.

**Mathematical and numerical methodology**  
**3D CFD model and validation**

A 3D CFD model using the Ansys Fluent software was developed. Figure 4a shows the temperature that was taken from the CFD simulation and the experimental results for the charging process at four different airflow velocities. The average discrepancy was about 6% between the experiment and the CFD simulation.

Figure 4b depicts discharging Ansys simulations and thermocouple temperature measurements at the same set of velocities. The results obtained from the experimental data and the CFD simulation were reasonably consistent.

Temperature contours demonstrate that the majority of rapid heat transfer happens between 1 and 300 seconds. After this amount of time, the inlet and outlet airflow temperatures are comparable, but not at a steady state.

To quantify when airflow velocity varies from 1.3 m/s to 6 m/s, the dynamic variations of PCM temperatures with time for both PCM charging and discharging processes are simulated and shown in Figure 5(a) and Figure 5(b) respectively.

**“PCM charging is carried out at night. It is not necessary to condition the area at night, so the air will be expelled into the atmosphere”**

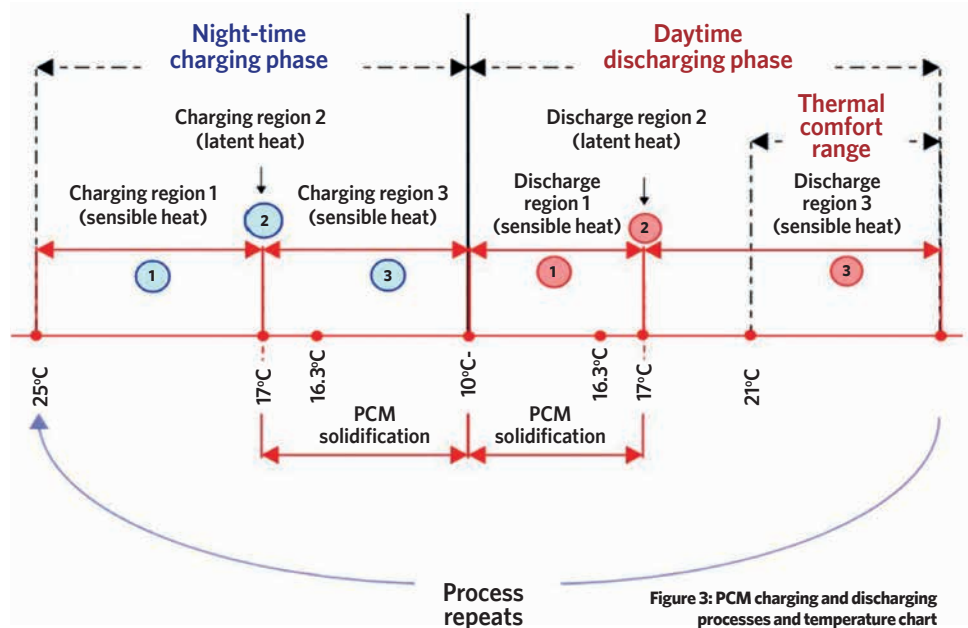


Figure 4. CFD simulation and measurement temperatures for PCM heat exchanger charging and discharging processes

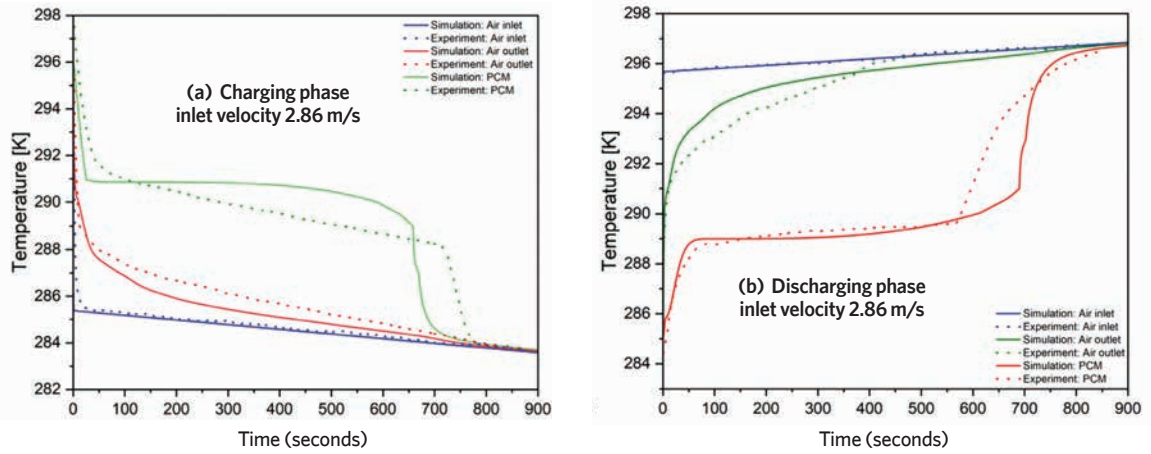
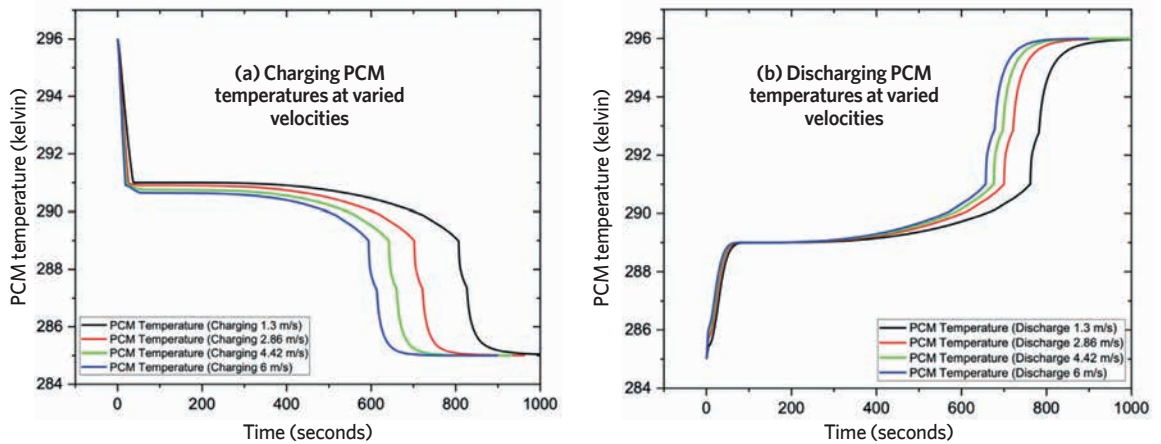


Figure 5: PCM temperature simulated in PCM heat exchanger



» Experimental investigations were carried out at design operating conditions of night-time PCM charging and daytime PCM discharging processes. A 3D CFD model for the PCM heat exchanger was developed and validated by comparing it with the respective measurement results.

The validated CFD model evaluates and compares the PCM heat exchanger performance at different design and operating conditions.

Based on the simulation results, for either the PCM charging or discharging process, the PCM undergoes sensible heat, phase change, and sensible heat stages.

It verifies that significant cold energy can be stored or released in the PCM with a two-phase state. The phase change periods, however, are affected greatly by some important operating parameters, such as external heat transfer fluid (airflow) flow velocity.

When the airflow velocity increases from 1.3m/s to 6m/s, the phase

change periods decrease by 25% and 23% for PCM charging and discharging processes. **CJ**

**References:**

- 1 V Butala and U Stritih, Experimental investigation of PCM cold storage, *Energy and Buildings*, vol 41, no 3, pp354-359, 2009.
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■ The paper was presented at the 2023 Technical Symposium. The 2024 event is on 11-12 April [www.cibse.org/symposium](http://www.cibse.org/symposium)

■ Professor **YUNTING GE** is director of the Centre for Civil and Building Services Engineering at LSBU. Co-authors were **ARTON MEROVICI**, research associate, and **DR XINYU ZHANG**, postdoctoral research associate, both at LSBU



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# Removing the guesswork

Embodied carbon is rising up the agenda as operational efficiencies peak, but it is challenging to obtain comparable and reliable data without an industry-agreed definition, says Vent-Axia's Louise McHugh

The launch of the consultation on the Future Homes & Buildings Standards has given the industry a route to net zero operational carbon, but there was no standard or legal definition for embodied carbon.

The government says it intends to consult on its approach to measuring and reducing embodied carbon in new buildings 'in due course'. Until then, the issue of embodied carbon is a challenge for manufacturers such as Vent-Axia.

Yselkla Farmer, CEO at Beama, the UK trade association for suppliers of energy infrastructure technologies, summed up the issue: 'We are in a position where fragmented and missing standards, practices and processes are causing challenges for manufacturers in providing comparable and reliable embodied carbon data to the market.'

Having no agreed definition for embodied carbon is one of the challenges. Embodied carbon is the carbon footprint of a product (inclusive of all components/materials), measured in kg CO<sub>2</sub>e. It excludes operational use, but can cover upstream activities – such as material extraction, transport and manufacturing – and downstream activities, such as maintaining it and end of life.

Opinion differs on what is included. There are no set boundaries for embodied carbon in a full life-cycle assessment (LCA) and groups in the supply chain are setting their own embodied carbon definitions. This means figures are not comparable.

Another difficulty is around collection of data. Supply chains are complex; it is hard to track the origin and use of materials. It is also tricky to ensure the data supplied is reliable or comparable.

Although there is no UK regulation mandating embodied carbon measurement or reduction, there are requirements through regional planning or certification for some approvals. There is also an international standard for the sustainability of construction works, BS EN 17472:2022 and other initiatives being worked on such as the UK Net Zero Carbon Buildings Standards, and the Built Environment Carbon Database. These are all driving a commercial demand for manufacturers to supply embodied carbon data.

Calculating embodied carbon requires an LCA.



**"We must not let embodied carbon narrow our focus at the expense of other ways to reduce carbon emissions"**

This can be done by a manufacturers' software or process (a third party will give assurance); via third-party software or methodologies for internal use, including CIBSE's *TM65 Embodied carbon in building services: A calculation methodology (2021)*; or by attaining a Type III environmental declaration (quantified and independently verified environmental information over the life-cycle of goods and services, which has a financial cost), such as an Environmental Product Declaration or Product Environmental Profile.

We have opted to use TM65, as it is specifically designed for building services products. TM65 considers embodied carbon to be the greenhouse gas emissions associated with the manufacture of a product, its installation, maintenance, repair, replacement, and end of life. We can provide TM65 data for our latest heat-recovery ventilation products.

However, we must not let embodied carbon narrow our focus at the expense of other ways of reducing CO<sub>2</sub> emissions and it must not trump the reason we install building services. For instance, heat recovery ventilation may, in some instances, have higher embodied carbon than other ventilation types, which may,

therefore, be selected to tick the embodied carbon box. But heat recovery ventilation provides excellent indoor air quality – plus, employing heat recovery ventilation solutions in airtight, optimally insulated buildings enables reductions in the operational energy and emissions used for heating or cooling.

Another area to consider is the use of recycled material, which can reduce embodied carbon by a third. At Vent-Axia, we have moved from using virgin to recycled material in the production of our fans.

Although there is no universally accepted method of reporting 'avoided emissions', the company asked Arup to model the carbon avoidance for its group. The methodology considers both domestic and non-domestic buildings, following standards and guidance in SAP 2012 and CIBSE Guide B2.

Until regulation comes into force, specifiers should consider the complexity of embodied carbon, as well as the wider operational carbon savings to be made in different areas, when selecting products for low carbon buildings. TM65 is available at [www.cibse.org/knowledge](http://www.cibse.org/knowledge)

**LOUISE McHUGH**  
is a product manager  
at Vent-Axia



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A graphic with a dark blue background featuring various icons related to risk management, such as a pie chart, a bar chart, a laptop, a person, and a checkmark. The words 'RISK MANAGEMENT' are written in large, white, bold, sans-serif capital letters across the center.

## RISK MANAGEMENT

## Security risk management processes for building services

This module explores the issues around security risk management in building services engineering applications

The field of risk management, including risk assessment and mitigation, has seen significant growth in the past 30 years, highlighting the increasing importance of managing risks effectively across various contexts. Drawing on the material that contributes to the new version of CIBSE AM4.1 *Security engineering: Strategy*, this article will introduce security risk management processes for building services engineering applications.

Security risk management goes hand-in-hand with business continuity and resilience, and each benefits from the active input of dedicated professionals. Designers of built environments must understand appropriate security concepts so that they can identify requirements and technologies in order to integrate them into their designs for a specific project. Built environments can have a variety of potential security risks that may be influenced by actions, designs, operations, and processes that are associated with the activity of the building services engineer. These may include a diverse range of areas such as: perimeter and internal security; access control; theft prevention; vandalism control; terrorism and natural disaster; threats to the person; fire safety; environmental and biological safety; occupant health and safety; information, document, IT and cyber security.

Once threats, mitigation options and a strategy are defined, security engineering comes into play. This focuses on designing, specifying and integrating physical, technical, and procedural security measures. Prior to attempting to develop designs for security measures, it is essential to properly define what needs protection by identifying valuable assets in the built environment, and how these may be threatened. A holistic – and likely cyclic – approach will identify threats, which will help to achieve desired security outcomes, ultimately reducing vulnerability and risk, as illustrated in the simplified example risk management cycle of Figure 1.

Security engineering contributes just one aspect of the procedure and resides towards the end of the security risk management process, relying on prior risk assessments, prioritisation and decision-making. Building services engineers, while experts in making buildings function, typically lack the specialised skills required to design and specify technical security systems within a defined security strategy, and so



Figure 1: Simplified risk management cycle (based on draft AM4.1 Figure 5)

- 1 What are the risks to the business?
- 2 How likely are the risks and what will be the impact?
- 3 What does management intend to do about those risks?
- 4 Is the risk management strategy effective and efficient?

» collaboration with security professionals provides a valuable, if not essential, pathway to a holistic risk assessment, management and mitigation process.

Security in the built environment should be a structured and transparent process, with solutions tailored to the specific risks and needs of each project, and it is unlikely to be satisfied with generalised solutions. It must be planned and designed collaboratively with other disciplines such as architecture, civil and structural engineering, and landscape architecture. While traditional threat assessments focus on motive and capacity (intent and capability), a comprehensive understanding demands broader examination. Group dynamics, past activities, ideological motivations, preferred attack methods, and the wider security landscape all play crucial roles. Different threats and tactics necessitate a tiered system for categorising their severity, ensuring clarity and precision. Table 1 provides an example of this gradation.

Vulnerability assessments quantify the likelihood of assets succumbing to an attack. They evaluate the effectiveness of potential measures (deter, detect, delay/deny, respond, recover (DDDRR)) and ensure no weak links compromise the entire system. Similarly to the graded threat levels, a vulnerability rating system can be established defining categories from very low to very high vulnerability.

The effective risk assessment process goes beyond just the ‘who’ and ‘how’ of potential threats; it delves into the likelihood of a threat materialising and the resulting consequences. By understanding these two factors, risks may be effectively prioritised and appropriate resources allocated.

Traditionally, some consider ‘likelihood’ solely as a function of threat and vulnerability levels. While this may work in certain scenarios, it may overlook crucial factors such as asset criticality and target attractiveness. A highly desirable target under high threat with significant vulnerabilities will naturally have a higher chance of attack. ‘Consequence’ is the overall impact of a security event, encompassing areas such as human harm, financial loss, reputational damage and business continuity disruption. While these are common areas of analysis, other specific impacts may be relevant, depending on the project. The combination of likelihood and consequence determines the overall rating of a risk event, which is often visualised through a risk assessment matrix, such as the example in Figure 2, providing a clear basis for stakeholders to evaluate and prioritise risks.

While attempts exist to quantify risk

Very high	Capability and intent of antagonist are confirmed and demonstrated through numerous successful incidents against similar targets. Environment is openly permissive (ie, fully accepting of interference by others).
High	Capability and intent of antagonist are confirmed and demonstrated through past incidents against similar targets, but with varying levels of success. Environment is permissive (ie, not hostile), but not openly accepting of interference by others.
Medium	Capability and intent of antagonist are confirmed with few demonstrated past incidents against similar targets and with lower levels of success. Environment is not permissive or accepting of interference by others.
Low	Capability and intent are possible but unconfirmed, and no demonstrated successful incidents against similar targets. Environment is hostile to interference by others.
Very low	Capability and intent remain uncommunicated and speculative, with no successful incidents against similar targets. Environment is openly hostile to interference by others.

Table 1: Example of threat ratings and definitions (Source: Based on draft AM4.1 Table 2)

through numerical values, these should be approached with caution. Security risk assessments are inherently qualitative, and assigning arbitrary numbers can be misleading. Once assessed, risks must be prioritised for management or mitigation. This crucial step aims to identify which risks require active intervention and which can be accepted or tolerated. For example, ‘very high’ and ‘high’ risks may be prioritised for management to reduce both likelihood and consequence. Conversely, low-impact, low-likelihood risks can be accepted with minimal monitoring. However, other scenarios require more nuanced decision-making, such as risks with low likelihood but catastrophic consequences, or high likelihood but lower consequences. Ultimately, ‘very high’ and ‘high’ risks should inform the development of ‘most-credible, worst-case scenarios’ (MCWCS), which guide risk management actions. The prioritisation of risks and MCWCS should be formally documented in a project security brief to ensure awareness across stakeholders. Typical key outputs that built environment security risk management professionals deliver as part of the development of a security brief are shown in Table 2.

The risk assessment process would typically require the input provided by security consultants and security engineers. Security risk consultants focus on the big picture – assessing risks, developing comprehensive security strategies, and integrating physical, technical, and operational measures. They are the architects of the overall security approach, playing a leading role early on in planning and design, establishing the foundation and overall security strategy while ensuring harmony with other project goals. They may also offer input on new technologies. During construction, the consultant takes a light, oversight role to ensure the designed security strategy stays on track; post-construction, they become more involved, participating in security reviews, audits, and oversight activities to guarantee ongoing risk management. Security engineers focus on the specifics – designing, implementing, and maintaining the technical and physical security solutions defined in the strategy. They are the builders and implementers of the security plan, and are primarily involved later in the detailed design and technical stages. They focus on designing, installing, and commissioning security equipment.

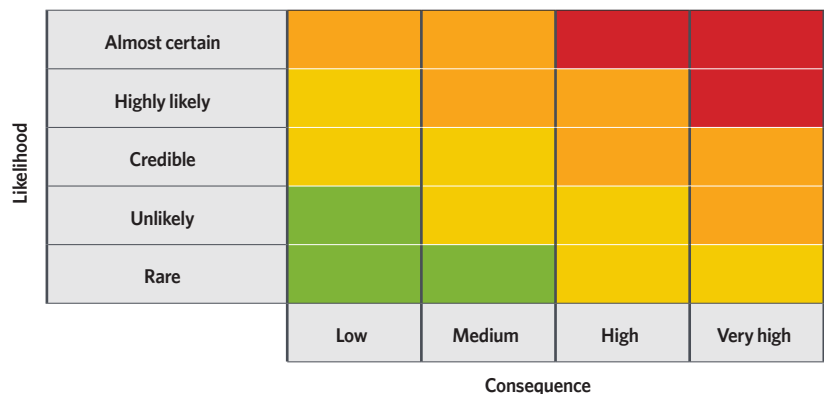


Figure 2: Example risk assessment matrix - green indicates low risk, through to red being a very high risk



Security risk assessment (SRA)	Formally documents the risk analysis process, excluding risk prioritisation and evaluation.
Design basis threats (DBTs)	Detailed descriptions of potential adversaries and their capabilities that guide security measures implementation.
Building assets	A list of assets requiring protection, agreed upon with clients.
Security risk register	Tracks controls and responsibilities for risk management responses.
Project security brief (PSB)	Outlines prioritised risks, security design goals and balance with other project objectives. Developed in close consultation with the client and stakeholders, based upon the findings of the SRA.
Security strategy and design	Response to the PSB and SRA, integrating security measures into the planning and design process. This strategy should be layered and holistic, incorporating physical, technical and operational measures to achieve DDDTR.

**Table 2: Key outputs of security brief development**

In essence, consultants analyse and plan throughout the project life-cycle, while engineers execute the technical details through the design and build. Both are crucial for effective security, but their skills and contributions differ throughout the risk management process.

To meet the demands of each individual project, the risk management process sets out a series of steps for tackling potential issues. It starts with pinpointing risks, followed by in-depth analysis, prioritisation, solution implementation and ongoing monitoring. These steps, often laden with paperwork and administrative tasks, have paved the way for software-assisted frameworks. Many frameworks and standards have been developed to guide risk management practices, most notably BS ISO 31000:2018,<sup>1</sup> which provide standardised approaches and best practices for identifying, analysing, and controlling risks. The presence of multiple frameworks might be reflective of the complex and nuanced nature of risk management, each offering tailored approaches depending on the specific context and needs.

There are several common routes to integrate security into a project. The most suitable route will depend on the specific security needs of the project.

A **security-needs assessment (SNA)** may be employed to identify site-specific security risks and vulnerabilities that would involve consultation with stakeholders, including the police. A successful SNA (including implementing recommendations) may be used to achieve Breeam ‘HEA 06 – Security’ exemplary level credit.<sup>2</sup> The Breeam guidance<sup>2</sup> provides a useful definition for what is considered as a ‘Suitably Qualified Security Specialist’ (SQSS) for the purposes of such work.

**Secured by design (SBD)**<sup>3</sup> focuses on incorporating security measures into properties by accrediting security products and developments. This is operated by the UK Police Services as their preferred scheme for demonstrating how security has been integrated into a new development to deter criminal and anti-social behaviour through the design, layout and specification of buildings and the spaces around and between them. It may be used to meet specific area planning conditions.

**SABRE**<sup>4</sup> is jointly operated by The Security Institute and BRE and is aimed at reflecting best practice in security risk management by emphasising security that is appropriate, proportionate and fit for purpose. It establishes the required documentation to evidence security decision-making. SABRE certification is a reflection of the security risk management process and documentation of security decision-making on a project and, in itself, does not specifically indicate that a development is more secure. Breeam guidance<sup>2</sup> defines what constitutes a SABRE professional.

A **full security design methodology** is a comprehensive approach to security design involving a detailed risk assessment and design process that is recommended for complex projects where security is critical. This integrates qualified security consultants throughout the entire project life-cycle (planning, design, construction, handover), and tasks are often mapped to the RIBA Stages.

**Standard design** applies pre-determined security measures based on industry standards, but may not be suitably tailored to specific project risks. This is often adopted for simpler projects where security isn’t a primary concern. Typically

employed by building services engineers, lacking secure risk assessment. This may risk incomplete security solutions and misaligned measures, as well as potentially unnecessary costs.

A **defined planning process** may be set by local authorities with specific security requirements and will vary by jurisdiction.

Reducing all risks to zero is often impractical. Therefore, risk management aims to reduce risks within the risk owner’s acceptable range, typically to ‘as low as reasonably practicable’ (ALARP). While security regimes cannot directly influence threat levels, they can significantly impact vulnerability and potential consequences. This is where the focus of risk management lies – reducing vulnerabilities through physical, technical, and operational measures (including user management). This relies on continuous communication, coordination, monitoring, and review. This iterative approach ensures risk mitigation measures are effective and residual risks are understood.

Until such time as these leading practices become more widely adopted throughout the development industry, it is likely that building services engineers may still be requested to undertake security engineering activities. This practice, and the reliance on procured physical and technical security solutions in the absence of a risk-based strategy, should be discouraged. If a building services engineer — or even a security engineer — is procured only to provide security systems design at RIBA Stages 3 or 4, it is likely that there will be significant gaps in the overall strategy, as the solutions will not be based on a sound foundation for technical systems design and will not be integrated with the physical and operational security measures. As a result, it will not be possible to confidently state that the project’s security is holistic, balanced, proportionate to the risks, appropriate to the context, and effective at reducing vulnerability and consequences.

On its own, a building services engineering approach may not be able to demonstrate that security is fit for purpose, as there is nothing against which to benchmark design or measure the efficacy of the security solution. This results in simply having security that may be good, but which is unable to be judged positively or defended in any meaningful way, or contribute to the ‘golden thread’ of assurance through the project by tracking risk, mitigation, and residual risk monitoring.

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■ Turn to page 44 for references.



# Module 229

February 2024

» 1. 1. Which of these is not shown as part of the illustrated risk management cycle?

- A Risk analysis
- B Risk control
- C Risk identification
- D Risk investment
- E Risk planning

2. Which of the threat ratings listed includes a description that the environment is not hostile to interference by others?

- A Very high
- B High
- C Medium
- D Low
- E Very low

3. What does MCWCS stand for?

- A Maximum catastrophic worst-case scenarios
- B Mishap, compromise, worst-case sequence
- C Mitigation, countermeasures, worst-case simulations
- D Most-credible, worst-case scenarios
- E Multi-domain cyber warfare control strategies

4. Which British Standard provides a standardised approach to risk management?

- A BS 10007:2013 – *Guidance on risk assessment for organisational projects*
- B BS 6086:2008 – *Managing risk: Guidance for practitioners*
- C BS EN ISO 7327:2013 – *Human factors in the design and operation of technical systems: Glossary of terms and concepts*
- D BS ISO 31000:2018 – *Risk management – Guidelines*
- E BS OHSAS 18001:2007 – *Occupational health and safety management systems*

5. Which of the discussed routes to integrate security into a project is partly operated by BRE?

- A Security-needs assessment (SNA)
- B Secured by design (SBD)
- C SABRE
- D Full security design methodology
- E A defined planning process

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### Further reading

CIBSE AM 4.1 *Security engineering: Strategy*

### References:

- 1 BS ISO 31000:2018: *Risk management. Guidelines*, British Standards Institution 2018.
- 2 [bit.ly/CJFeb24CPD1](http://bit.ly/CJFeb24CPD1) – accessed 1 January 2024.
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## Service of the month

### Decoding the confusion and chaos in UK energy direction

Chris Goggin delves into the complex landscape of current UK domestic energy policy, focusing on the shift towards clean energy dispersal

The current state of UK energy policy is characterised by convulsion and chaos, leaving consumers and industry professionals in the dark about its future direction.

With the aim of phasing out fossil fuels and embracing significant carbon-reducing alternatives, the UK government faces the monumental task of aligning its actions with the laws it has set in motion.

As the nation pivots away from oil and gas, solar, wind and greener gases – such as hydrogen or renewal DME – are likely to play significant roles in delivering power to UK housing and building stock. For this to happen, a clear and concise strategy is required to deliver infrastructure and installations capable of transporting clean energy into UK properties.

Recent developments, however, paint a picture of conflicting priorities. While the UK is committed to reducing carbon emissions, there's a paradoxical focus on expanding North Sea oil and gas production, as reported by *The Times*.

Meanwhile, the largest insurance provider in the UK, Aviva, notes that the government seems to prioritise short-term energy security over long-term sustainability, leading to a lack of investment in large-scale renewable projects.

The Energy Transition Readiness Index 2023 emphasises the need for clear governance and regulatory stability to attract investors to UK renewable projects. Unfortunately, the current lack of evidence in these areas poses a challenge, hindering potential capital investments from outside sources.

For those involved in the supply chain, including installers, specifiers and consultants of heating and hot-water products, the inconsistent flow of governmental information becomes a significant hurdle. A unified and clear approach is necessary to develop carbonising solutions that align with the nation's energy transition goals.

Hydrogen exemplifies the confusion permeating the UK energy sector.



Conflicting reports on the future of the national gas transmission network add to the uncertainty. While one report suggests decommissioning the network in favour of widespread electrification, another – funded by a UK gas operator – proposes a shift to hydrogen, potentially saving billions compared with electrification.

Major energy companies are also preparing for a hydrogen-centric future, retrofitting the current gas infrastructure to accommodate hydrogen gas mixes and, eventually, 100% pure hydrogen. However, the lack of a unified direction creates uncertainty for industry players and investors alike.

Offshore wind projects, despite government subsidies, face viability concerns, with no bids received in a recent contracts for difference scheme. To attract financial

investment, the UK government is aiming to raise subsidies by two-thirds and the starting price by 50% in the next round of offshore wind auctions.

Major energy companies specialising in offshore wind are expressing financial concerns or withdrawing from planned projects, citing rising international market costs and insufficient government subsidies. The solar energy sector, while less turbulent, faces challenges such as long waits for Grid connectivity, with some customers told to expect delays of 10 to 15 years.

Compared with other economies such as Germany, France and the Netherlands, the UK lags behind in energy policy, lacking infrastructure, financial subsidies, and decisive direction. The result is a shortfall in offering attractive international investment opportunities.

For contractors, specifiers and installers, choosing companies that provide a range of decarbonising products becomes crucial. Rinnai's H3 range, covering solar, hydrogen and heat pump technologies, aims to meet low carbon needs efficiently.

Rinnai believes in providing consistent and transparent updates to help customers navigate the evolving landscape of UK energy policy, ensuring informed investment decisions for clean-energy heating and hot-water systems.



■ For more information visit [www.rinnaiuk.com](http://www.rinnaiuk.com)

## Products of the month

### Fuelling the future

Rinnai's latest launch includes electric cylinders, heat pumps, and plate heat exchangers

Rinnai aims to revolutionise the heating and hot-water market with an extensive new product launch encompassing low global warming potential (GWP) heat pumps, electric water heaters, hot water cylinders, and plate heat exchangers.

This comprehensive offering spans various fuel options, including gas, electric and renewables, ensuring Rinnai caters for residential and commercial applications.

The initiative kicks off with the introduction of low-GWP air source heat pumps featuring R290 refrigerant. After this, a range of innovative electric cylinders, in multiple sizes, and instantaneous electric water heaters, ranging from 21-27kW, will be unveiled.

The product lineup will also include the KCM and E Series of condensing gas-fired water heaters, designed for light commercial and residential applications. In the first quarter of the year, Rinnai plans to launch plate heat



exchangers tailored for larger commercial and industrial sites.

Committed to providing cost-effective low carbon solutions for commercial hot water and building heating, Rinnai's product expansion aligns with its dedication to environmentally conscious technology.

Furthermore, its H3 range of decarbonisation products offers diverse pathways and cost reductions for commercial, domestic and off-grid heating and hot-water delivery. Featuring hydrogen/BioLPG-ready technology, hybrid

systems, low-GWP heat pumps, and solar thermal options, Rinnai's H3 range aims to provide efficient, robust, and affordable decarbonising appliances.

The H1 continuous water heaters and boilers focus on hydrogen, anticipating the future relevance of clean hydrogen fuels. These units are hydrogen 20% blends ready, showcasing technological innovation with the world's first 100% hydrogen-ready hot-water heating technology.

The H2 range simplifies decarbonisation with renewable gas-ready units, solar thermal solutions, and heat pump hybrids. Designed for practicality and cost-effectiveness, H2 facilitates multiple decarbonisation pathways with high performance.

Rinnai's H3 range, featuring low-GWP heat pump technology, offers a user-friendly solution for domestic and commercial use. It boasts an extensive range of appliances, from 4kW to 115kW, with favourable coefficient of performance (COP) and seasonal COP metrics, using R32 refrigerant.

■ Call 0300 373 0660 or visit [www.rinnaiuk.com](http://www.rinnaiuk.com)

### Carrier's call to action

Firm urges building owners to act now to secure funding for low carbon heat projects

In a bid to accelerate the transition to low and zero carbon heat networks, Carrier, a subsidiary of Carrier Global Corporation, is calling on building owners to seize the opportunity offered by UK government grants.

As the deadline for funding applications approaches, Carrier is encouraging organisations in the public, private and third sectors to tap into initiatives such as the Green Heat Network Fund (GHNF). Launched in March 2022 with an initial fund of £288m, the GHNF aims to support the development of sustainable heating and cooling networks in England.

With its increasing popularity, additional funding is available for drawdown in fiscal years 2023/24 through 2026/27. The GHNF has already undergone six rounds of applications, with the seventh currently open and set to close on 23 February 2024.

Oliver Sanders, commercial HVAC director, UK & Ireland, highlights the crucial role of



heat networks in achieving the UK's net zero targets, particularly through the adoption of highly efficient heat pumps to reduce carbon emissions.

According to the UK government's Heat and Buildings Strategy, deploying at least 600,000 hydronic heat pumps annually by 2028 is essential for staying on course to reach net zero. Sanders notes the gap between the current sales of 55,000 hydronic heat pumps in 2021 and the

ambitious target, underscoring that the GHNF is a vital opportunity to bridge this deficit.

One exemplar project featuring Carrier's heat pumps is the E.ON Citigen scheme in the City of London. Expected to slash carbon emissions by up to 50%, the project highlights the potential for energy-efficient district heating and improved air quality.

Carrier has further reinforced its commitment to the net zero agenda by introducing a new line of high- and very high-temperature heat pumps, designed to reduce carbon emissions and energy costs.

As the seventh round of the GHNF beckons, Carrier urges organisations to submit applications promptly and capitalise on the available £288m. It believes the GHNF represents a pivotal opportunity for building owners to contribute to the UK's sustainability goals and benefit from advancements in energy-efficient technologies.

For those seeking advice and assistance on heat pump system design to support GHNF applications, information is available on Carriers website.

■ Visit [www.carrier.com/commercial/en/uk](http://www.carrier.com/commercial/en/uk)



✓ **Gilberts launches swirl diffuser with bespoke patterns**

UK air movement specialist Gilberts Blackpool is hoping to attract the attention of interior designers, as well as engineers, with its Series GA swirl diffuser.

The addition to Gilberts' swirl diffuser lineup features a contemporary face design aimed at delivering dynamism into interior spaces, whether integrated into an exposed building services strategy or inset into a suspended ceiling grid.

While offering a standard face-plate design, Gilberts can tailor bespoke variations of patterns and hole sizes, using its in-house design, manufacturing and testing capabilities.

The Series GA incorporates a radial-pattern air distribution impeller core behind the face plate. This core allows for the adjustment of swirl patterns based on the layout and occupancy of the space below.

Functionally, the Series GA efficiently delivers high volumes of air horizontally, with rapid entrainment and mixing capabilities, supporting cooling, heating or ventilation at up to 60l/s (GA Type A) or 170l/s (GA Type B).

Gilberts' swirl diffusers have been specified in Uber's European Centre of Excellence and Virgin's first UK hotel, in Edinburgh.

■ Call 01253 766911 or email [info@gilbertsblackpool.com](mailto:info@gilbertsblackpool.com)



✓ **Pump Technology's new system to enhance accurate level control**

Aldermaston-based Pump Technology has introduced the DrainMajor Duo and DrainKing systems, featuring a robust triangular float on a ridged arm for precise stop-start and duty standby functions.

Unlike systems with separate floats on leads, the innovative ridged arm design enhances reliability against fluid turbulence and debris.

The system, available in rectangular or square tanks, ensures accurate level control. Trust in the proven performance of these systems for efficient fluid management.

■ Call 07984 520515 or visit [bit.ly/PumpTech02](http://bit.ly/PumpTech02)

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Carbon neutrality and water conservation are current issues for SoPHE members



Peter White

# Insights into industry

Outgoing SoPHE chair Peter White looks back at his career as a public health engineer, and at the challenges and innovations shaping the industry's future

**P**eter White MCIBSE FSoPHE has been chair of the Society of Public Health Engineers (SoPHE) for the past three years, but will step down from this role in April. He is the founder of Public Health Design Consultants, for which he is a director offering specialist public health advice to the construction industry. Working within the plumbing sector for more than 40 years, he started out as an apprentice for his family's plumbing and heating business.

## Were you fated to become a public health engineer?

In retrospect, I guess I was, but I didn't know it at the time! When I first came into the workplace, I knew what a plumber did, but I had never heard of a public health engineer.

I have been lucky to meet and be inspired by so many interesting people throughout my career. Their support and encouragement has helped me enormously and I've learned never to be afraid to ask for advice.

## What is the biggest change you have seen as SoPHE chair?

Carbon neutrality, and water conservation and security have been influencing what we do for a while now. I noticed at December's COP28 that water resilience is moving up the agenda, so that may begin to accelerate the conversation here in the UK.

## What do you think the future challenges will be in the public health industry?

The industry is currently wrestling with the need to protect domestic hot water systems against legionella versus an energy-saving desire to reduce hot water distribution temperatures. There is no consensus at present, but SoPHE is playing its part, and one of our past chairs, Steve Vaughan, is doing a lot to lead the conversation in the wider industry.

More broadly, we need to ensure that we continue to attract and properly train good-quality engineers to deal with an increasingly complex set of challenges. There is a lot of research worldwide on viable alternatives to using water for toilet flushing. Nowadays, it seems bonkers that we use drinking water to transport human waste to treatment plants – but, like most things, there's no simple fix. I have no doubt some future SoPHE chair will write an article about whatever this 'new' technology turns out to be!

## What would you say to someone considering a career in public health?

I would say that it was an excellent idea. Based on my own experience, it has given me a career that I thoroughly enjoy, working on all sorts of interesting projects with all sorts of interesting people. I've also made a lot of friends and a good living along the way. I'd encourage them to take a look at the SoPHE website and put them in contact with SoPHE YEN.

## Of what have you been most proud at SoPHE?

Those who know me best will know that my immediate response would be unprintable, but the polite version would be that I haven't messed it up too badly!

Like every chair before me, we've all tried to make SoPHE a little better. My term started at the tail-end of Covid, amid all the disruption that caused. In bringing SoPHE back to normal business, we now have a well-established set of committees empowered to organise and host a solid calendar of annual events for our membership, and have set up a quarterly e-newsletter.

## What are the key dates for SoPHE in the 2024 calendar?

There are so many to choose from. Our next headline event is our Technical Conference at the IMechE on 21 March, which will focus on 'Rainwater; collection, reuse and disposal' and the challenges that public health engineers face with reference to climate change. There are also lots of CPDs, networking events, YEN competitions and flagship dinners in London and Manchester. Updates are available in our newsletter.

● For more information about SoPHE, visit [www.cibse.org/sophe](http://www.cibse.org/sophe)



# EVENTS AND TRAINING



## NATIONAL EVENTS AND CONFERENCES

### CIBSE Building Performance Awards 2024

29 February, Park Plaza Westminster Bridge, London

Booking is now open for the Building Performance Awards, the only industry accolades that focus on actual, measured performance outcomes, and not just design intent or performance specifications. Entries are open to any organisation or individual, within the UK or internationally, that is responsible for the design, commissioning, construction, installation or operation of low energy buildings, and the manufacturers whose products enable efficient energy consumption. Book your place to celebrate with the industry at [www.cibse.org/bpa](http://www.cibse.org/bpa)



### CIBSE Technical Symposium

11-12 April, Cardiff University

With the theme 'Fit for 2050 - Delivering buildings and defining performance for a net zero built environment', the 2024 symposium will present a range of peer-reviewed papers and presentations outlining the latest developments in practice, technology and policy, and highlight the latest guidance for building services engineers.

## CIBSE REGIONS AND GROUP EVENTS

Check the website for up-to-date information on regions and groups meetings, webinars and podcasts. Visit [www.cibse.org/events](http://www.cibse.org/events)

### Intelligent Buildings Group: Deep decarbonisation of data centres

14 February, online

Webinar with presentation by Professor Xiaoshu Lu, introducing a method for

decarbonisation of data centres.

### CIBSE Yorkshire: Escalators – engineering the ups and downs

28 February, Leeds

CPD session on escalators, with CIBSE vice-president Dave Cooper. He will guide attendees through the applicable standards and potential issues with escalator design, covering aspects such as location,

specification, passenger input, and component failure.

### South Wales: Energy-efficient underfloor heating for future buildings

5 February, Cardiff

Why underfloor heating should be used in modern buildings, Regulations (Part L) and the impact on carbon neutrality, and floor construction types.



## TRAINING COURSES

CIBSE's courses are run as in-person and live online training. Corporate delivery is also available in-house face to face, or remotely online. See [www.cibse.org/training](http://www.cibse.org/training)

### Electrical services explained

20-22 February, remote  
19-21 March, London

### Introduction to the Building Safety Act

14 February, remote  
13 March, remote

### Commissioning Code M: Commissioning management

13 February, London

### Introduction to Heat Networks and Code of Practice

28 February, remote  
16 May, London

### Energy strategy reports

29 February, remote

### Designing water-efficient hot and cold supplies

5 March, London

### Heat Networks Code of Practice (short update)

20 March, remote

### Mentoring skills workshop

27 March, remote

### Below-ground building drainage

18 April, remote

### Design of heating and chilled water pipe systems

14 March, London

### The importance of energy-efficient buildings

15 May, London

### Mechanical services explained

20 February, London

### Fire safety Building Regulations: Part B

27 February, remote  
28 March, remote

### Design of ductwork systems

27 March, remote

### Heat Networks Code of Practice

6-7 February, remote

### Building services explained

27 February, London  
26 March, remote

### ISO 50001:2018 Energy management system/ Low Carbon Consultant

19-20 March, remote

### Energy Savings Opportunity Scheme (ESOS)

13 February, remote  
24 April, remote

### Building Regulations Part O: Overheating

14 February, London  
23 April, remote

## On-demand training

CIBSE has a portfolio of on-demand courses that contain interactive online content, with quizzes and additional resources to support your learning. [go.cibse.org/training-mycibselearning](http://go.cibse.org/training-mycibselearning)

Benefits include:

- Online platform accessible on desktop and mobile devices
- Courses and modules available offline when using the app
- Flexibility
- Interactive content
- Corporate training exclusive tools (dashboards, reports)



## CIBSE JOURNAL WEBINAR

The next *CIBSE Journal* webinar, sponsored by Vertiv – titled 'Deploying liquid cooling in air-cooled data centres' – takes place on 28 February. Register at [www.cibsejournal.com/webinars](http://www.cibsejournal.com/webinars)

All previous *Journal* webinars are also available on demand at: [www.cibsejournal.com/webinars](http://www.cibsejournal.com/webinars)



## MEMBERSHIP WEBINARS

CIBSE Membership hosts free, two-part webinar series to support members with applications for the Associate and Member grades and registration with the Engineering Council as Incorporated Engineer and Chartered Engineer level.

Visit [bit.ly/CJMar23memweb](http://bit.ly/CJMar23memweb) for more information and to register. **Upcoming dates:** 13 and 20 February; 12 and 26 March



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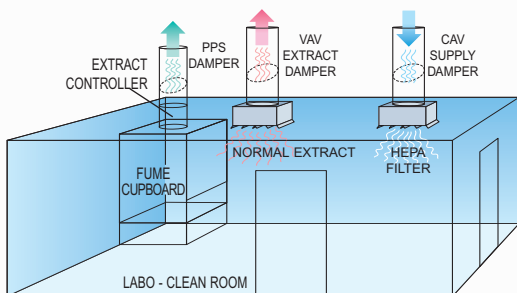


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