

# CIBSE

JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

July 2015

## EDGING CLOSER

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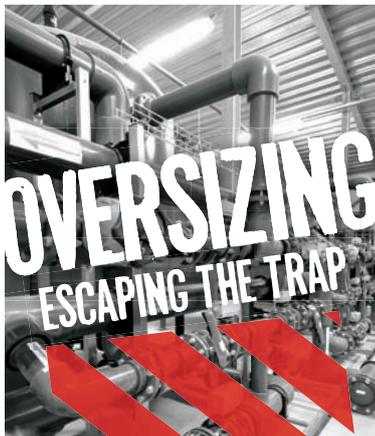
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# Performance art

It's festival season and, over the summer months, thousands of us will be leaving the comforts of our masonry and timber homes to spend a few nights under canvas in one of the dozens of tented cities that appear in the British countryside at this time of year.

The environmental impact of these festivals can be substantial. Glastonbury had more than 175,000 people living on its site last month, the equivalent of a city the size of Wigan. The organisers have to put in place infrastructure that powers the site, provides fresh water and disposes of mountains of waste.

Minimising the use of resources for these mini metropolises is a complicated task but thankfully festival organisers can now turn to an environmental consultant specialising in temporary arts events.

Not-for-profit company Julie's Bicycle was set up by music executives who were struck by the perversity of flying in rock stars for Live Earth – a music concert aimed at raising public awareness of climate change. They realised that artists were in no position to lecture on the environment without getting their own 'front of house' in order first (page 28).

In only eight years, the organisation has given advice on resource efficiency to more than 1,000 groups in the UK and

overseas. Impressively, it has gathered enough data to provide benchmarks across a diverse range of arts venues and events covering festivals, arts buildings, offices, tours and productions. The data has been collected using carbon calculators known as creative industry green tools (IG Tools). Such has been their success that the tools are now a condition of funding by the Arts Council England and Creative Scotland.

IG Tools also form the basis of a certification scheme, involving an energy audit by Julie's Bicycle. Already 200 organisations covering festivals, venues, events and offices have signed up. Julie's Bicycle is now spreading its message across the arts industry; a great example of positive engagement on resource reduction can be seen in the striking infographics on Shambala's festival website.

For anyone involved in creating buildings with a low environmental impact, CIBSE's new Guide A is an essential document. Over the next three months we will offer a chapter-by-chapter guide to the key changes in one of our sector's most important texts (page 34).

**Alex Smith, editor**

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## In brief

### DECC EDR PILOT UPDATE

The second phase of the government's electricity demand reduction (EDR) pilot is open for registrations. Anyone interested in submitting a potential pilot can now bid for funding for projects down to 50kW capacity – half the previous minimum size.

Other changes include:

- More time to install measures
  - Greater scope for successful projects to develop over time
  - Early payment after installation
- For guidance, and to register, visit <http://bit.ly/1qMxLFj>

### WARM RECEPTION FOR EU HEATING AND COOLING PLAN

The European Partnership for Energy and the Environment (EPEE) has welcomed the European Commission's Heating and Cooling Strategy, which is due to be unveiled later this year.

The strategy will be important because it focuses 'on the largest energy consuming sector in Europe, namely the heating and cooling of buildings', said EPEE director general Andrea Voigt.

She added that the EPEE would redouble its efforts to cut the use of HFC refrigerant gases 'in a way that is economically viable, compatible with high safety standards, and that continues to observe energy efficiency as a fundamental objective at EU level'.

### ESOS DEADLINE SET

The deadline for compliance with the Energy Savings Opportunities Scheme (ESOS) is 5 December 2015, the Department of Energy & Climate Change has confirmed.

Officials said the deadline would not be moved back because it is laid down in the EU Energy Efficiency Directive. This means there are just five months for large enterprises to complete and submit their energy audits.

CIBSE technical director Hywel Davies said: 'We believe there are enough assessors, but an ESOS audit is not a two-day exercise, and if companies leave it late they are risking falling foul of the Environment Agency. The time to act is now, not in September.'

## SCREEN TEST

Ventilation was uppermost in the mind of architect Sheppard Robinson when specifying this striking metal façade for a car park serving Central Manchester University Hospitals NHS Trust. Perforations in the mesh at Grafton Street car park provide a minimum 60% natural airflow, which allows the car park to be naturally ventilated. At the base and top of the mesh, manufactured by Aliva, the aperture sizes were reduced to create a bigger area for artwork to be screen-printed on the façade. To compensate for the reduced airflow through the mesh, the levels in between had larger openings. See more on car parks on page 49.



## IAQ health fears confirmed

### • Ventilation could reduce pollution impact by 38%

Poor indoor air quality (IAQ) may be responsible for the loss of more than 200,000 'healthy life years' annually in the UK, according to a new study.

Research published by the Finnish National Institute for Health & Welfare (THL) appears to prove the link between exposure to indoor pollutants and cardiovascular disease, as well as a number of other health issues, including lung cancer, asthma and other respiratory conditions.

Changing the way buildings are

ventilated, said the report, could reduce the impact of indoor air pollution by as much as 38%.

Meanwhile, the spread of Middle East respiratory syndrome (Mers) – which has infected 41 people, killing four, in South Korea – has been blamed on inadequate ventilation in the hospital where



ANDOU/AGENCY / GETTY IMAGES

the first victim was treated.

JongKoo Lee, director of the Seoul National University Hospital, and former head of the Korea Centers for Disease Control and Prevention, said 'bad ventilation' played an important role in the rapid spread of the disease, for which there is no known cure.

The room at St Mary's Hospital in Pyeongtaek, where the first victim – a 68-year-old man – and most of the subsequent victims were treated, had one small window that remained shut. An air conditioning unit cycled the air and an investigation after the outbreak found traces of Mers bacteria on filters inside the unit.

## Up to 20% of homes overheat

Up to 20% of homes in England may already be overheating, a Zero Carbon Hub report has found.

*Overheating in homes – the big picture*, released on 16 June, showed that the problem was almost certainly set to get worse as the climate changes, and said that checking for overheating risk must become a normal part of business practice.

Housing associations and housebuilders are starting to push the issue up their list of priorities but, said Hub project manager Nicola O'Connor: 'Organisations that haven't had a problem with their stock to date would benefit from understanding their risk profile. Being

caught out by complaints from occupants is not where most businesses want to be.'

She added: 'While the extent of overheating is still a little fuzzy, we should not wait for perfect knowledge before acting. We can't afford to wait and see – it's much harder to deal with an overheating issue after the event, and much more risky for the health of the occupants.'

Phase 2 of the project – to be completed by April 2016 – will make recommendations to industry and government on an effective overheating policy.

See next month's *Journal* for more details.

# Europe warns UK over energy certificates non-compliance

## ● Penalties and controls insufficient says EC

The European Commission (EC) has warned the UK government that its system of energy performance certificates (EPCs) is in breach of a key energy directive. It has asked the UK to ensure EPCs are displayed in accordance with the Energy Performance of Buildings Directive (EPBD).

The EC said it had received a complaint about a potential lack of compliance by the UK over the issuing and display of certificates in public buildings. It said the UK's system of penalties and controls for the display of EPCs 'appears insufficient to ensure compliance



JORGNO / SHUTTERSTOCK

with the obligations of the directive'.

The UK has previously received a letter of formal notice regarding the possible infringement, and it now has two months to notify the EC of measures taken to remedy this situation – otherwise it may be referred to the EU Court of Justice.

The infringement could apply to EPCs, which show predicted

energy use, or display energy certificates (DECs), which record operational energy use. The display of certificates is required in buildings of more than 500m<sup>2</sup> that are occupied by a public authority or frequently used by the public.

CIBSE technical director Hywel Davies said: 'Not having DECs, and not enforcing them, is like the Treasury turning a blind eye to energy managers wasting money.'

Richard Griffiths, senior policy adviser at the UK Green Building Council, said: 'The poor enforcement of EPC and DEC regulations is a significant concern, and it's no surprise the commission has made a complaint to the government on this issue.'

# Developer unveils design for tallest tower on City of London skyline

Designs for the proposed tower at 22 Bishopsgate in the City of London have been released by developer Lipton Rogers and architect PLP, ahead of the submission of a new planning application later this summer.

The skyscraper will replace the Pinnacle scheme, which was ditched in 2012. The new proposals are for a 278m building, rising to 62 storeys, 10m lower than previously approved.

It will provide more than 1.4 million ft<sup>2</sup> of net internal area, with the floor plates shaped to reduce the mass of the building. At the top of the building will be a free public viewing gallery and a two-storey public restaurant and bar.

Plans for the 'integrated vertical city' – accommodating more than 12,000 people – include spaces for meeting and collaboration, a range of cafés, food outlets and a conference centre, plus a medical centre, library, wellness suite and sports facilities.

It will be the first building in London to adopt the Delos WELL

Building Standard – the world's first to focus exclusively on human health and wellness.

The building also aims to achieve BREEAM Excellent certification and a 25% carbon saving compared with the previously submitted scheme.

Commenting on the impact of the building, architect Julie Fitcher said: 'The height and form of the

tower ensures that the shadow will pass quickly over the underlying setting, minimising its impact. But the building sits awkwardly with its neighbours, creating a dark void at its base.'

She added that the form of the eastern cluster as a whole raises interesting questions about the collective impact of tall buildings on their immediate environment.



## Energy efficiency VAT must increase after EU decision

The European Court of Justice has ruled that the UK's 5% rate of VAT on energy efficiency goods and the installation of energy saving measures is illegal.

As a result, VAT on insulation, solar panels, heating controls and other energy saving equipment will have to rise by 15% to the standard 20%, despite the new Conservative government's pledge to legislate against rises in taxation.

The court ruled that the UK was failing to 'fulfil its obligations' under the European VAT directive.

Heating and hot-water controls, insulation, solar panels, wind turbines, heat pumps, micro combined heat and power units, and wood-fuelled boilers currently qualify for the 5% rate, but the UK faces legal penalties if it does not bring them into line with other building products.

The European Court first ordered the UK to raise the rate in 2013, but the government appealed the decision. That appeal has now been thrown out, although the reduced rate can still be applied to work on social housing projects.

## ILEVE launches competence standards

The Institute of Local Exhaust Ventilation Engineers (ILEVE) has launched a competence matrix to help raise standards across the sector.

More than 13,000 deaths each year in the UK are due to occupational ill health, mainly lung disease and cancers, related to exposure to dusts, fumes and gases at work.

'Good hazard management, including local exhaust ventilation, is essential to the provision of safe and healthy workplaces, and prevention of asthma, cancers and respiratory diseases,' the Institute said.

The Matrix identifies the skills, knowledge and expertise needed by all those involved in exhaust ventilation at work, from owners to salespeople, and sets out what is needed to be considered competent.

The Matrix is available for download at [www.ileve.org](http://www.ileve.org)

## Solar-cell breakthrough

UCLA chemists have developed a way in which solar cells can keep their charge for weeks, instead of seconds.

They have created a process that mimics plants' nanoscale structures, which can keep negatively charged molecules separated from positively charged ones.

To do this in plastic solar cells, the team needed to use a polymer donor and a nanoscale fullerene (a pure carbon molecule) acceptor.

The process is described as like having small bundles of uncooked spaghetti with precisely placed meatballs. Some fullerene 'meatballs' sit inside the polymer 'spaghetti' bundles, while others are forced to stay on the outside.

The inside ones take electrons from the polymers and toss them to the outside ones, which can keep the electrons away from the polymer for weeks, greatly improving a cell's capability to retain power.

# Parliament refurb to cost billions

## ● Refurbishment would cost £5.7bn if MPs and Lords vote to stay in situ during works

Crumbling masonry and urine 'pouring' down office walls are just some of the problems being caused by lack of adequate maintenance in the Houses of Parliament, according to MPs.

The buildings are in such bad condition that it might take 32 years to repair the historic landmark fully.

An Independent Options Appraisal (IOA) – produced by external experts led by Deloitte Real Estate, and including the consultancy AECOM – has been delivered to parliament. The document sets out different options to help MPs decide how to fix the Palace of Westminster buildings. The report was commissioned in 2013, after publication of a study that showed major, irreversible damage could be done to the Palace unless significant restoration work was undertaken. Repair work is not expected to start until 2020.

MP Ben Bradshaw – speaking on Jeremy Vine's show on Radio 2 – said he had been forced out of his office after urine flooded down the walls from leaking Victorian pipework in the ceiling.

The IOA has put forward a range of options. The worst-case scenario – 32 years at a cost of £5.7bn – will be required if MPs and Lords elect to remain in situ while the work is carried out around them. If they move

The Palace of Westminster needs urgent repair work



STUART MONK / SHUTTERSTOCK

out temporarily, the work would take six years at a cost of £3.9bn. Alternative scenarios include a partial closure and less ambitious improvement works.

At the recent CIBSE Patrons annual lunch, held at the House of Lords, Lord Martin O'Neill said moving out for at least five years might be inevitable because maintenance had 'not been well handled' in the past.

'Many of the country's historic buildings need the same kind of care and attention – so there is a lot of work for your industry to do,' he said. 'The issue is whether you have the skills to deliver projects on time and to quality... there is also growing anxiety about material shortages.'

However, he said it was an exciting time for the sector, with so many 'great projects to carry out'.

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# Lord Deben urges MPs to focus on energy efficiency

## ● Support from 35 politicians for Cost Effective Energy Measures Bill

Energy efficiency should be at the heart of this government's policies, Lord Deben told MPs at a reception to promote a new Energy Measures Bill.

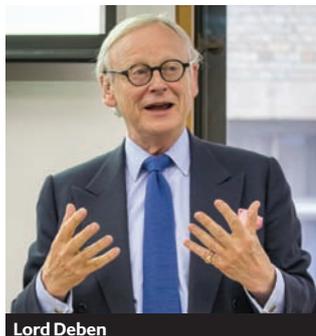
More than 50 MPs gathered at Westminster's Portcullis House last month for an event hosted by CIBSE and the Sustainable Energy Association (SEA) to discuss developing a vision for energy in buildings.

Lord Deben spoke in support of focusing on energy in buildings as an effective way of dealing with the 'energy trilemma' – security, affordability for business and domestic users, and carbon reduction.

The chair of the UK's independent committee on climate change, said: 'On a planet of nine billion people we will need to use what we have more efficiently.'

'How stupid would it be, when we already have a stock of inefficient buildings, to create a whole new generation of them?'

In all, five cross-party speakers – including Green Party MP Caroline



Lord Deben



Caroline Lucas



CIBSE President Nick Mead (left)

Lucas – addressed the attendees, who were told that a lack of a clear strategy for energy in buildings is costing the UK economy more than £12bn a year.

The majority backed the proposed Cost Effective Energy Measures Bill, which calls for a national strategy to promote the use of cost-effective measures to ensure new buildings are constructed to high energy efficiency standards. The bill's authors claim it would boost GDP by £13.9bn per year.

'Austerity is not an obstacle – it is a very good reason for this bill,' said Lucas. However, she was sceptical about the Conservative government's ability to deliver on the green promises made in its election manifesto.

Representatives from organisations including CIBSE, SEA, Community Energy England, Cooperatives UK, the Passivhaus Trust and the Renewable Energy Association were also at the event.

MPs showed a good level of engagement with the subject, with 35 expressing their support for energy policy by backing the bill. However, the bill was not selected to be put before parliament this time.

## In brief

### SWECO AND GRONTMIJ MERGE TO CREATE £1.2BN COMPANY

Swedish engineering consultancy Sweco has bought Dutch rival Grontmij in a deal that will create a €1.7bn (£1.22bn) company, with about 14,500 employees.

The companies believe they are a near-perfect fit, with complementary geographic footprints and similar governance models and corporate cultures.

It is estimated that there will be annual synergies and operational improvements of around €27m, of which 90% is expected to be realised in the first four years after settlement.

### ASHRAE AND US GOVERNMENT RENEW ENERGY AGREEMENT

Technical society ASHRAE and the US Department of Energy (DOE) have renewed a memorandum of understanding to work together to: improve the efficient use of energy; improve the visible and widespread use of renewable energy sources; and minimise the impact of energy use on the environment.

The agreement, which updates the original version from 2011, was signed by ASHRAE president, Tom Phoenix, and David Danielson, DOE assistant secretary for energy efficiency and renewable energy.

### CLIENT GROUP TO FOCUS ON ZERO-CARBON STANDARDS

Several major clients, including John Lewis, Whitbread and Saint Gobain, have formed a task group to help shape UK zero-carbon building standards.

Under current government policy, all new non-domestic buildings must meet zero-carbon targets by 2019, but a number of industry groups have expressed concern about the pace of development of technical standards.

The group was created under the direction of the UK Green Building Council (UK GBC) to explore how 'allowable solutions' – the mechanism aimed at helping developers deliver zero-carbon projects cost effectively – might deliver 'high-value carbon-saving solutions in the built environment'.

## Stronger RHI could get UK back on track

Industry groups are calling for an expansion of the Renewable Heat Incentive (RHI) to get the UK back on track for meeting legally binding energy targets.

New analysis by energy watchdog Keep on Track revealed that the country was falling behind on two out of three of its 2020 renewable targets.

Under EU law, the UK is obliged to be sourcing 15% of its energy from renewables by the end of the decade. This overall target is made up of three 'sub-targets', namely 30% of electricity generation, 12% of heat and 10% of transport fuel.

According to Keep on Track, the UK is on target for electricity generation, but off course for the other two. The percentage of electricity produced by renewables in 2013 was 13.9%, with transport at 4.4% and renewable heat at 2.6%.

The Renewable Energy Association (REA) says

extending subsidies for renewable heating schemes available under the RHI – and providing greater legislative certainty – could get the UK back on track. The REA also urged the government to announce budgets for the RHI for 2016-2020, to provide 'sufficient tariff certainty for projects with long lead times'.

The UK, along with France, the Netherlands, Malta and Luxembourg, has also been urged by the European Commission to review its renewables policies more generally. A progress report for all 28 EU member states said these five countries should 'assess whether their policies and tools are sufficient and effective' to meet the target.

Most member countries were revealed to be on track to meet their renewable energy obligations by 2020, with Sweden, Denmark and Estonia well ahead of schedule, according to the report.

# Air conditioning and ventilation markets up 4%

## ● Sector expected to grow 10% by end of the decade

The market for UK ventilation and air conditioning products grew by 4% in 2014, and will be worth more than £1.2bn by 2019, according to a new report from AMA Research.

Growth rates between 2015 and 2019 'can be considered moderate', researchers said, but represented a significant turnaround for a market 'that has seen static conditions at best since the beginning of the economic downturn'.

Positive influences on the market include increased health, safety and energy efficiency legislation, revised Building Regulations, and environmental



legislation, which have stimulated product development.

The AMA anticipates that the market will have grown by 10% by 2020. It lists the ErP Directive for ventilation fans, the European Ozone Depleting Substances (ODS) Regulation, the CRC

Energy Efficiency Scheme, EU Fire Legislation and 'general concerns relating to fire and smoke precautions' as likely influences on the market up to 2019.

Product innovation and technological developments – including variable speed drives, multiple scroll compressors, EC motors, heat recovery and demand control ventilation – will also increase market penetration, the report said.

Keith Taylor, director of AMA Research, said the 'relatively wide range of end-use sectors and specialist applications for UK ventilation and air conditioning products represents a supporting factor to underpin long-term market development'.

The report is available at [www.amaresearch.co.uk](http://www.amaresearch.co.uk)

ALEXANDRA TASEVSKI / SHUTTERSTOCK

## In brief

### SCOTLAND PUTS ENERGY EFFICIENCY INFRASTRUCTURE AT TOP OF AGENDA

Scottish Climate Change Minister Aileen McLeod has announced that Scotland's energy efficiency programme will be made an infrastructure priority in an effort to improve the ratings of homes and non-domestic buildings over the next 20 years.

The country will also examine how supplier obligations on energy efficiency and fuel poverty can be designed for Scottish circumstances, and to 'leverage private sector investment using new devolved powers in the Scotland Bill', McLeod said.

Investment in domestic energy efficiency will rise to £119m in 2015, from £99m last year, the minister added.

### BUILDING SERVICES FIRMS TRIUMPH IN ECO-AWARDS

Building services firms have scooped major accolades at the annual Ashden Awards. Multiple CIBSE Award winner Max Fordham picked up the Ashden Gold Award and the Ashden Award for Sustainable Buildings, supported by the Garfield Weston Foundation. The judges praised Max Fordham for its 'trailblazing role in driving up standards across the sector.' Meanwhile smart building pioneer Demand Logic won the Impax Ashden Award for Energy Innovation. The London firms' cloud-based system plugs into the BMS of commercial buildings and detects what it calls 'energy insanities'.

# Apprenticeships to get legal status

The Department for Business, Innovation and Skills (BIS) has announced that apprenticeships are to be given the same legal status as university degrees.

The government has committed to creating three million apprenticeships by 2020, with targets set for public sector bodies to help reach this total.

Giving the term 'apprenticeship' legal protection via the forthcoming Enterprise Bill will 'strengthen their reputation, help working people, and ensure apprenticeships are recognised as a career path equal to higher education', a BIS statement said. It will also give government the power to take action if

the term is abused by 'rogue' trainers attempting to promote sub-standard courses.

More than 2.2 million apprenticeships have been created since 2010, helping to 'establish the UK as the fastest-growing economy in the G7', claims BIS.

'With apprenticeships giving hope and opportunity to more young people, and helping all types and sizes of businesses grow in communities across the UK, the Skills Minister will legally protect the term "apprenticeship"', it added. 'Schools, hospitals, prisons and police forces will all be creating opportunities for young people to get on.'

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## Integration key at technical event

For a chance to present at CIBSE's Technical Symposium – held at Heriot Watt University, Edinburgh, on 14-15 April 2016 – now is the time to submit your 250-word proposals for papers, presentations and case studies.

The theme of the meeting is integration for whole life building performance: professional collaborative delivery of effective and efficient analysis, design, construction and operation of buildings. It is inspired both by discussions at the 2015 symposium, and CIBSE President Nick Mead's call for the industry to pull together and 'put its head above the parapet' by working collaboratively across the supply chain.

The event is aimed at both young and experienced industry practitioners, researchers, academics and building users.

For full details visit [www.cibse.org/symposium](http://www.cibse.org/symposium) or email [symposium@cibse.org](mailto:symposium@cibse.org)

The deadline for proposals is Monday 14 September.

## Final call for YEN awards

The deadline is fast approaching for the Young Engineers Awards, which encompass the CIBSE ASHRAE Graduate of the Year and the Employer of the Year accolades.

The Graduate of the Year Award – which celebrates its 20th anniversary this year – is open to anyone who has graduated in a building services-related discipline in the past two years.

Finalists will be invited to present on a given subject at the awards ceremony at the IMECHE, London, on 8 October, for a chance to win a trip to the ASHRAE Winter Conference in Orlando, Florida.

The Employer of the Year Award recognises companies that have put the development of young engineers at the heart of their business. The closing date is Friday 31 July. For more info, visit [www.cibse.org/yea](http://www.cibse.org/yea)

# CIBSE Building Performance Awards 2016 launched

## ● Awards will be given for Project of the Year across five different sectors

The 2016 CIBSE Building Performance Awards have been launched at the 2015 Carbon Champion's offices, in London.

M&G Real Estate – which scooped the energy management and carbon champion awards at last year's ceremony – hosted the event in June, when director Nina Reid gave a presentation, highlighting the firm's achievements.

Reid told the audience that M&G had achieved a 23% reduction in energy consumption across its shopping centre portfolio since 2010, with provisional data for 2014/15 showing the

reduction was now at 32%, with a £1.8m saving in energy bills.

Hywel Davies, CIBSE technical director, and chair of the awards judging panel, introduced the new categories for 2016. He has written a blog explaining the reasons for the restructure, which can be viewed at [www.cibse.org/bpa](http://www.cibse.org/bpa)

Davies told attendees at the 2016 awards launch that the changes had been made to help 'shine a light on some of the unsung heroes of the built environment'.

Five new project categories replace the New Build Project and Refurbishment Project awards. They are: Project of the Year – Commercial/Industrial; Leisure; Public Use; Residential; and Retail.

Davies says the decision to rethink the awards was primarily driven by the diversity of last year's entries, which made it extremely difficult to compare projects from radically different sectors.

If you have been working on a project that you think deserves industry recognition, don't miss your chance to showcase your hard work and achievements in front of industry leaders – enter the awards today.

Full details of all the award categories and criteria, plus guidance on how to enter, are available at [www.cibse.org/bpa](http://www.cibse.org/bpa)



M&G Real Estate's Nina Reid at the launch

## Students' building simulation contest offers prize worth £8,000

The CIBSE Building Simulation Group is calling for entries to its annual postgraduate prize, sponsored by Integrated Environmental Solutions (IES).

The award is open to UK or overseas postgraduate students undertaking a Master's – or equivalent level – research project involving the application of building simulation tools.

The qualifying research areas have been expanded, and entries – with modelling as the main focus – are invited on:

- Building physics

- Compliance and performance
- Dynamic thermal modelling
- HVAC systems
- Computational fluid dynamics
- Daylighting and artificial lighting

The winner will receive £1,000 and a 12-month, unlimited laptop licence for the IES VE-Pro software suite, plus a place on one of the IES three-day training courses, worth more than £7,000.

There are also two runners-up prizes of £250.

A one-page summary outlining the project's title, the name(s) of participants and a brief project description and endorsement must be submitted by 31 August.

Applicants selected to go forward for the award must submit their full reports by 30 October, and the winning entries will then be announced in December.

For more information, visit [www.cibse.org/bsg](http://www.cibse.org/bsg)

Entries should be sent to CIBSE BSG secretary at [competition@cibsebsg.org](mailto:competition@cibsebsg.org)

# Peck appointed Society of Light and Lighting president

● SLL awards also presented at AGM in May

The new Society of Light and Lighting (SLL) president, Liz Peck, delivered her inaugural address at RIBA headquarters in May.

Her address, at the SLL AGM, focused on collaboration between industries and the UNESCO International Year of Light, as well as raising awareness and understanding of light and light-based technologies.

She said she wanted the society to be a 'lighting family tree' that was open to anyone with an interest in lighting. 'We welcome all those interested in any aspect of the world of light, lighting and its application.'

'Whether your interest is in photonics, astronomy, physics, product design, architecture, interior design, medicine, photography or ophthalmology, this society is open to you: you are all welcome,' she added.



SLL president Liz Peck with immediate past president John Aston

The address was followed by the presentation of awards.

Feride Sener Yilmaz won the Jean Heap Research Bursary – a new award for 2015 – for her proposal *Human Centric Sustainable Retail Lighting Design Approach: An Experimental Study*.

Prizes for technical papers published in the *Lighting Research and Technology* (LR&T) journal went to: Markus

Canazei, who received the Leon Gaster Award, and Andre Barroso, who received the Walsh Weston Award.

The Regional Award went to Jim Shove, of the South West, while the SLL Lighting Award went to Peter Raynham and Kevin Mansfield. Honorary Fellowships were awarded to Paul Ruffles and Iain Maclean.

The President's Medal went to Barrie Wilde.

## Heat pump code feedback sought

A public consultation is under way on the draft publication *Surface water source heat pumps: A Code of Practice for the UK*. The document is being produced by CIBSE in association with the Ground Source Heat Pump Association (GSHPA) and the Heat Pump Association (HPA), with support from the Department of Energy & Climate Change (DECC).

Feedback is sought from across the sector and CIBSE would be grateful for comments on the draft. The consultation closes in late July.

The Code aims to raise standards in the design, implementation and operation of water source heat pumps, and covers the entire life-cycle of a project. It focuses on the use of surface water, harnessing energy from the sea, rivers, canals and lakes, and does not cover ground water, such as in mines, caverns and aquifers.

For more information go to [www.cibse.org/SWSHPconsultation](http://www.cibse.org/SWSHPconsultation) and see 'From could do to must do standards' (*CIBSE Journal*, May 2015) and 'Coming on stream' (*Journal Products Special*, May 2015).

## New members, fellows and associates

### FELLOWS

**Aizlewood, Claire**  
Watford, UK

**Belfield, Jonathan Hugh**  
Droxford, UK

**Bourke, Simon Peter**  
Leeds, UK

**Cao, Chunli**  
Watford, UK

**Colley, Mark John**  
Newcastle West,  
Republic of Ireland

**Kelly, Stephen Anthony**  
Londonderry, UK

**Lewis, Gary**  
Saughall, UK

**Ng, Pui Keung**  
Yuen Long, Hong Kong

**Ryan, Chew Piang**  
Oud Metha,  
United Arab Emirates

**Shabha, Ghassan**  
Stourbridge, UK

**Thomas, Paul William**  
Birmingham, UK

**Traboulsi, Samir**  
Beirut, Lebanon

**Wong, Kwok Wai**  
48 Wing Shun Street,  
Hong Kong

### MEMBER

**Ahmed, Alik**  
South Shields, UK

**Allcock, John Alexander**  
London, UK

**Ampadu-Sam, Rashmi Kwasi**  
Sharjah, UAE

**Anatolitis, Kyriakos**  
London, UK

**Asare, Isolyne Simone**  
London, UK

**Ashton, Lewis John**  
Slough, UK

**Au Yeung, Lun Kwong**  
Hong Kong, Hong Kong

**Baldrey, David Shaun**  
Portsmouth, UK

**Bamber, Thomas**  
London, UK

**Barekyan, Sergey**  
London, UK

**Bateman, Mark**  
London, UK

**Bearder, Katie**  
London, UK

**Bell, Richard Leslie**  
York, UK

**Bennett, Stephen John**  
Carshalton, UK

**Bloomer, Allister**  
Belfast, UK

**Bond, Josh**  
Hereford, UK

**Bradstock, Matthew**  
Caterham, UK

**Brazier, Neil James**  
Worcester, UK

**Brimfield, Richard**  
Oxford, UK

**Brown, David Alan**  
Stanley, UK

**Brown, Dave**  
Makati City Ncr, Philippines

**Bryce, Mark**  
Cambridge, UK

**Bullard, Joshua Aidan**  
Bristol, UK

**Cairns, Adrian**  
Wetherby, UK

**Callaghan, David Robert**  
Wolverhampton, UK

**Capela Pimentel, Rui Manuel**  
Porto, Portugal

**Carr, John**  
Galway, Ireland

**Chan, Tak Shing**  
Sheung Shui, Hong Kong

**Chan, Siu Cheung Andy**  
Kowloon, Hong Kong

**Chan, Siu Lung**  
Sai Wan Ho, Hong Kong

**Chan, Chi Ho**  
Chai Wan, Hong Kong

**Chaffield, Gary**  
Sutton, UK

**Cheetham, Michael Jamie**  
Kingston Upon Thames, UK

**Chow, Ho Pan, Steven**  
Tseung Kwan O, Hong Kong

**Chu, Ki Fung**  
Tai Po, Hong Kong

**Clifton, Simon John**  
Colchester, UK

**Coley, John**  
London, UK

**Coyle, Robert**  
Glasgow, UK

**Cunningham, Michael**  
Birmingham, UK

**Day, Graham**  
Beckenham, UK

**Divac, Vladimir**  
Bushey, UK

**Doylend, Nicholas**  
Loughborough, UK

**Draper, Philip Andrew**  
Braintree, UK

**Dunne, Martyn**  
Manchester, UK

**Evans, Barny Thomas**  
London, UK

**Evans, Ashley Gareth**  
London, UK

**Everist, John**  
Epsom, UK

**Forrest, Jordan**  
Basingstoke, UK

**Fung, Wai Yee Connie**  
Wanchai, Hong Kong

**Galante, Carmelo Guido**  
London, UK

**Glanfield, Michael George**

Isle of Man, UK

**Green, Edward**

London, UK

**Glossop, David**

Guildford, UK

**Goodwin, Matthew**

Doncaster, UK

**Gordon, Simon-Renford**

Slough, UK

**Grafton, Jamie**

Lichfield, UK

**Greenwood, Robert**

Manchester, UK

**Grice, Philip**

Hebden Bridge, UK

**Halse, Philip Douglas**

Tyne and Wear, UK

**Harris, Robert John**

Woking, UK

**Harris, Dimitri Nicholas**

Bristol, UK

**Harrop, Carl Douglas**

Bradford, UK

**Hattam, David Benjamin**

London, UK

**Heeramun, Hemlesh**

Floreal, Mauritius

**Hemmings, David Robert**

Bristol, UK

**Hodgson, Peter Donald**

Dundee, UK

**Holloway, Andrew**

Southport, UK

**Hooley, Michael**

Cramlington, UK

**Hudson, Andrew**

Leeds, UK

**Jackson, Karen**

Glasgow, UK

**Jacobs, Luke**

Abu Dhabi, UAE

**Karetnikov, Fedor**

Sutton, UK

**Keeling, Trevor Paul**

London, UK

**Kennedy, Karen Jean**

Clydebank, UK

**Kmita, Jaroslaw Daniel**

Bristol, UK

**Konsta, Aikaterini**

Manchester, UK

**Krezolek, Maciej Andrzej**

Redditch, UK

**Lam, Yui**

Kowloon, Hong Kong

**Lau, Tsz Wai**

Ma On Shan, Hong Kong

**Lee, Siu Cheong**

NT, Hong Kong

**Lee, Paul**

Hillingdon, UK

**Leung, Wai Kee**

Wan Chai, Hong Kong

**Leung, Suet Ha**

Kowloon, Hong Kong

**Lo, Ho Lam Samuel**

Shatin, Hong Kong

**MacIntyre-Cathles, Paul**

Martyn

Tadworth, UK

**MacLennan, Martin**

London, UK

**Mahendru, Ajay**

London, UK

**Maguire, Alex E T**

Stevenage, UK

**Mak, Cheuk Wai**

Hong Kong, Hong Kong

**Mazareanu, Ovidiu**

London, UK

**McAndrew, Horace Charles**

Portsmouth, UK

**McGarrigan, David**

Huddersfield, UK

**McGarrity, Mark**

Westbury Park, UK

**McGrath, Anthony**

Leamington Spa, UK

**McQueen, David George**

Glasgow, UK

**Menezes, Anna Carolina**

London, UK

**Miles, Ian Graham**

Brympton, Gibraltar

**Mitchell, Alexander John**

Leicester, UK

**Mohammed Khaja, Mujeeb-Ur-Rehman**

Ilford, UK

**Mounfield, Keir Duncan**

Bristol, UK

**Neksojevic, Miroslav**

Bristol, UK

**Ngai, Yat Wa**

Kowloon, Hong Kong

**Okpevba, Victor**

Bristol, UK

**Ouyang, Yu**

Hong Kong, Hong Kong

**Pandey, Bodha Raj**

London, UK

**Panicucci, Stefano**

Pisa, Italy

**Patti, Jasmeer**

London, UK

**Perre, Ivan**

Charvil, UK

**Phinn, Andrew John**

Bathgate, UK

**Poborskyy, Oleksandr**

Bromley, UK

**Popa, Mihai Eugen**

Basildon, UK

**Pritchett, Robin**

London, UK

**Richardson, John Tyrone**

County Londonderry, UK

**Rowe, Alastair Michael**

London, UK

**Salehi Kouhestani, Mohammad**

Harrow, UK

**Shareef, Mohammed Asadullah**

Leicester, UK

**Sherwood, David**

Kindersminster, UK

**Smith, Gary**

Bristol, UK

**Solomon Degefa, Fitsum**

London, UK

**Somerville, Euan Ninian**

Glasgow, UK

**Sowerby, Paul William**

Darlington, UK

**Spence, Michael King**

London, UK

**Stafylaki, Christina**

London, UK

**Sturt, Andrew**

Princes Risborough, UK

**Suddrey, Stuart**

Bournemouth, UK

**Sudi, Idris**

5th Floor, Office 515, Saudi Arabia

**Surette, Robert**

Nova Scotia, Canada

**Syed, Asif Ali**

Romford, UK

**Titley, Oliver**

London, UK

**To, Chi Kwong**

New Territories, Hong Kong

**Trentham, Martin**

Halesowen, UK

**Tse, Chi Wai**

Hong Kong, Hong Kong

**Uzair, Muhammad Umer**

London, UK

**Vincent, Paul**

Thornaby, UK

**Wan, Ho Lung**

Tuen Mun, Hong Kong

**Weir, Craig Gordon**

Livingston, UK

**Whelan, Mark**

Newry, UK

**Williams, Steven**

Ponteland, UK

**Wilson, Kevin Richard**

Edinburgh, UK

**Wiltshire, James**

West Midlands, UK

**Winstone, Paul**

Waltham Abbey, UK

**Wittenberg, Daniel**

London, UK

**Wong, Ching To**

Tsungung Kwan O, Hong Kong

**Wong, Ngan Ting**

Shatin, Hong Kong

**Wu, Kim**

Tai Hang, Hong Kong

**Wu, Chun Fai**

Kwai Chung NT, Hong Kong

**Ziebarth, James Patrick**

London, UK

**ASSOCIATE**

**Burfit, Andrew Brian**

Exeter, UK

**Courreges, Anthony**

Cambridge, UK

**Cullinane, Lewis**

Cardiff, UK

**Davis, Richard**

Worthing, UK

**Evans, David**

Faversham, UK

**Everett, Kieran**

Pinner, UK

**Fleming, Daniel**

Glasgow, UK

**Foster, Richard**

Selby, UK

**Jones, Jonathan**

St Albans, UK

**Latham, Donna**

London, UK

**O'Riordan, John Ben**

London, UK

**Pallet, Ian**

Romford, UK

**Pennell, Matthew Adam**

Chelmsford, UK

**Pilbeam, Francis Wilfred**

Bedford, UK

**Shaw, Timothy Ryan**

Swansea, UK

**Siracusa, Giuseppe**

Enfield, UK

**Smith, Mark Steven**

Brentwood, UK

**Wong, Gordon**

Canning Town, UK

**Wood, James Raymond**

Milton Keynes, UK

**LICENTIATE**

**Bartlett, Ricky**

London, UK

**Brook, Daniel Michael**

Pudsey, UK

**Clayton, Steven Rogers**

Felltham, UK

**Hall, Mark James**

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**Surette, Robert**

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# Annual general meeting

## ● The Chartered Institution of Building Services Engineers Annual General Meeting

The CIBSE Annual General Meeting was held at the Royal Academy of Engineering, Carlton House Terrace, London, on 7 May 2015. Peter Kinsella, outgoing President, chaired the meeting. Chief executive, Stephen Matthews, read the notice convening the meeting.

The minutes of the 37th annual general meeting of CIBSE, held on Thursday 8 May 2014 and published in the July 2014 issue of the *CIBSE Journal*, were accepted as a correct record and signed by the chair.

### Annual report and financial statements

Kinsella introduced the annual report for 2014, noting that change was constant within the industry and that the work of CIBSE must keep up with it. Authoritative knowledge was needed, and he drew attention to the range of new publications produced during the year.

CIBSE membership now stood at more than 21,000, with 30% of the membership spread across 100 countries other than the UK. CIBSE's guidance, therefore, needed to be relevant worldwide and it was essential for the Institution to look outside national boundaries and take a global perspective.

CIBSE should encourage adoption of its guidance overseas, and seek and welcome feedback that would improve and broaden its knowledge base over time.

Kinsella referred to developments during the year, including efforts to develop a new CIBSE Region in the Middle East, and the initiation of a Governance Review that would be taken forward during the current year. He welcomed, in particular, the visit of Stephen Matthews and Hywel Davies to Australia during his year of presidency.

Kinsella thanked members for the opportunity to have held the presidency of CIBSE, and praised the continued strong performance of the Institution, with membership

continuing to increase at a time when many engineering institutions were finding growth difficult.

Kinsella then introduced Richard Willis, audit partner of Moore Stephens (formerly Chantrey Vellacott DFK). He read the audit report and confirmed that the accounts provided a true and fair view of the Institution's affairs, and that there were no matters that he was required to bring to the meeting's attention.

Stuart MacPherson presented the financial statements for 2014, drawing attention to the key issues. CIBSE Services income had increased compared with the previous year and, while investment income showed a slight decrease, income from membership and fees had also risen. Overall income had increased by around £350K.

MacPherson went on to explain the turnover of the subsidiary company CIBSE Services, noting the breakdown between different activities. While total turnover had increased, Certification continued to face challenging market conditions and was slightly down on the previous year.

He went on to explain the breakdown of expenditure, noting that it was also up on the previous year, showing an increase of around £300K overall.

The overall result of a £49K surplus for the year had been unexpected because of the need to accommodate costs from the implementation of the IT strategy. Additional IT costs of £90K had been accommodated within the figures; however, this was below expectations because of changes to the timing of the project. Costs for 2015 were expected to be significantly higher as implementation progressed, and a deficit for the year was therefore expected.

In respect of funds carried forward, MacPherson noted that net assets were down by around £100K on the previous year. This was mostly due to the change in the pension fund valuation, which had worsened in 2014 after a strong improvement in 2013. It was explained that this valuation was very variable, but that the pension scheme was being closely managed by scheme trustees and the finance sub-

committee, and he was much more comfortable about the management of the scheme position than in previous years.

### Auditors

It was noted that Chantrey Vellacott had merged with Moore Stephens. MacPherson proposed that Moore Stephens be appointed as the Institution's auditors for 2015, and that the Board be empowered to agree their remuneration. This was seconded by Donald Leeper and approved *nem con*.

### Special Resolution

MacPherson proposed adoption of the Special Resolution for membership subscriptions for 2015 as set out in the Calling Notice. This was seconded by Graham Manly and approved *nem con*.

## Board and Council for 2015/2016

Stephen Matthews declared the following individuals elected to serve as officers, board members and council members after the AGM 2015:

### Officers:

<b>President:</b>	Nick Mead
<b>President-elect:</b>	John Field
<b>Immediate past president:</b>	George Adams
<b>Vice-presidents:</b>	Paddy Conaghan Tadj Oreszczyn Cathie Simpson
<b>Hon treasurer:</b>	Stuart MacPherson

### Members of the board:

<b>Elected members:</b>	Janet Beckett, John Packer
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### Members of council:

<b>Elected members:</b>	Colin Ashford, Geraldine O'Farrell, Mariana Trusson
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The Scrutineers' Report setting out the results of the ballot for vice-presidents and elected board members is available in the members area of the CIBSE website at [www.cibse.org/members](http://www.cibse.org/members)



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# Letters

This month, readers discuss the election of CIBSE officers; universities opening the doors to ‘polymath’ students; and the Priority Schools Building Programme



Port Regis School, Dorset

## PSBP is working

A recent opinion poll, conducted by *Architects' Journal* and reported in *TES* magazine, reveals a profession highly critical of the Priority Schools Building Programme (PSBP).

The main concern of designers, shared by headteachers, is that poor build quality and finishing standards will lead to greater costs for schools and local councils further down the line.

Schools designed under the PSBP banner are on tighter budgets than those built through Building Schools for the Future. However, by reducing the cost of each school or extension, more classrooms can be built for the same fixed sum of money.

To ensure costs are kept to a minimum, it is vital that design-stage modelling takes into account the way in which a building is used. One cost-cutting approach to school construction – which does not have to result in a reduction in standards – is that of modular off-site construction. This is an efficient framework, in which time spent on site is greatly reduced by prefabricating building elements in quality-controlled, off-site factories.

*Dr Owen Connick*

*Consulting engineer at Breathing Buildings*

## Election thank you

I feel deeply honoured to have been re-elected as a CIBSE vice-president. A second term of office has a special significance because it builds on my efforts last year and, more importantly, is a direct result of positive feedback from many CIBSE members who kindly gave me their vote.

I would like to say ‘thank you’ to every member who participated in the election – and, if you voted for me, an extra ‘thank you’ is due. I would also like to thank my husband, John, and my two children, because without their support I would not be able to fulfil this role on behalf of my Institution.

*Catherine Simpson FCIBSE  
CIBSE vice-president*

## Restructuring education

Three years ago, the Royal Academy of Engineering (RAE) – led by Fellow Professor Doug King – started an initiative to create four centres of excellence in sustainable building design. These would aim to equip students with the skills to deliver zero-energy buildings successfully.

The RAE’s report highlighted seed funding of £30m to establish the centres and showed how they could deliver

savings of more than £1bn by 2030. The report formed part of the Department for Business Innovation and Skills Low Carbon Construction Action Plan.

Four universities were chosen to be the RAE Centres of Excellence – University College London (UCL), Herriot-Watt, Loughborough, and Sheffield. Then came the disappointment: there was to be no £30m after all. Despite the lack of funding, the universities looked at how different disciplines could be brought together in the interests of more integrated building design. London South Bank University (LSBU) has since been invited to join the group and significant progress is being made in rethinking engineering education.

One significant change has been UCL shifting from a rigid requirement for both maths and physics at A level in civil engineering<sup>2</sup>. The change came about after UCL discovered it was missing out on bright ‘polymath’ students who had chosen not to follow pure science. With extra maths lessons at university, these students often even outperform their more traditionally qualified peers. This change has also improved the gender balance on courses.

A key step now is for the centres of excellence to disseminate knowledge to other universities and connect with engineers in the private sector.

*Andy Ford, professor of building systems engineering, LSBU*

## References:

- 1 *The case for Centres of Excellence in sustainable building design*, May 2012, RAE <http://bit.ly/1GAltYm>
- 2 ‘Women push for places on UCL engineering course after it dropped need for physics and maths A-level’, *Evening Standard*, April 2015 <http://bit.ly/1FUUHDD>

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The change came about after UCL discovered it was missing out on bright ‘polymath’ students, who had chosen not to follow pure science at A level

# ACT ON SAFETY BEFORE AN INSPECTOR CALLS



The partial collapse of the main auditorium ceiling at London’s Apollo Theatre in 2013 led to new guidance for venues with similar ceilings. **Hywel Davies** explores the implications for engineers

About 40 minutes into the evening performance of *The Curious Incident of the Dog in the Night-time*, at London’s Apollo Theatre on 19 December 2013, the suspended, fibrous-plaster ceiling of the main auditorium collapsed, injuring 88 people, seven seriously.

The ceiling dated from 1901, when the Grade II-listed theatre was built. It was suspended by wadding ties – made of a mix of hessian and plaster – which broke, causing a large part of the ceiling to come down in one lump. Just three months previously, the ceiling had been inspected, and no indications of potential collapse had been found.

As the local authority – responsible for the enforcement of health and safety legislation – Westminster City Council investigated the incident.<sup>1</sup> It sought to understand the cause of the collapse and whether there had been a breach of the Health and Safety at Work etc Act 1974 (the Act), particularly with regard to sections two and three, which set out the requirement to maintain safe premises for employees and the public.

Section 2 outlines the duties of all employers ‘to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all [their] employees’. Section 3 imposes a general duty on employers to non-employees, to ‘ensure, so far as is reasonably practicable, that persons not in [their] employment who may be affected are not thereby exposed to risks to their health and safety’.

Regulation 5 of the Management of Health and Safety at Work Regulations 1999 also requires organisations to have appropriate health and safety arrangements, covering ‘effective planning, organisation, control, monitoring and review of the preventative and protective measures’.

The Association of British Theatre Technicians (ABTT) publishes extensive guidance relating to places

There was no guidance as to what constituted a competent person or appropriate qualification in the case of suspended fibrous ceilings

of entertainment, while the District Surveyors Association provides information on structural surveys. The Institute of Licensing also issues guidance. In its report, Westminster City Council noted that these standards were relevant to regulators as a guide to best practice under the duties imposed by the Act, but did not have the same standing as an Approved Code of Practice or guidance issued by the Health and Safety Executive (HSE).

This applies equally to the activities of building services engineers in respect of duties to employees and the public, and sheds light on the status of technical guidance issued by authoritative bodies.

Any place licensed for entertainment must be properly maintained. Westminster council grants licences with a ‘rules of management’ condition, which requires certification of various aspects of the premises, including ceilings, emergency lighting, electrical installations and boilers.

The ABTT’s Technical Standards for Places of Entertainment (known as ‘the Yellow Book’) states that a certificate should be completed by a competent person, such as an appropriately qualified engineer or a member of an accredited body. However, the Apollo

investigation established that there was no guidance as to what constituted a competent person or appropriate qualification in the case of suspended fibrous ceilings. As a result, the council found that the theatre’s management had taken all reasonable measures to ensure the safety of the ceiling. The incident was solely a result of age-related deterioration of wadding ties.

Westminster City Council and the HSE worked with English Heritage, the Society of London Theatres, the Building Research Establishment, The Theatres Trust and the Association of Interior Specialists and structural engineers to develop new guidance on inspection, certification and record keeping for suspended fibrous ceilings.<sup>2</sup>

All similar ceilings in the UK are now being reassessed, a task that will require about 500 inspections of a range of buildings. London’s Dominion Theatre has already had wire ceiling supports put in, its ceiling void cleaned, and proper access and lighting installed to enable inspections. It also has a new policy of routing cables through trunking, not loose on the ceiling, while drilling holes in the ceiling for cables can only be done after an assessment and by a theatre-appointed contractor.

The Apollo Theatre ceiling collapse has provided a timely reminder about the responsibility of ‘competent’ and ‘suitably qualified’ people. It has also shown the importance of following appropriate technical guidance to demonstrate ‘reasonable provision’ for health and safety. **CJ**

## References:

- 1 The Health and Safety (Enforcing Authority) Regulations 1998
- 2 Advice to Theatre Owners and Managers regarding Suspended Fibrous Plaster Ceilings; Survey, Certification, Record Keeping etc [bit.ly/1Gxpqaa](http://bit.ly/1Gxpqaa)

● **HYWEL DAVIES** is technical director at CIBSE [www.cibse.org](http://www.cibse.org)



The Apollo Theatre ceiling collapse injured 88 people

BENJA PRICHNIE/GETTY IMAGES

# OUR BUILDINGS, OUR DATA... MAYBE NOT



Energy data is essential to monitor the performance of buildings and will underpin the move to smart constructions. But who owns the data? **Robert Klaschka** warns of the dangers of allowing building data to fall into the hands of third-party operators

**I**n this article is about something I believe is fundamental to every aspect of our lives, not just the built environment. It is about who collects, owns, controls and sells data that we perceive as being about us or our buildings; data that, quite reasonably, we think should belong to us.

It has taken a long time for the world of massive data collection to reach the construction industry, but – with the advent of the Internet of Things (IoT) – we can see it approaching. However, because construction is a little behind other areas of our lives, we have the opportunity to look at how the data industry works elsewhere and ask: ‘Is this going to be good for our buildings? How do we want this to work for us?’

Of course, there is great potential in collecting data. Improvements in performance and operation could be achieved as building equipment and sensors connect to the internet.

There are some big claims being made about the potential of ‘smart buildings’ and learning more about your built assets by automated data collection is something I would recommend to any building owner. However, we have had this opportunity for a long time with modern building management systems; perhaps we just don’t have a good interface with the limited data that is being collected. This is why the potential for connected devices to push data to the internet – where it can be better analysed and visualised – is great, but we need to ask: ‘Is there a hidden trade off?’

Take smart devices. Whenever you download an app, you’ll see a long list of access types that you grant to the app. This list often increases when you are offered updates and bug fixes. If you look closely, these accesses often



**Beware: Who benefits the most from data gathered via smart meters?**

appear completely unconnected to the function of the app: for example, access to your photos or text messages. This is because the business model involves collecting as much information as possible and then using it or selling it to anyone who will pay for it. By clicking ‘I agree’ you give whoever makes the app – and probably third-party affiliates – permission to do so.

It is worth thinking about this in the context of buildings and the devices we are being offered. If you don’t, this could affect your built environment. What would you do if you arrived home to find the terms and conditions of your thermostat had been changed, and that you couldn’t control the heating without agreeing to give it access to your Facebook friends or your text messages.

So if using a smart device means we’re already agreeing to these intrusive data-gathering policies whenever we download an app, what do we get in return? Is it enough to receive a better interface with the data – and will we even get that? Do we need the expertise of the ‘big data’ crunchers in order to benefit from what is being collected?

It is information collected over groups of buildings – which won’t be available to the individual owners – that has real financial value to the gatherer. If you get access to a trickle of data, your bills may be reduced by a small amount; but the device provider gets access to analyse data from hundreds of buildings, and to sell this on or use it to speculate in the marketplace. Who has the better deal?

During an NBS roundtable I participated in, the government’s chief construction adviser, Paul Morrell, was asked who owns the model. His response was categorical: ‘The client.’ Of course, he was talking about BIM, but I would argue that collected, in-use data is part of that model – probably a much more important part than the skeletal geometry that a BIM provides.

If the terms and conditions to which you have to agree to use smart devices and sensors means you must grant a licence to collect data – including data outside of the device, but within the building’s network of other devices – do you really own the model? If you are not in control of your data, it seems pretty obvious that you don’t. I’d go further and say, where the data collected is from public buildings – it should not pass into the sole ownership of private companies.

I am not saying we shouldn’t collect data, but we need to ensure that free, permanent access to our building data is retained in a format that means we can change data providers. In my mind, the BIM protocols need a section on data gathering, to protect owners. After all, one of the BIM task group’s stated aims is that no building data should be lost again. If it is contractually locked up in a private company’s system, it is lost.

● This article first appeared on Robert Klaschka’s blog at [www.studioklaschka.com](http://www.studioklaschka.com) Twitter @studioklaschka

● **ROBERT KLASCHKA** is a director at Studio Klaschka



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# THE POWER OF THREE



New CIBSE President **Nick Mead** joins fellow presidents **Andy Sneyd** and **Stephen Hodder** to discuss how institutions can encourage the professions to break out of their silos and become involved in collaboration. **Ewen Rose** senses a cultural change at the first presidential debate in Westminster Central Hall

**T**here continues to be plenty of talk about collaborating, but not enough actually happening in supply chains and between professional institutions and trade bodies, according to the presidents of CIBSE, B&ES and RIBA.

These three industry leaders came together to tackle the obstacles to cross-industry collaboration during the first CIBSE Patrons' Presidential Debate at Westminster Central Hall in May.

Nick Mead (CIBSE), Andy Sneyd (B&ES) and Stephen Hodder (RIBA) all agreed that it was time for the talking to be translated into practical outcomes, with Sneyd calling on the professional bodies to develop 'a common interface... to get this collaboration going'.

'The fact we are thinking about this is a positive step – eventually we will do the doing – but we need to have a way of representing the wider industry,' he added. He pointed out

that 35 to 40% of the value of new build is in the services 'and even more in refurbishment projects', but 'we don't have a voice'.

'There are 27 different bodies in building services so we need to be much more strategic and more focused,' added Sneyd, who is also a Fellow of CIBSE. 'Wider collaboration with bodies like RIBA is vital. We need to do more networking with architects and elevate what we do.'

## Setting an example

Hodder said there was very little collaboration between industry bodies. 'We rarely come together and emulate what we see in practice.' He said the organisations could learn from collaborative projects 'in the field' where good examples were being set.

However Hodder, who became the first RIBA president to address a CIBSE Conference last year – famously telling delegates that 'we don't even collaborate about collaboration' – believes there is still plenty of confusion about the definition of the term.

'It is much more than simply exchanging knowledge,' he said. 'It is the whole culture that has to change – and that is not recognised by enough people.'

The root of the problem of disjointed supply chains can be traced back to the education process, according to Hodder,



Nick Mead: 'We cannot continue to separate design and construction from operation'



Stephen Hodder: 'We are in a much more complex industry now'

Designing for one day [in the year] and then adding margins on margins to protect our PI insurance is not an approach for lifetime operation – *Nick Mead*

who pinpointed the fact that architects are still trained in a system that has not changed since 1958. RIBA is now looking at this area, partly in a bid to address the growing problem of student debt, but also to deliver a closer link between academia and practice.

'We are in a much more complex industry now,' said Hodder. 'They need to instil the understanding that it takes many, many people to deliver a project. They need to embrace multi-disciplinary design before they specialise.'

Sneyd said young people don't naturally put themselves in 'silos' when they leave further education. 'We do that to them; and we didn't 25 years ago.' He suggested a root and branch review was needed into how people are recruited into the sector. 'Perhaps we should look to attract them later in their 20s once they have had some life experience,' he said.

'We have real resource challenges to deliver projects – the traditional apprentice skills we learned are no longer relevant,' he added. 'We do not want to deskill, we want to reskill with a multi-disciplined workforce.'

He also urged the industry to start telling universities and colleges about the skills wanted and needed.

The CIBSE Patrons work placement initiative was described as a model for improving understanding between the

professions. 'By placing our people with different employers, they can learn about what other members of the supply chain are doing,' said Patrons chair David Fitzpatrick.

### Performance goals

Mead, a former Patrons chair, has made collaboration the central plank of his presidential year and believes it is essential to achieve 'energy reduction in the built environment'. He added it was not possible for CIBSE members to deliver better building performance on their own.

'We need to work with others... and the building needs to work as a complete system not a collection of products,' he said, adding that high performance equipment was often used in a way that does not allow it to fulfil its



CIBSE Patrons chair David Fitzpatrick

potential for energy and carbon saving.

'Designing for one day [in the year] and then adding margins on margins to protect our PI insurance is not an approach for lifetime operation. Systems work better when they are pushed and are, therefore, more efficient,' he said.

He also called for more collaboration with facilities managers, who are now 'a far cry from the janitors of old' in order to improve lifetime performance of buildings.

'We cannot continue to separate design and construction from operation. Many services are installed in spaces that are impractical for maintenance purposes. Box ticking exercises distract us from real-life building operational issues,' said Mead, who added that reforming supply chain culture should be led by the institutions 'not by individual companies'.

Sneyd warned that a failure to collaborate would leave the industry short of the government's goals for cutting costs in the construction process, and open to the threat of others coming in 'to fill our space'. He believes the way constructors are starting to use technology on site will prove crucial.

'The role of the contractor is unrecognisable from 10 years ago, but one thing that hasn't changed is that we are still criticised for being inefficient – that's hurtful. We have a huge supply chain with lots of

➤ expertise, which is undervalued.

‘Part of the problem is that we are a hugely diverse sector. Small contractors have very different needs from their larger counterparts. For a small contractor it is often about payment and being a respected member of the supply chain. So, when we talk about collaboration we need to think about who we are collaborating with.’

Hodder pointed out that 75% of architectural practices were also very small businesses – employing fewer than 10 people – and it was likely that most of those would continue to work in ‘broadly traditional ways’ and on local projects.

‘It is really only in the larger, more complex projects that we are seeing change and a pressing need for better collaboration and co-ordination,’ he said.

The role of the main contractor was raised by CIBSE Patrons chair David Fitzpatrick, who said that, as a manufacturer, he saw an increase in the number of engineers and architects getting involved in product design, but questioned whether we are ‘missing the main contractors to make sure we get these things built properly?’.

### Budget

‘The problems of silo culture and the role of the client are huge, but the main contractor has to deliver,’ agreed Hodder. He explained his practice had worked on a major project that was delivered on time and on budget only because there was a good level of collaboration with the main contractor

leading to ‘80% cost certainty before we started’.

Sneyd added that contractors were trying to deliver new approaches, ‘but in the end it all comes back to how the client wants to procure and how much risk they are prepared to take’.

The role of Building Information Modelling (BIM) was raised by Mead, but he warned that it was only the answer ‘on paper’ as people were coming up with their own interpretations and ‘doing their own thing’, which hindered collaboration.

‘It’s like herding cats at the moment. We need to stop saying it’s too difficult, choose a platform and then set standards,’ he said.

Hodder urged the institutions to support the BIM Toolkit, which he described as ‘a great piece of work’. ‘The I is the critical bit – it’s about information,’ he added, urging the professional bodies to produce guidance for users.

However, Sneyd said BIM would not be a collaborative tool until the software vendors started to produce the formats the industry wants. Currently BIM stands for ‘Big and Impossible to Manage’, he said, ‘but we can make things work. That is what we as engineers do. Technology is the tool for proving that what we build meets the specification and that can be linked to the BIM model.’

However, the presidents all agreed the elephant in the room was money. Tight margins meant suppliers were looking to find ways of squeezing more financial reward from each project – and this leads to design variations and increases the potential for disputes – while late payment practices erode trust.

‘So we need to go back to the client and present them with a better way of working that would improve profit and deliver better projects,’ said Mead. ‘Often we create a cost model and then the client says he can’t afford it, so we beat the hell out of each other and the big loser is the client because he doesn’t get what he wants.’

He explained the process of ‘cost management’ was at fault and ‘the client leads this – there’s no point blaming each other’.

‘As individuals we will not win this; we need to support the institutions and drive collaboration, but there is a perception problem,’ concluded Mead.

‘We always highlight the bad buildings, but there are some brilliant ones out there and we need to shout about what we do well – that’s a role for the professional bodies.

‘We must lead by example.’ **CJ**

Currently BIM stands for ‘Big and Impossible to Manage’, he said, ‘but we can make things work – *Andy Sneyd*



The presidents discuss how collaboration could benefit all

# RE FUTURE

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# KICK UP THE ARTS

Festivals are known as much for the waste and squalor they create as for the quality of entertainment on offer, but some former music execs are now showing the arts world how to save resources. **Liza Young** goes for a spin with Julie's Bicycle

**A** summer music festival holds the promise of hedonistic days in a bucolic setting, somewhere deep in the British countryside.

However, the reality is not normally so serene – or green. The peace is often disturbed by diesel generators powering fast-food vans, while waste produced by thousands of campers turns sites into rural shanty towns, with fields knee-deep in plastic glasses, burger boxes and abandoned tents.

Thankfully, a growing number of events – such as the Shambala Festival (pictured), in Northamptonshire – are taking their environmental responsibilities very seriously. Powered entirely by waste vegetable oil, wind and solar energy, Shambala has zero disposable plastic on site and has reduced its carbon footprint by more than 80% in five years. Last year, it emitted 0.4kg of carbon per person per day – compared with 2.23kg in 2009 (see panel, 'Festival power').

Shambala has been advised by not-for-profit organisation Julie's Bicycle, which works with more than 1,000 groups in the UK and abroad to help measure, manage and reduce the environmental impact of festivals, outdoor events and arts venues.

Julie's Bicycle was formed eight years ago because no-one else was focusing on the green credentials of arts venues and events. 'It's difficult to categorise arts venues by building type as they are idiosyncratic by their nature,' says Luke Ramsay, environmental sustainability manager at Julie's Bicycle.

'They might host one-off performances, be temporary structures or multiple-use spaces. Take the Bush Theatre [in Shepherd's Bush, London], for example –



The Shambala Festival is now totally powered by renewable energy, 94% of which is waste vegetable oil

it's a theatre, with a makeshift shop that's here for one day, an office and a café. It has four different functions, so it's difficult to get a rule that applies to all.'

Creative organisations can now compare their performance or venue with others by using extensive industry benchmarks created by Julie's Bicycle, in partnership with the University of Oxford.

Over the past five years, the organisation has been collecting environmental data from hundreds of festivals and creative groups using its Creative Industry Green Tools (IG Tools). These are now well-established – covering outdoor events, arts buildings, offices, tours and productions – and their use has been made a requirement for funding by Arts Council England and Creative Scotland.



CREDIT: LOUISE ROBERTS



CREDIT: LOUISE ROBERTS



Cycle power at an Imogen Heap gig

halfway around the world was not. In response, a small group of music executives met in Julie's Restaurant, in Holland Park, London, and agreed that the industry had to change. They thought it hypocritical for jet-setting pop stars to preach about climate change before they had addressed their own carbon footprints – and so Julie's Bicycle was born.

The company provides the creative sector with the tools, support, expertise and advice to reduce energy use, water consumption and waste, while encouraging recycling and a sustainable supply chain.

Originally, Julie's Bicycle restricted itself to tackling environmental issues in the music industry, but soon broadened its remit to the cultural sector, covering theatre, visual arts, museums, dance, combined arts and literature. Most recently, it has started 'greening' the offices and operations of design and advertising agencies. 'The philosophy remains the same – to inspire and show that change can happen,' says Ramsay. 'Like any sector, the arts industry needed a champion to help it bring about change. We help organisations understand how they can engage with environmental issues.'

### Carbon calculators

IG Tools are a free set of carbon calculators, developed by Julie's Bicycle specifically for the creative industries. They are used by 2,000 organisations – across 40 countries – to understand the environmental impacts of buildings, outdoor events, productions and tours. They measure impacts in five areas:

- Energy
- Water
- Waste and recycling
- Transport and travel
- Production materials

Different analyses are available; organisations can benchmark themselves against an average in their sector or against those that represent best practice.

In 2012, Arts Council England became the first arts-funding body in the world to embed environmental sustainability into the funding agreements of its major programmes. It rolled out mandatory environmental reporting and action planning across 700 organisations between 2012 and 2015.

Organisations are required to report their electricity, gas and water use at least once a year, and to put in place both an environmental action plan and policy relevant to their business. 'It's not just a data-collection exercise,' says Ramsay. 'People are invited to



CREDIT: DANNY NORTH

### Champion of the arts

Julie's Bicycle was founded in 2007 at a time when the music industry's main response to global issues was Live Earth. This, Ramsay says, symbolised both the opportunities and challenges – while the sector's interest in climate change was encouraging, flying artists



CREDIT: CAROLINA FARUOLO

submit data, if it's meaningful and helps to inform action. We now have a wealth of data, which enables us to highlight best practice.'

He adds: 'Our approach is to work around some of the more rigid policies and practices – the ISOs and BSIs – that do not necessarily work for the cultural sector. Sustainability should not be about box-ticking; it should be something bigger than that.'

'We want our tools to be an opportunity, not a regulatory burden. We have a positive and actions-based approach – it's important to have a conversation about things that can be done differently, and how to comply in the most cost-effective way, rather than pointing out what is bad.'

Ramsay says environmental action has resulted in financial gains and positive reputational impacts for more than half of the participating Arts Council-funded organisations, and – as they align sustainability to their core values – 73% are reporting an improvement in team morale and wellbeing.

### Certification

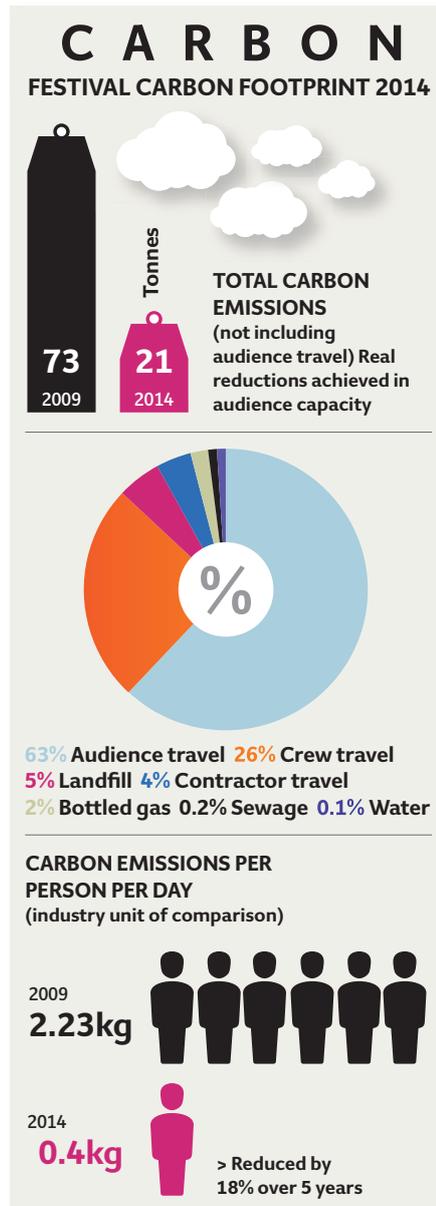
IG Tools also form the basis of the Creative Industry Green (Creative IG) certification scheme, which involves a carbon and environmental-management auditor from Julie's Bicycle assessing an organisation's performance over a year. To date, it has certified almost 200 organisations in five years and covers festivals, venues, outdoor events and offices.

The certification scheme uses IG Tools to record: energy and water use; waste volumes, including the percentage of waste diverted to non-landfill sources; travel footprint; and impacts specific to the sector. One, two or three stars are awarded, and an organisation is assessed across four criteria:

- Commitment – for example, from staff, suppliers and audience members to use sustainable transport to reach the venue
- Understanding – of environmental impacts
- Improvement – reduction in environmental impacts
- Communication – of the actions made, and commissioning works that speak about those issues.

As well as reducing their environmental impacts, Ramsay says organisations are promoting sustainability through their work. For example the Royal Court, in London, put on *2071*, a one-man play that explored the science behind climate change, and featured a programme of talks on the subject.

The coveted three-star Creative IG rating has been achieved by Wembley Stadium, the Bush Theatre, Hammersmith's Lyric theatre,



Shambala's environmental data, which is shared on the festival's website at [www.shambalafestival.org](http://www.shambalafestival.org)

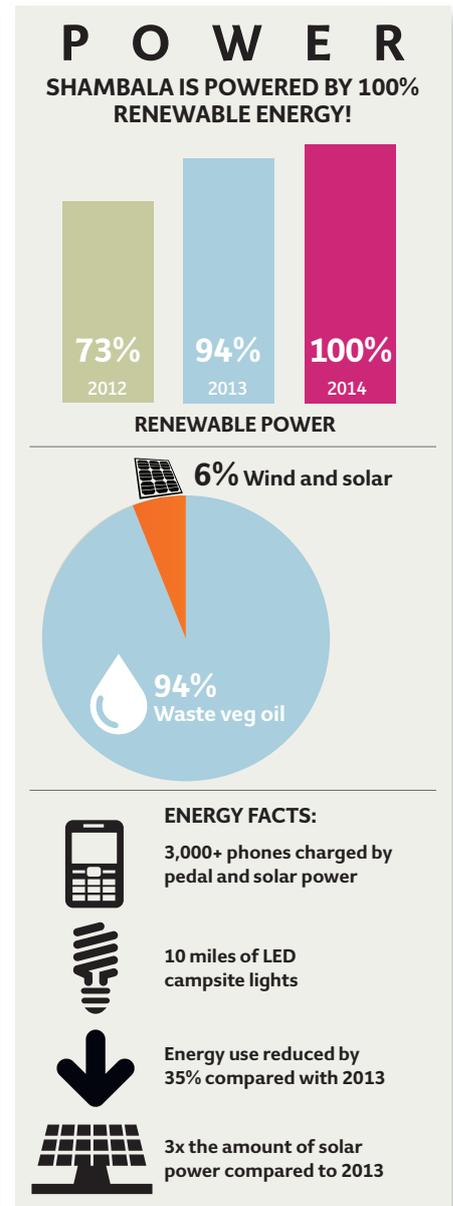


## Festival power

Shambala Festival has reduced its carbon footprint by 81% in five years, and was presented with the international A Greener Festival Award for the second year running in 2014.

It is now 100% renewably powered, achieving the three-star Creative Industry Green (IG) certification from Julie's Bicycle last year. To maintain the rating, the organisers have to push the boundaries of sustainability and, this year, will be focused on improving recycling rates, carbon accounting and public transport uptake.

In 2014, Shambala's Bring a Bottle campaign stopped the sale of 10,000 single-use plastic bottles, and 100,000 bar cups were reused by visitors. Despite an increase in audience capacity, the festival released 21 tonnes of carbon, compared with 73 tonnes in 2009.

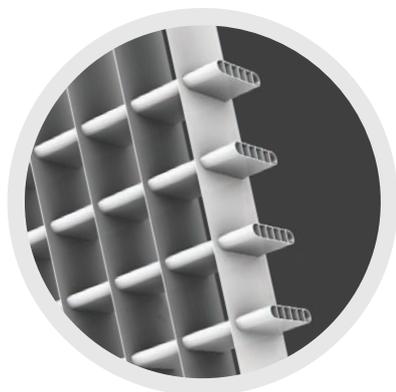


The biggest carbon footprint was crew travel (26%) and audience travel (63%), with 75% of festival-goers using their own vehicles to get to the venue. However, the event's biodiesel shuttlebus was used by more than 1,000 people, and 709 journeys were shared – a 300% increase on 2013. Shambala has co-founded The Energy Revolution, which aims to account for audience travel. If festival-goers plan to arrive by car, they are encouraged to make a donation, which is invested in renewable energy.

Shambala's recycling campaign resulted in 3,942 people using the recycling exchange and claiming £10 back, and a 77% recycling rate was achieved (41% in campsite pens). Fare Share South West collected one tonne of useable food from traders at the end of the event.



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**To the future**

The partnership between Julie's Bicycle and Arts Council England was renewed in 2015, and is set to deliver a nationwide programme of workshops, webinars and resources to push for change at all levels.

'We work with an open-minded sector – it's really refreshing. There's been a strong uptake in environmental reporting,' says Ramsay. The figures support his claim.

Data collected from more than 490 organisations via IG Tools showed a 6.3% decrease in carbon emissions in 2013-14, compared with the year before, representing a saving of 7,063 tonnes CO<sub>2</sub>e or £1.25m. The carbon saved would fill the Royal Albert Hall 47 times over.

This was achieved despite a 16% increase in cultural activity during the same period. 'Proof,' says Ramsay, 'that the creative community can grow without increasing its impact on the planet.' **CJ**



6 Sustainability should not be about box-ticking; it should be something bigger than that



**Benchmarking the arts**

The dataset used for benchmarking in the cultural sector, first introduced by Julie's Bicycle in 2012, indicates that benchmarks using the median for performing arts buildings – classified by CIBSE as entertainment halls – is 101kWh/(m<sup>2</sup>·year) for electricity and 139kWh/(m<sup>2</sup>·year) for gas.

For museums and galleries – classified by CIBSE as cultural activities – Julie's Bicycle's benchmark is 86kWh/(m<sup>2</sup>·year) for electricity and 132kWh/(m<sup>2</sup>·year) for gas. These are far lower than existing national standards.

Ramsay says TM46 benchmarks for cultural buildings should be superseded by the new dataset. 'The current A-G DEC rating is too

lenient on energy performance – especially on gas consumption – which is having an effect on peoples' perception of how well they are doing.'

He says that until national benchmarks are revised, arts organisations should receive an A-G rating based on standards devised by Julie's Bicycle, which can be shown alongside their display energy certificate (DEC).

CIBSE technical director Hywel Davies confirms that the Institution would like to incorporate Julie's Bicycle's benchmarks into TM46. He says CIBSE is seeking discussions with Department for Communities and Local Government (DCLG) officials to agree an update mechanism for TM46.

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# GUIDE A

## CIBSE's essential guide to environmental design explained

Our three-part series highlights the most important changes to CIBSE Guide A. **Tim Dwyer** explains the changes on a chapter-by-chapter basis. Part one looks at design stages, use of data and thermal comfort

**T**he CIBSE guide to *Environmental design* has had a major upgrade for the first time in nine years, and large parts of the edition have been revised.

CIBSE Guide 2015 aims to define the main criteria for design in terms of comfort and health, and to set out appropriate internal and external design conditions. Under the chairmanship of Derrick Braham, Guide A describes a logical process for engineers to deliver comfortable, productive, and low environmental impact buildings, while considering the consequences of climate change.

This is the first of a series of three articles that will provide an overview of



the new Guide A. It will focus particularly on areas that have changed significantly since the 2006 edition, and is essential reading for anyone involved in the design, procurement and operation of buildings.

As with all key CIBSE publications, this Guide can be downloaded free of charge by CIBSE members from the CIBSE Knowledge Portal [www.cibse.org/knowledge](http://www.cibse.org/knowledge)

**Chapter 0: Quality in environmental design**

The all-new Chapter 0 is designed both to provide an introduction to Guide A and to set out an holistic design routemap and quality assurance process. Principal author Foroutan Parand sets the bar high in the introductory paragraph by proclaiming that the Guide is the premier reference source for such activity. More humbly, and realistically, he subsequently reflects that the guide is not to be taken as being exhaustive, or definitive – as with all engineering challenges, the appropriate application is dependent on professional judgement.

A flowchart provides the structure for the guide. It links functional stages, with the appropriate chapter. For example, ‘define the amount of fresh air ventilation rates required for each space’ is in chapter four. This simple but effective diagram allows the more casual reader to determine a first path through the 290-page guide quickly.

Although the guide is designed for use anywhere in the world, the first part of the chapter concludes with example legislation and regulations that are specific to the UK.

The more significant part of the new chapter covers the design process, design calculations quality plan, sources of uncertainty, user issues, and performance assessment methods. The whole chapter is developed around the core need to ensure a properly quality assured design process.

The design process sets out the generic stages of design – concept, scheme, and detailed design – and attempts to encapsulate the overall design questions and calculation methods that might deliver the

required output for each stage.

By exploring the main elements in the design flow (as shown in Figure 1) the design calculations quality is explained through a 10-step action list. This considers how each stage might be assured by rigorously maintaining appropriate methods and checks. So, for example, this stepped approach could be applied to individual design scenarios such as ‘what size openings should be used for natural ventilation in a building?’

This chapter highlights the need for engineers properly to interpret and understand calculations and modelling. It provides links to relevant CIBSE publications that can guide the designer in determining areas of uncertainty and degrees of risk.

With the endemic application of computer software, the danger of both poorly-qualified and ill-informed ‘operators’ is discussed, and the necessity for appropriate quality assurance (QA) reinforced.

The chapter concludes with a very brief introduction to the concept of ‘Performance assessment methods (PAM)’ that was developed within IEA Annex 21 (Environmental Performance) as a means of documenting a QA procedure when applying a particular calculation method. An example application of a PAM for a ‘Calculation of summertime temperatures using the CIBSE cyclic method’ can be downloaded from [www.cibse.org/Guide-A/pdfs](http://www.cibse.org/Guide-A/pdfs)

**Chapter 1: Environmental criteria for design**

This chapter sets out to include the best available information for the optimal specification of environments in and around buildings. It provides a basis for other chapters in Guide A and other CIBSE documents. Since the publication of the previous edition there has been a greater acceptance of the importance of both adaptive and integrative aspects in the assessment of a comfortable, healthy and productive environment.

The preamble to this chapter strongly aligns these areas of contemporary understanding with a more closely argued, and referenced,



**GUIDE A LAUNCH**

CIBSE will officially launch the new Guide A on 22 July, at 5pm, at Grand Connaught Rooms, 61-63 Great Queen Street, London. Derrick Braham, Steering Group chair, will host an evening of presentations and discussions, highlighting the most important updates to Guide A.

For full details and to register for this free event visit [www.cibse.org/events](http://www.cibse.org/events)

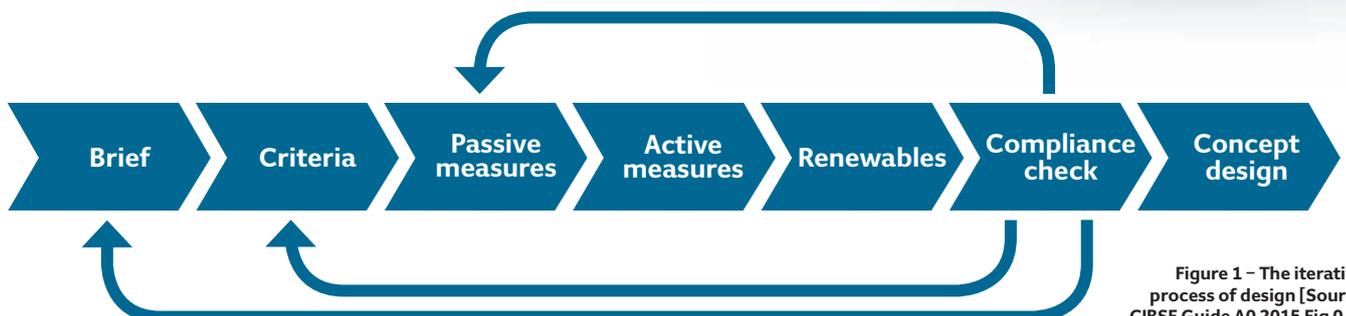
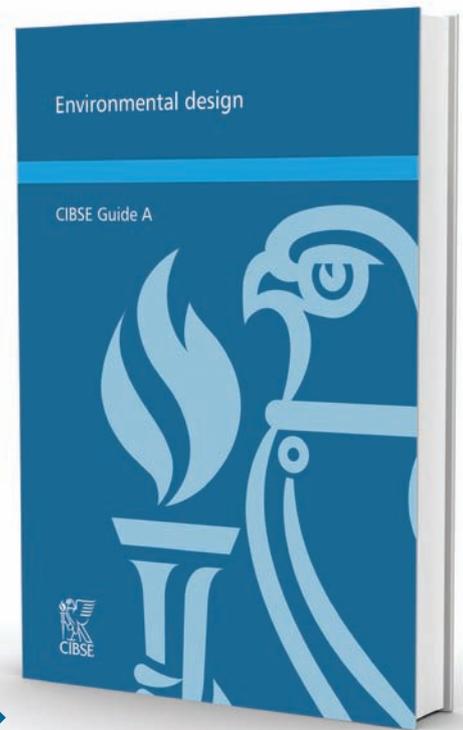


Figure 1 – The iterative process of design [Source CIBSE Guide A0 2015 Fig 0.2]

evaluation of the physiological and psychological determinants for wellbeing and comfort. Chapter 1 has been radically overhauled for the 2015 edition with reordering and revisions of many sections. The explanation of thermal comfort is completely revised and benefits from the insight of the chapter's principal author, Fergus Nicol, who has undertaken a significant number of studies in this area. The section describing the adaptive thermal comfort model has elevated prominence at the beginning of the chapter – where it is explained in some detail – considering aspects of occupant expectation, control and clothing as well as the temporal changes in conditions that provide opportunity for maintaining more sustainable internal conditions. Noting that there is potential deviation in the expectation of comfort – as predicted by the Predicated Mean Vote (PMV) and Predicted Percentage of Dissatisfied (PPD) procedure – from that experienced in 'daily life', is a significant new stance for the guide.

Possibly the most used and oft-referenced table in CIBSE Guide A is Table 1.5, 'Recommended comfort criteria for specific applications'. This has been revamped and expanded to accommodate more room types particularly for institutional and commercial buildings such as educational, health care, hotels, retailing and television studios.

A subtle change in terminology preprends the word 'customary' to the column headers for the winter and summer operative temperatures. This, together with the associated codicil, offers a long-needed clarification that the 'daily mean operative temperature for comfort is likely to be somewhere within the range given, and that the variation of +/-1K within the day would attract little notice, while a variation of +/-2K will be noticed and may cause some complaint at the extremes'. This pragmatism will empower designers, clients and operators to be more realistic in their expectations. This table also provides more detailed noise criteria than in the 2006 version.

Overheating has a more prominent position in the chapter. Some of the 2006 content on overheating has been adjusted and reordered and a new section 'Identifying the overheating of buildings in Europe' explains some of the findings of the CIBSE 'Overheating task force' and promotes methods for establishing and avoiding the risks of overheating in mechanically and naturally ventilated buildings, which are developed in more detail in CIBSE TM52 *Limits of Thermal Comfort: Avoiding Overheating*.

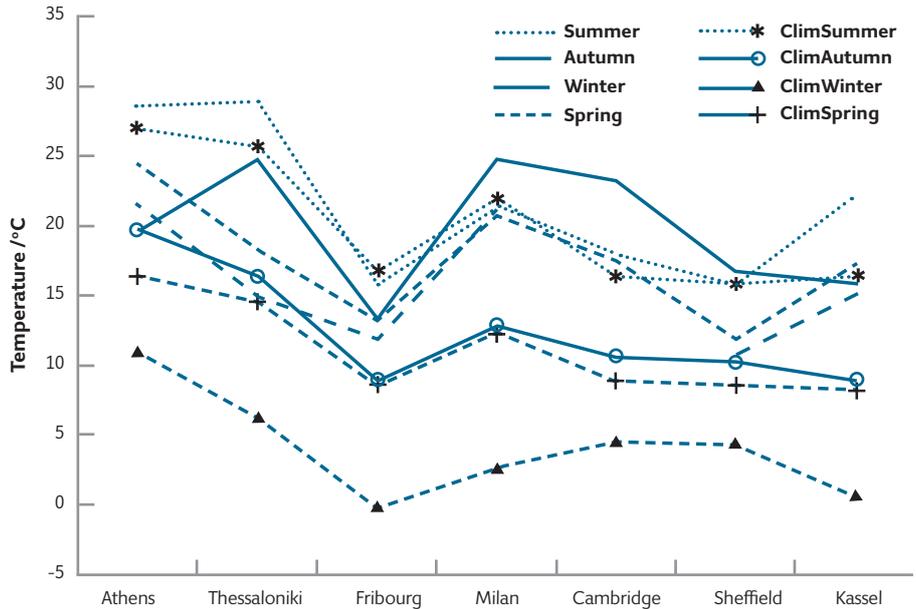


Figure 2 – Chart indicating how the thermal comfort of individuals as given by their 'neutral temperature' – where they feel neither too hot nor too cold – varies widely with geographic location and season [Source CIBSE Guide A1 2015 Fig 1.15]

Guide A can be downloaded free of charge by CIBSE members from the Knowledge Portal at [www.cibse.org/knowledge](http://www.cibse.org/knowledge)

An innovative addition is the section on 'Outdoor thermal comfort' that reaches beyond the traditional confines of the building. It examines the factors that determine comfort in external spaces that are associated with the building, such as courtyards. These spaces are increasingly popular in contemporary building designs.

The section includes a discussion on adaptive comfort and the relationship between the building and its immediate microclimate, together with suggested design strategies to create an environment that delivers an effective and usable outdoor space. Meeting an individual's comfort needs in the outdoor space is likely to be dependent on geographic location, the season and culture (see figure 2).

The lighting coverage in the 'Visual environment' section is briefer than in the previous edition – predominantly considering comfort rather than task-related needs. This is presumably since the referenced *SLL Guide to Lighting* is able to provide the necessary comprehensive coverage of concepts such as disability glare and directional effects.

The two final sections covering 'Noise' and 'Vibration' have been updated, reordered and significantly expanded. They begin with clear

identification and description of the units and parameters that define the human aural, and vibratory environment, continuing with the relevant aspects of human perception, and response to noise and vibration. Recommended measurands are discussed, followed by a review of noise assessment guidance that is far more extensive than in the previous Guide. The noise section includes a useful commentary on the application of extended noise criteria contained in the expanded Table 1.5.

The contents of the brief section that concluded the 2006 Chapter 1 on 'Electromagnetic and electrostatic environment' has been appropriately removed and passed to chapter 8, 'Health issues'.

The appendices for Chapter 1 deliver a nostalgic detour with the inclusion of a program listing for PMV written in, what some may regard as, the antediluvian BASIC language – however the logic and simplicity is still as illuminating as it was back in the days of the BBC Model B computer.

### Chapter 2: External design data

The principal author Geoff Levermore has overseen this comprehensive update with more recently sourced climate data evident throughout the chapter to underpin the evaluation, modelling and simulation of buildings. A selective cull of some previously included material has been designed to specifically leave information applicable to support other sections of the guide. Some of the derivative illustrations – for example, tables of degree-days and graphical

representations of bin weather data – have also been removed.

To provide improved context for the included UK climate data sets, each of the 14 sites have more extensive climate descriptions. A group of colour-shaded maps (as shown in the example in Figure 3) graphically indicating the seasonal mean temperatures, provide a complementary view of the climatic differences across the UK.

Many of the data tables associated with Chapter 2 are not printed but are downloadable from the CIBSE website ([www.cibse.org/Guide-A/pdfs](http://www.cibse.org/Guide-A/pdfs)). This includes climatic design information for 250 worldwide locations – providing more detail than the previous edition – with additional data such as precipitation, degree-days and clear sky solar irradiance, as well as a wider set of ranges of monthly cumulative frequencies of occurrence of wet and dry bulb temperatures.

Solar data has been revised. The sol-air temperature and long wave loss equations have been simplified and more clearly introduced. Cumulative frequency data for global and diffuse illuminance (as used for lighting design assessment) is now included for all 14 UK sites.

Wind frequency data is presented in a seasonal format to assist in the more realistic evaluation of natural ventilation that, until now, was restricted to relating predicted wind speeds with annual bands of external temperatures.

Climate change data has been updated from the UK Climate Projections (UKCP09) from the Met Office Hadley Centre climate prediction model (HadCM3). There is an explanation of how predictions have been derived, and commentary on how climate is likely to be affected. The data produced is

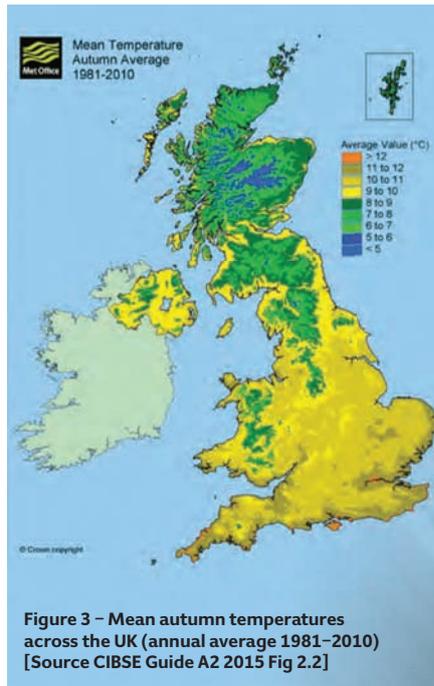


Figure 3 – Mean autumn temperatures across the UK (annual average 1981–2010) [Source CIBSE Guide A2 2015 Fig 2.2]

probabilistic (a combination of probability that deals with uncertainty and deductive logic) reflecting uncertainty in projected climate changes. Tables at different probabilistic levels are provided, as well as references to Probabilistic climate profiles (ProCliP) graphs to appreciate the temperature rises through the century for different emissions scenarios (defined by the IPCC).

The urban heat island (UHI) data has been updated to give the UHI effect on the City of London – and various distances out from it – compared to Heathrow. Manchester UHI data is also provided for the first time. **CJ**

- Next month: Tim Dwyer highlights the significant changes in the chapters considering building thermal properties and thermal response; ventilation and infiltration; and the sizing of environmental equipment.

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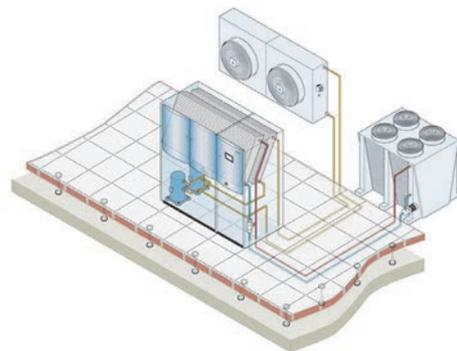


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# SPECIAL FEATURES

AIR CONDITIONING ● CAR PARK VENTILATION ● FIRE AND SMOKE DESIGN

This month: Car park ventilation strategies, oversizing of heating and cooling systems and mechanically ventilated smoke shafts

## OVERSIZING ESCAPING THE TRAP

System oversizing is an easy trap to fall into when designing a heating and cooling system. **Richard Green**, VRV specialist at Daikin UK, both examines the pitfalls and highlights how to remediate an oversized system

**D**uring the design phase of any project, the consideration of comfort of the occupants in the building through the use of air conditioning and ventilation is a high priority. However, during the design phase it's not always clear how the building is going to be used, especially in offices with multiple tenants.

With this in mind, it's perhaps clear to see why consultants add in safety margins when calculating heating and cooling loads. The prospect of having insufficient capacity and potential for complaints is, at best, an

unwelcome thought and, at worst, could lead to claims against those responsible for the design.

The problem is that oversizing systems can have a large negative effect on efficiency. This was shown in Daikin research comparing variable refrigerant volume (VRV) systems in Europe and the UK. It found UK engineers were oversizing systems more than their peers on the continent. This is not an ideal situation but, as this article will explain, there are methods of increasing the energy performance of oversized systems that have already been installed.

ALEXEV/STEMMER/SHUTTERSTOCK



Monitored site cooling load

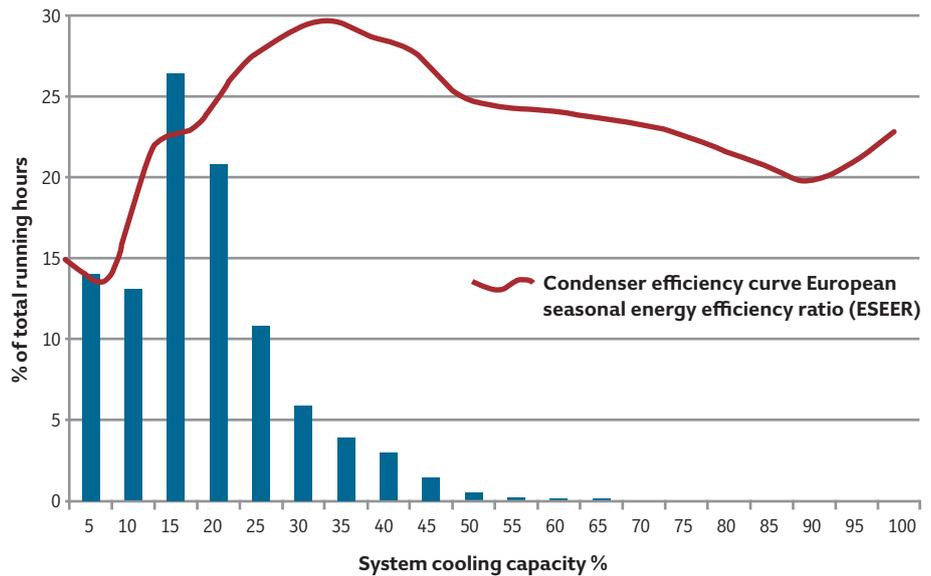


Figure 1 shows that the system is oversized for the load. For the majority of the time the system will be running below the most efficient operating point and is also below the lowest frequency of the inverter compressor (approx. 20% of the system load) meaning the system runs less efficiently

There are methods of increasing the energy performance of oversized systems that have already been installed

Why are systems oversized?

Determining heat loss and gains within a space that hasn't yet been built or occupied can be predicted using various load calculation methods that range in accuracy from 'rules of thumb' all the way through to dynamic simulation modelling software and CIBSE's *TM54: Evaluating Operational Energy Performance of Buildings at the Design Stage*.

All these rely on historically collected, or predicted, source information that may lead to unexpectedly extreme errors – for example climate data, which, for the most part, is sourced from airfields that may not be representative of the project's local climate – especially for projects in built-up areas.

For a number of years, Daikin has been monitoring various older model VRV sites around Europe. This monitoring shows how closely the installed equipment matches the actual building loads. But the results from UK sites were surprisingly different.

They demonstrated that the sites had a maximum load demand of only 45% of the nominal condenser capacity in cooling, and that the condensers were spending most of their time operating at around 20% capacity. But in heating, the maximum load was 70% of the nominal heating capacity.

Ideal site cooling load

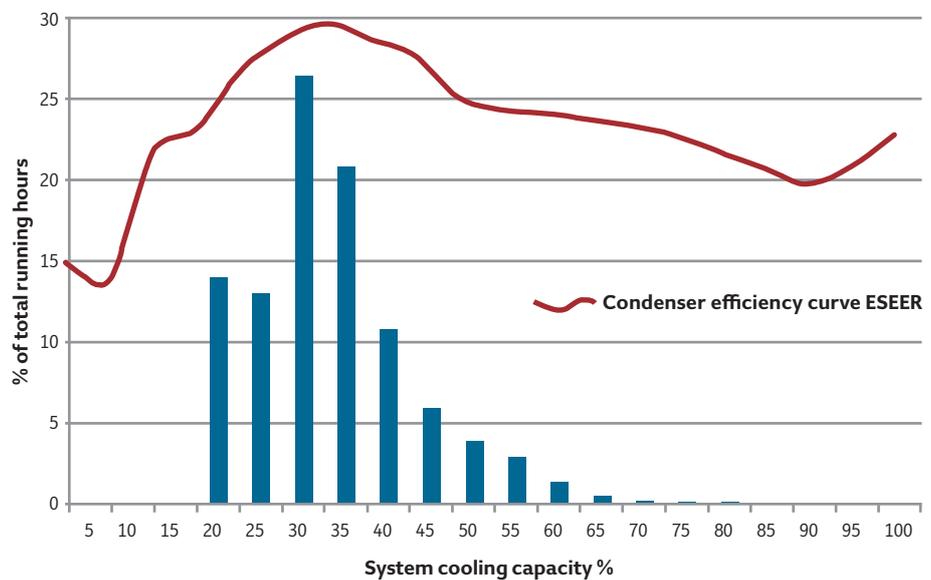


Figure 2. Reducing system capacity better matches the load to meet the system's most efficient point

This raises two important points.

Firstly, many building service engineers design primarily on cooling loads and, in some cases, assume the heating load will consequently be satisfied. However, this study shows that the heating demand on these systems is higher than one that may have been expected. This may be because the majority of the sample systems are in older buildings with poor thermal insulation. Any installed heating must also allow for capacity reduction during periods of defrost.

Secondly, the effect on efficiency and comfort at low load – it is well documented



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▶ that inverter driven compressors are more efficient at part load. Typically, the most effective operating range is from 40-60%. Below this, the efficiency drops gradually until the minimum inverter speed, at which point it effectively switches to being an on/off compressor.

The graph in Figure 1 shows a monitored example system performance in terms of the system loads and efficiency.

**Improving performance**

A more favourable solution would be to raise the evaporating temperature of the system. Increasing the evaporating temperature of a VRV system has several benefits.

Firstly, as the evaporating temperature increases, the capacity of the system drops. This is because the indoor coil is not as cool but still below the return air temperature, therefore less heat transfer takes place. This brings the system capacity down to better match the actual capacity required from the space.

Secondly, the system efficiency increases. For example, on a 22kW VRV system, if there was a part load requirement from the system of 10kW (at room condition of 23°C 50% RH), then at an evaporating temperature of 6°C, the condenser efficiency would be 6.8. However, when the system evaporating temperature rises to 11°C, the same capacity can be delivered at the same conditions at an efficiency of 7.81, increasing the efficiency by nearly 15%. Additionally, evaporating temperatures can go as high as 16°C on Daikin systems so even higher efficiencies are feasibly obtainable, even at very low loads.

Thirdly, fan coil off-coil temperatures will remain stable, or increase, the higher the



HDD/L / SHUTTERSTOCK

evaporating temperature. This is because the capacity of the fan coil is reduced, while maintaining the same level of airflow. If the evaporating temperature was to remain at 6°C then, as the room temperature reduces, so would the off-coil temperature.

Most manufacturers have settings on their systems to allow them to operate at higher evaporating temperatures. Some allow for the system to increase evaporating temperature automatically in response to the load, so that the systems can provide the correct capacity under full and part load conditions without compromising on efficiency or comfort.

So, as we can see, the oversizing of systems can have a significant negative effect on efficiency. Fortunately, there are ways to overcome this issue, with systems that can automatically adjust evaporating temperatures based on system load, or by monitoring systems in an occupied building to identify the 'in use' load profile, so that the evaporating temperature of the system can be adjusted accordingly. CJ

By reducing system capacity, you better match the building load to meet the most efficient performance point of the system

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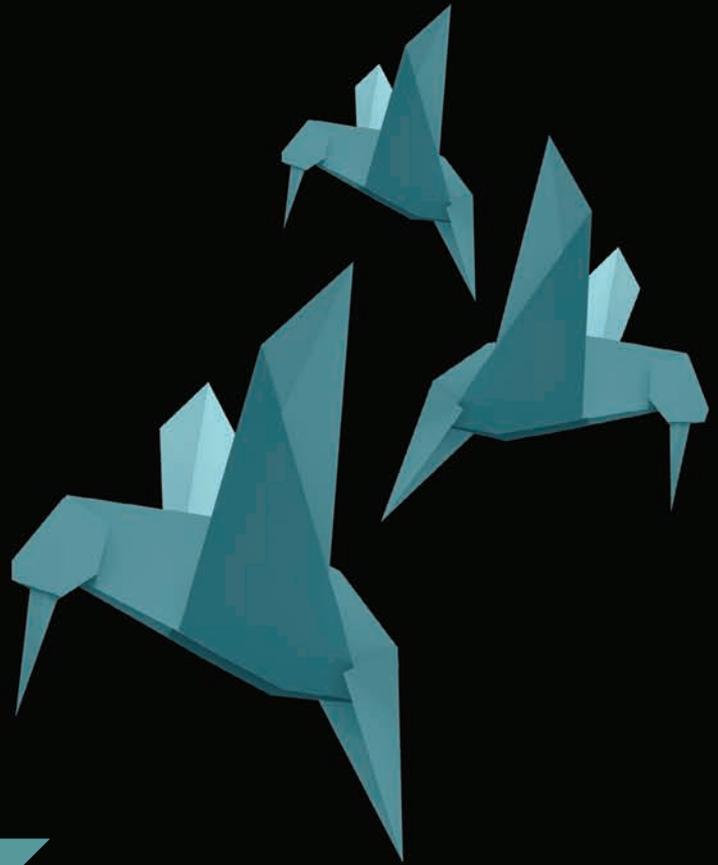
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# SAFER ESCAPE ROUTES

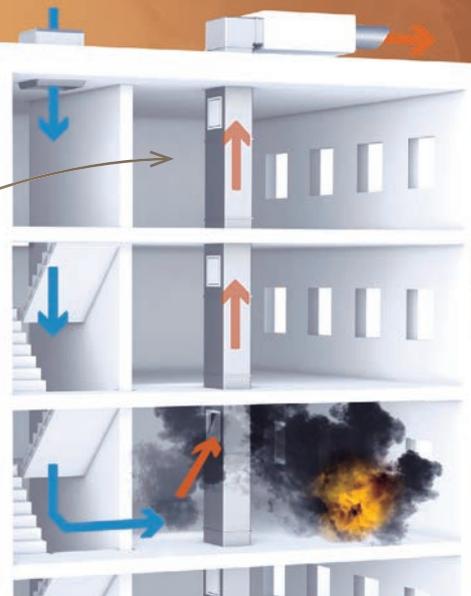
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# WHEN CFD IS NOT THE MODEL ANSWER



There can be too much reliance on fire engineering when specifying natural smoke shafts, argues SCS's Allan Meek, who says standardised products are often the most appropriate solution

There is a general assumption that computational fluid dynamics (CFD) is an integral part of any smoke shaft system design, but I question whether it should be.

Across construction, standardisation and offsite manufacture lead to greater efficiencies and cost savings without any negative impact on the success of projects or their long-term safety and sustainability. But smoke control has long been shrouded in a degree of mystery, which makes it hard for clients or main contractors to have real confidence when specifying a solution.

Take a mechanically ventilated smoke shaft; if the subcontractor or consultant tells the client they need a bespoke, designed solution, they sign on the dotted line, with the term 'life safety' foremost in their minds.

Natural smoke shafts – as found in Approved Document B – were formally conceived more than a decade ago, in BRE79204, by modelling a 'typical' building with vent size as the key variable and many specific conditions built in. Consequently, the proposed 3m<sup>2</sup> shaft solution could never fit every building configuration, but it is universally considered good enough; in mechanical smoke shafts – which, because of their reduced footprint, are today's default solution – extract flow rate is the key variable.

A mechanical smoke shaft is designed using CFD models, which are created with assumptions built in – for example, the time taken for people to escape a burning building and the area of inlet from shattered windows. The models are used to calculate flow rates and determine a desired fan duty.

Having worked on hundreds of projects, and commissioned



Smoke control has been shrouded in a degree of mystery, claims Meek

hundreds of CFDs on designed mechanical smoke ventilation shafts, I have seen – particularly within certain parameters (for example, less than 20-storey buildings and single-shaft systems) – that the outcomes are generally very similar in terms of flow rate and desired extract fan duty.

### Why not standardise?

So my question is this: in the same way that we specify standard 1.5m<sup>2</sup> automatic opening vents (AOVs) – or standard smoke detectors or fire doors – why don't we stop pretending that each smoke shaft/stairwell arrangement is bespoke and start to specify standard fans and controls?

With so many assumptions and 'good enough' standards appearing in accepted documentation and practice, why the emphasis on case-by-case design to such precise margins where extract flow rate is concerned?

I realise the words 'life safety system' can be intimidating, but the generally accepted guidelines – ADB, EN12101 and the SCA guidance – are easy enough to follow, and the systems are far from complicated. However, we

need to divorce product from design; any smoke system is just a collection of products (roof fans, AOVs, smoke detectors and so on) linked by a main control system, which should be talking to the BEMS and other building automation services. Less focus should be placed on individual system design concepts and more on the products, to ensure they are fit for purpose and kept properly operational during a building's lifetime.

These products are always situated in the same way, and operate to the same cause and effect protocol. The design aspect is really just about how many of each product you need, based on building size, and that can be done with a simple spreadsheet.

This isn't just talk or theory – I have sample CFD models to back up the experience. These are taken for short and tall buildings, with short and long corridors, and the results show that the same fan and control arrangement is appropriate to maintain the desired flow rate.

### Keep it simple

While there is a case for design in extreme cases – where an unusually high flow rate is needed – we must consider the potential risks of each solution being individually designed. Over-engineering can lead to added complexity, which may hinder firefighting services, operating override controls; under-specifying can lead to systems that don't operate adequately in real-world situations. Mechanical shaft systems are the most common way to protect high-rise buildings – surely standardisation is the lowest-risk way to go?

We need to empower installers and consultants to make their own selections and be rid of this unnecessary reliance on fire engineering. **CJ**

**ALLAN MEEK** is managing director at SCS Group, a specialist building engineering services company focusing on BEMS, smoke control and passive ventilation projects



## How a smoke shaft system works

### Principle

An extract fan is placed on top of a shaft that runs the full height of the building. If fire breaks out, smoke is allowed to enter the shaft via an automatically opening vent (vents on other floors remain closed to prevent contamination) and is drawn away by the fan, to be expelled into the atmosphere.

Clean inlet air is provided from the stairwell, allowing the safe escape of occupants and easier access for firefighters. The system is operated automatically via smoke detectors, or by integration with the fire-alarm system.

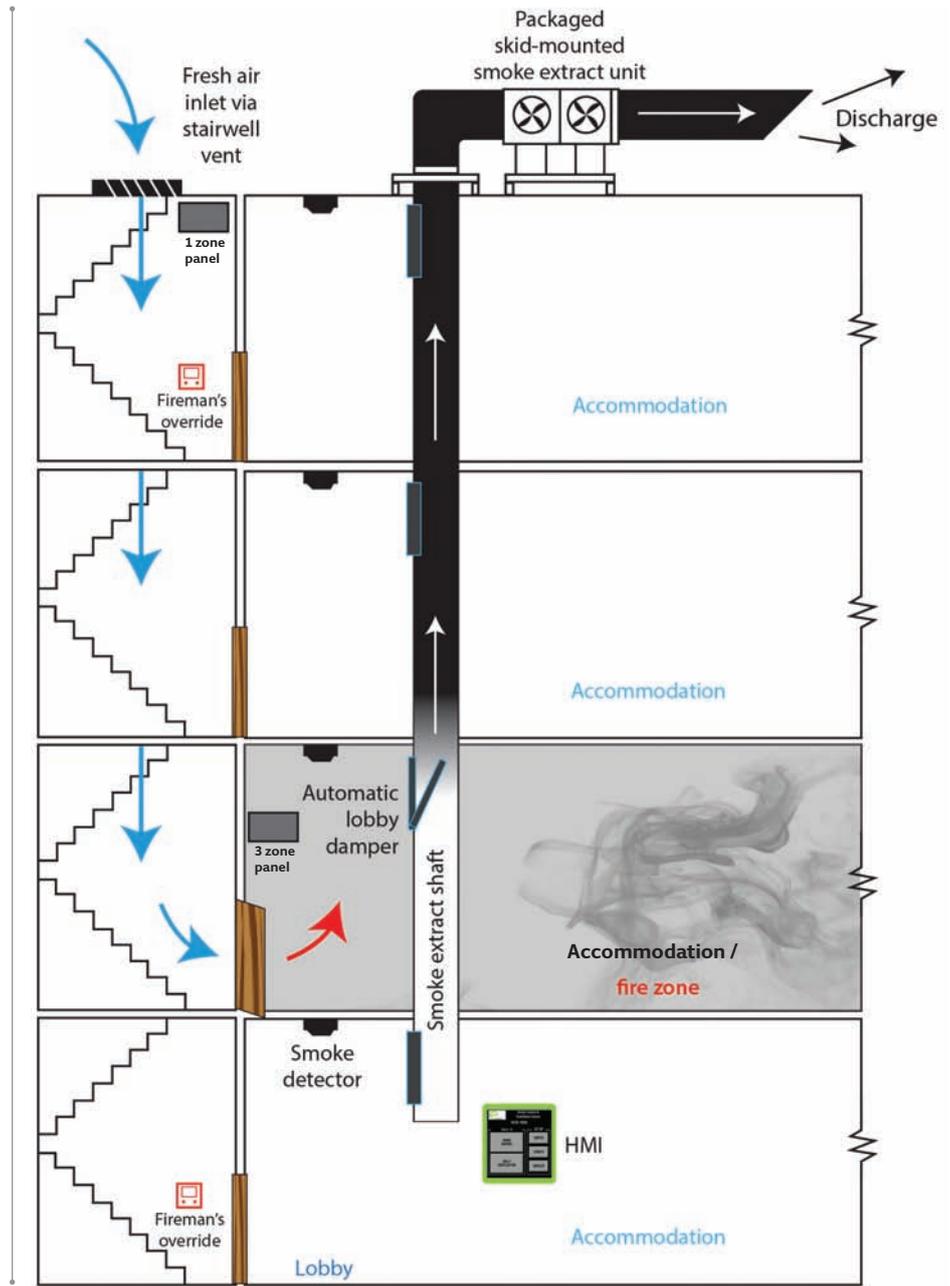
### Setup

A builders' work shaft is fitted with a mechanical extract fan at its head, while smoke dampers/AOVs are placed in the lobby of each floor. These, plus smoke detectors and local zone control panels, are linked to a central control unit governed by a touchscreen.

At the head of the stairs, a rooftop AOV is installed; this can open to allow in fresh air.

### Operation

- 1 The damper/AOV into the shaft serving the lobby where smoke is detected opens
- 2 A signal is sent to stop other dampers opening, so smoke can't spread to other floors
3. The duty extract fan starts
4. The AOV at the head of the stairs opens, providing a fresh-air inlet
5. The door to the fire lobby opens mechanically (if pressure sensors are installed they can provide information to control the fan speed), to prevent negative pressure forming in the lobby if the door to the stairwell is closed.



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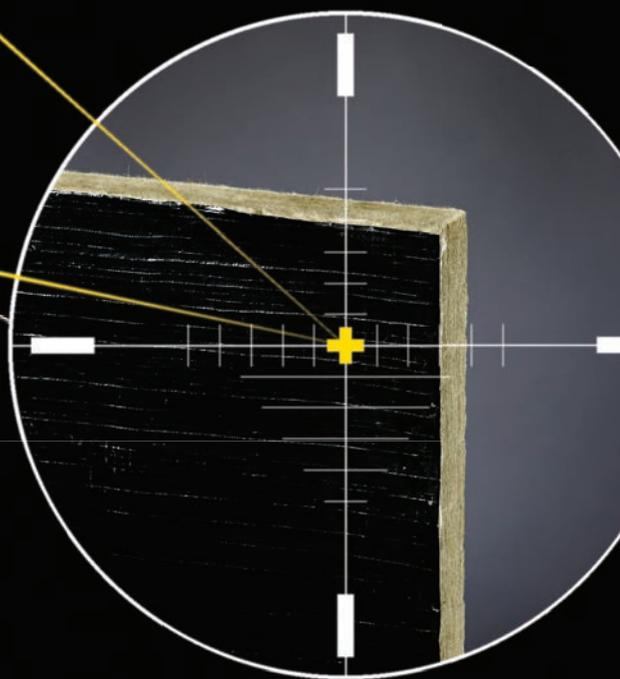
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# SMOKE AND REAR-VIEW MIRRORS

When designing a car park ventilation system incorporating fire and smoke control, there are several approaches that can be taken depending on the type of facility. Fläkt Woods' **Ross Barritt**, explains the regulations and system design

**C**ar park ventilation is essential for several reasons. Pollution control is perhaps the most obvious, but emergency ventilation – the control of smoke and toxic fumes in the event of a fire – is equally important, although only used in extreme circumstances.

Even though the UK has some of the most comprehensive car park regulations in the world, the guidance on ventilation is quite limited. The primary prescriptive requirement is defined by Approved Documents B and F, in which the limits of natural ventilation are defined (if this can't be achieved, the required extract flow rate is specified).

Meanwhile, BS7346-7 is specifically written for the ventilation of smoke and heat in car parks – but the basic set of requirements in this document is the same as in the Approved Documents. It does, however, go into further detail about the design of jet-thrust systems to achieve the prescriptive requirements of Approved Documents B and F, as well as defining other types of ventilation systems.

Jet-thrust systems are among the most popular types of car park ventilation, taking over from traditional systems because of their reduced life-cycle cost and easier installation, as they do not use ductwork. They feature

reduced external noise levels, a cleaner, neater appearance, and – importantly – truly symmetrical blades for a fully reversible design if required. This means the air can be directed to the closest extract point, depending on where the fire is located. The use of jet-thrust systems also creates more space, optimising car park use.

## Fire and smoke-control systems

There are three fire and smoke-control systems to consider: smoke and heat exhaust ventilation; smoke clearance; and smoke control.

Deciding which solution is most appropriate largely depends on the car park and any specific characteristics it has.

With many types of car park design in the UK, their different properties must be taken into consideration – such as whether they have a tunnel or stacking system design, have open sides, are below ground, have high ceilings, or are used for deliveries.

## Smoke and heat exhaust ventilation systems (SHEVS)

SHEVS work by producing a smoke reservoir. They are based on smoke-extract systems primarily developed for shopping centres, so



Although the UK has some of the most comprehensive car park regulations in the world, the guidance on ventilation is quite limited



are best suited to very tall car parks, where an extract point can be located at, or close to, the ceiling. The majority of UK car parks are height constrained in order to save excavation costs or to fit in multiple levels of parking, so the scope for using SHEVS is quite limited.

#### Smoke-clearance systems (fire smoke purging)

Smoke-clearance systems are an appropriate solution for the majority of UK car parks, especially if there is a sprinkler system in place. Indeed, they are the most widely used ventilation method, and make it simple and easy for operators to give the required level of proof to the approving authorities.

Smoke-clearance systems use robust, traditional methods that have been developed over time; for Approved Document B, this relates to an extract volume flow rate of 10 air changes per hour.

Approved Document B also stipulates that the extract duty must be shared by at least two fans or systems, for redundancy, and that the fans should be rated to 300°C for one hour (required by law within Europe, in accordance with BSEN12101-3).

BS7346-7 states: 'The objective of a smoke-clearance system is to assist firefighters by providing ventilation, allowing for speedier clearance of smoke once the fire has been extinguished, and to help reduce smoke density and temperature during the course of the fire. It is not specifically intended to maintain any area of the car park free from smoke, to limit smoke density or temperature to within any limits, or to assist means of escape.'

If a smoke-clearance system is to be used within a basement car park, building authorities tend to require a sprinkler system, as defined by Approved Document B. While this can be mitigated in smaller car parks,

or by a fire consultant carrying out a risk assessment, the easiest way to eliminate the need for a sprinkler system – and the associated requirement for a permanent tank of water/guaranteed water supply – would be to implement a smoke-control solution.

#### Smoke-control system

This is a fire-engineered solution; its design is based on predicting how large a fire would be in a specific car park, with or without a sprinkler system. It takes into account a car on fire within the car park and designs the system around controlling the smoke produced. The designer calculates how much smoke there would be and how much air needs to be extracted – the 'controlling velocity'.

Smoke-control solutions are best suited to large car parks, because they can reduce the total volume of air extracted when zoned, or can be used to provide an increased level of life safety if a facility is regarded as 'at risk' – for example, if it is next to a bank or data centre.

BS7346-7 doesn't state how to design a smoke-control solution, but it does define two main types of design fire and two main criteria for designing the system:

- The fire can be sprinkler-controlled or non-sprinkler-controlled, resulting in either a 4MW or 8MW design-fire size respectively. This is supported by live-fire test data – compiled by the BRE – showing, for a typical car fire, 4MW maximum heat-release rate is appropriate and that, for a multi-car fire, the maximum heat-release rate can increase significantly. The BRE also noted that, for a car-stacking system, sprinklers should be fitted to each level of parking, to reduce the risk of a very large fire as lower-level cars can ignite vehicles above and beside them.
- The system can either be designed for firefighter access or occupant escape, where the tenability criteria for occupant escape are more onerous than for firefighter access, as the fire service is well-equipped with insulated clothing and breathing apparatus. However, both sets of criteria tend to be reviewed in a firefighter access system as the occupant escape is required for the early stages of the fire, and the firefighter access for the latter stages.

For a smoke-control solution to be effective, an accurate calculation is essential. However, airflow behaviour is difficult and complicated to predict. One of the main equations for calculating the mass of smoke generated by a car fire is stated in BRE 368 as:  $M = C_e P Y^{3/2}$  where:



$M$  = Mass rate of smoke production (kg/sec)  
 $P$  = Perimeter of fire (m)  
 $Y$  = Height of clear layer (m)  
 $C_e$  = Constant

Once the mass of smoke has been calculated, the controlling velocity can also be calculated using an equation such as Heselden's method<sup>1</sup> of predicting smoke velocity. (There are a number of other calculations that can also be applied – the use of them very much depends on the specific project layout and how a fire would spread.)

The controlling velocity – applied across the car park cross-sectional area or zone cross-sectional area – determines the minimum extract duty required for the system. Jet-thrust fans are then positioned within the car park space to distribute the supply air and ensure that this controlling velocity is applied across the facility (since car park geometry is largely simple or without internal rooms). Finally, an assessment needs to be made of the volume of air moved by the jet-thrust fans across the car park. This is usually many times the duty of air through the fan because of the entrainment effect, but it can be reduced by obstructions such as services, columns and beams.

This total flow rate needs to be compared to the total extract duty for the zone, such that the jet-thrust fans should not overpower the extract fans – otherwise, recirculating flow can be created, causing smoke to spread back up the system, and reducing the time in which the tenability criteria are met.

This should be proved by CFD analysis before fan delivery on site, so the client, consultant and approving authority have confidence that a safe, effective and efficient system has been provided. **CJ**

● **ROSS BARRITT** is operational marketing manager for car parks and fire safety at Fläkt Woods

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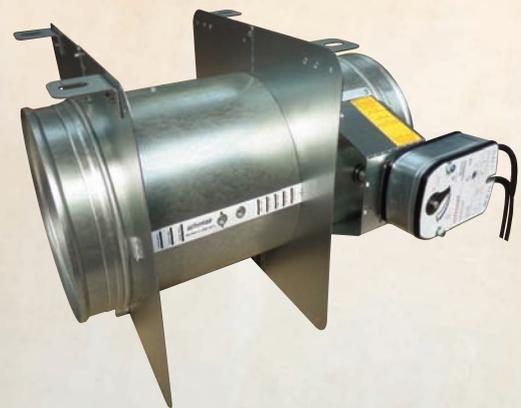
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## Integrating gas-fired and electrical heat pumps with heating and hot-water systems

### This CPD explores how systems using air source heat pumps are evolving

This CPD will consider the integration of (electrically powered) vapour compression and (gas powered) gas absorption air source heat pumps in non-domestic applications.

With the recent moderation<sup>1</sup> in projected natural gas price increases over the next 15 years, a strong economic case for using natural gas – in areas where it is available – for heating and hot water services is likely to continue for the foreseeable future. However, even in existing installations the inclusion of a 'low carbon' or 'renewable' technology – such as heat pumps – can provide an attractive supplemental, or replacement, heat source.

The financial benefit of these alternative methods is magnified by the tax and grant incentives provided by schemes such as the UK's Renewable Heat Incentive (RHI)<sup>2</sup>, which makes significant payments for heat sourced from air source heat pumps that meet appropriate quality standards.

The operational characteristics for heat pumps are such that, as the difference in temperature between the source (the outdoor 'ambient' air) and the output (the heated water) gets higher, the COP<sub>H</sub> – the ratio of useful heat output divided by supplied energy – will reduce. This will lower the output of the heat pump, so, at times of a building's peak heating requirement, when it is coolest outdoors, the heat pump output will be at its lowest, so may

require additional – or alternative – heating from another source, such as a condensing gas boiler.

The 'carbon' benefit for the inclusion of such technology is not always clear-cut, as it is open to the vagaries of the energy supply (electricity and gas) and the carbon 'embodied' in the equipment. So to model true 'life-cycle' comparative environmental impact requires local, site-specific knowledge, as well as assumptions about the production and transportation of the equipment.

#### Application of modern air source heat pump (ASHP) technology

Until recently, for a typical northern European cold day, the carbon impact – and energy cost – was likely to favour the use of a natural-gas-fuelled condensing boiler over the traditional vapour compression cycle heat pump. However, technology that was formerly only applied to larger commercial, multi-stage compressors (known as 'intercooling' or 'economising') is now available in smaller compressors – in particular, scroll types – that have been developed to allow the injection of refrigerant part way through the compression process.

This is shown in Figure 1, where a small amount of 'economising' refrigerant is initially separated off (as a liquid), after it leaves the condenser, passed through an expansion

device – thereby reducing its temperature and pressure – and then used to cool the main, high-pressure refrigerant flow, across a heat exchanger. The superheated – but cool, medium pressure – economising refrigerant is then injected into an intermediate point in the compression process. This 'economised vapour injection' (EVI) arrangement effectively splits the compression process into two stages within a single compressor. It acts to cool the bulk of the refrigerant in the compression process and so reduces the work of compression.

As illustrated in the pressure-enthalpy diagram of Figure 1, EVI shifts the compression process to the left, and the refrigerant superheat is reduced at the outlet of the compressor. EVI is particularly beneficial at lower evaporating temperatures – that is, at low outdoor air temperatures around 0°C or below. It also increases the refrigeration effect, the useful amount of heat that the refrigerant can gain from the outside air.

In applications that have little or no available natural gas, but do have grid-supplied electricity, there is an advantage in operating a modern ASHP – even in more adverse conditions – because it will out-perform simple electrical resistance heating. This is also very likely to be more carbon efficient than using other fuels, such as oil and coal. (The excellent research paper<sup>3</sup> by Huang and Hewitt reports on the

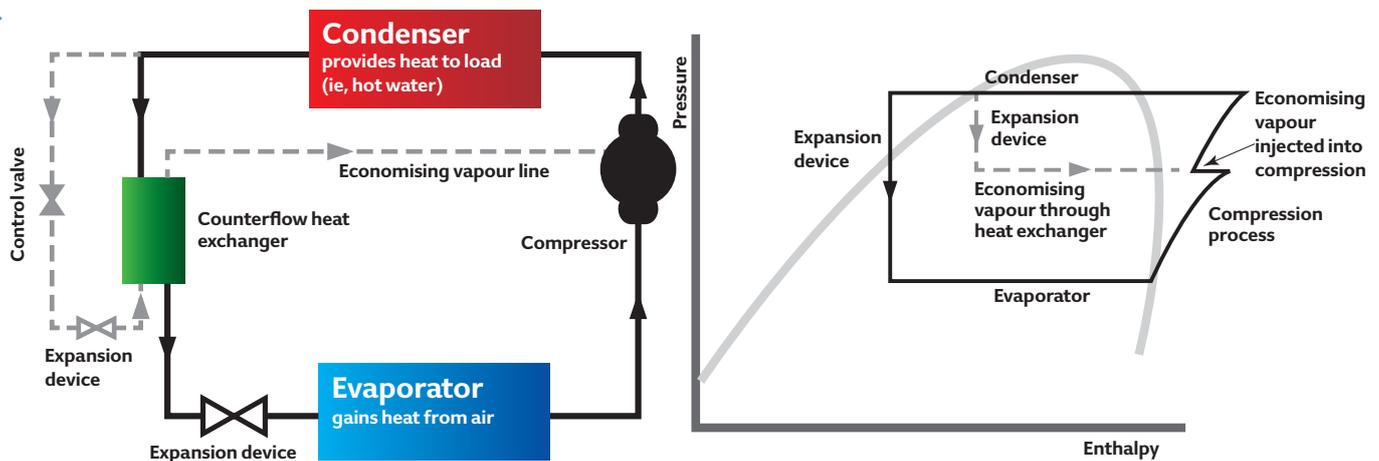


Figure 1: Simplified functional schematic and P-h process diagram of air source heat pump employing EVI

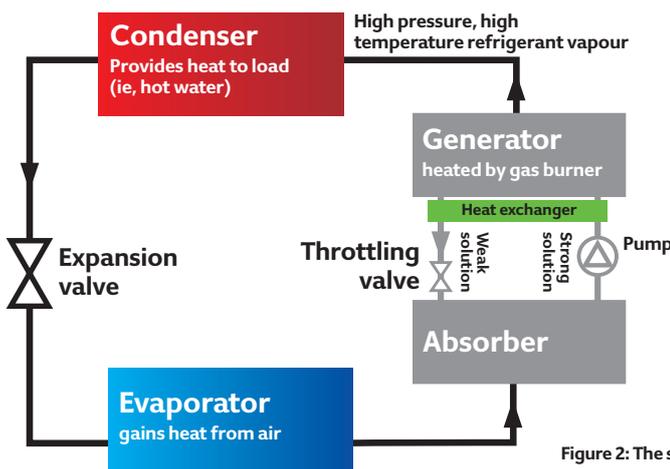


Figure 2: The simplified process of a GAHP

practical implementation of EVI, as well as indicating that such systems can be successfully – and economically – applied at temperatures below  $-1^{\circ}\text{C}$ .)

### Gas absorption heat pumps (GAHP)

As shown in Figure 2, a GAHP heats an ammonia and water solution with a natural gas burner (in the generator), and the high-pressure vapour is then passed to the condenser, providing heat for the load – for example, hot water. The remaining liquid from the generator (weak ammonia solution) is passed via the heat exchanger into the absorber.

The main flow from the condenser is passed through an expansion valve, and the now low-pressure, low-temperature, strong ammonia solution absorbs heat in the evaporator – from the outdoor air – so evaporating the ammonia (the refrigerant), which is then redissolved into the water (the absorbent) in the absorber. The pump then increases its pressure, ready to repeat the cycle in the generator.

Effectively, this is the same operating principle as ASHP, but the electrically-driven compressor is replaced by the absorber/generator combination, powered by heat from gas combustion. This can be packaged into a ‘low-noise’ unit that will include appropriate

controls and ancillary components – such as that shown in Figure 3.

Compared with a typical vapour compression ASHP, absorption heating COP and output will vary much less with the outdoor temperature.<sup>4</sup> As outdoor temperature falls from  $5^{\circ}\text{C}$  to  $-5^{\circ}\text{C}$ , the reduction in capacity for an absorption system is less than 10%, compared with more than 30% for a similarly sized electric heat pump. This means that a properly sized GAHP may well be able to provide a consistent source of hot water throughout the seasons.

For a GAHP, the  $\text{COP}_H$  is likely to be 1.3 to 1.5<sup>4</sup>, and a typical seasonal COP will be 1.4.<sup>5</sup> This is 40% better than a typical gas-fired condensing boiler. A recent study<sup>6</sup> indicated that GAHP were particularly successful when applied as part of a multi-valent system.

### Examples of ASHP integration

Figure 4 shows an example of a manufacturer’s application of an electrical air sourced heat pump providing heating for a storage hot-water vessel. ASHP units typically operate with a flow/return temperature difference of approximately 5K, whereas traditional boiler systems worked on 10K, and modern condensing boilers 20K. This means, when sizing an indirect coil (for ASHP), the coil

size has to be larger to meet a particular load.

Experience shows that it is difficult, practically, to source appropriately sized indirect cylinders, so a heat exchanger – with an effectiveness of around 95% – is used, as shown in Figure 4. The plate heat exchanger thermally connects the ASHP to the buffer vessel – effectively making it part of a primary circuit. The capacity of that buffer should be designed to prevent undue cycling of the ASHP.

This example system comes as a package that can work as a stand-alone water heater, with all controls required built into the ASHP – including the cylinder sensor and a manually reset overhear thermostat.

When sensing a demand, the ASHP is switched on while concurrently activating the pump between the heat exchanger and the cylinder. The cylinder immersion heater will be activated if the unit cannot provide domestic hot water (DHW) at suitable temperatures – that is, higher than  $60^{\circ}\text{C}$ . The cylinder temperature sensor provides the signal to activate the shunt pump and immersion heater backup, and even the secondary pump as required. The unit also has a standard anti-legionella programme to ‘pasteurise’ the vessel. Such an application – operating with ASHP flow/return temperatures of  $63^{\circ}\text{C}/57^{\circ}\text{C}$  – will work with a  $\text{COP}_H$  of around 2.4 (dependent on model).

This application of the ASHP has integrated controls to provide weather compensation in heating mode. So, for example, when applied to smaller systems it can provide heat for DHW with a small indirect cylinder (via a three-port valve), and also be used for underfloor heating or oversized standard radiators working on lower temperatures. When supplying DHW, it can operate at  $63^{\circ}\text{C}/57^{\circ}\text{C}$  and then – working solely in heating mode – at  $50^{\circ}\text{C}/45^{\circ}\text{C}$ .

If natural gas is available, it may be better at lower external temperatures to use a condensing gas water heater, with the ASHP pre-heating the incoming water in a similar way to the GAHP example below.

The example illustrated in Figure 6 has a gas absorption heat pump integrated with a gas condensing boiler, providing low-temperature hot water – used, for example, for underfloor heating or low-temperature radiators – and also pre-heated hot water to a gas-fired condensing water heater. The thermal store, as in Figure 5, acts as a large, low-resistance header – which can also integrate heat from other sources, such as solar thermal panels, using the additional coil in the cylinder. This allows the heat pump to continue working in its most efficient mode, while providing useful input to the hot-water system from multi-modal sources. The thermal store also prevents legionella risk, as it is not being used to accumulate domestic hot water.

When operating air sourced heat pumps at low external temperatures (approaching 0°C), frost is likely to accumulate on the ambient evaporator coil, as the moisture in the outdoor air freezes, obstructing the coil. For ASHP, a typical solution is to run the heat pump in a reverse cycle – by altering the direction of flow into, and out of, the compressor – thereby using heat from the compressor and the load coil to provide a defrost for the outdoor coil; or by supplying hot gas directly from the outlet of the compressor to the inlet of the evaporator, so bypassing the condenser. During this period, there will be no heating provided to the load. In GAHP, the heat pump has an automatic defrosting system that also enables

a continuous, but reduced, supply of heat to the load. With both types of heat pumps, this reduces the system's overall efficiency and, therefore, will affect the seasonal performance.

Thermal stores (buffer vessels) need to be sized to prevent cycling of the air sourced heat pump, but also to provide a heat store for when it is in defrost mode. The size of the store needs to take into account various factors including:

- The output rating of the heat pump
- Whether there are backup gas boilers
- The number of compressors within the heat pump



Figure 5: A thermal store (buffer tank) with tapings for multiple direct heat sources and coils for indirect sources and secondary circuits (Source: Lochinvar)



Figure 3: Commercially available GAHP (Source: Lochinvar)

A typical 'rule of thumb' is to size the store at 20 litres/kW output of the heat pump, plus an additional 10 litres/kW output of any modulating boiler. The manufacturer of the equipment should be able to provide explicit guidance pertinent to a particular application. © Tim Dwyer, 2015.

- With thanks to Steve Addis, of Lochinvar, for sharing his practical experience of gas-fired and renewable hot water production.

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Turn over page to complete module ➤

Legend for Figures 4 and 6	
TPRV	Temperature and pressure-relief valve
EV	Expansion-relief valve
EXV	Expansion vessel
TD	Tundish
NRV	Non-return valve
IV	Isolation valve
LSV	Lock-shield valve
PMP	Pump
HL	High limit stat
TP	Temperature and pressure gauge
PRV	Pressure-reducing valve
AVC	Anti-vibration coupling
AVM	Anti-vibration mounts
SFG	System fill group
FSW	Flow switch
AS	Air separator
DS	Dirt separator
DV	Drain valve
FR	Flow regulator
3PV	Three-port valve
AV	Air vent
PHEX	Plate heat exchanger
TS	Temperature sensor
TS1	Heat pump return sensor
TS2	Heat pump flow sensor
BTI	User circuit sensor
BTS	DHW circuit sensor
STR	In-line strainer

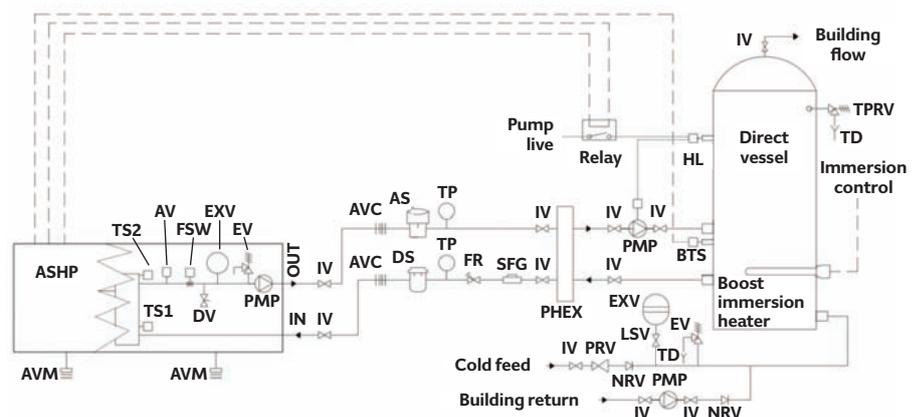


Figure 4: Air source heat pump providing primary heating for domestic hot water (Source: Lochinvar)

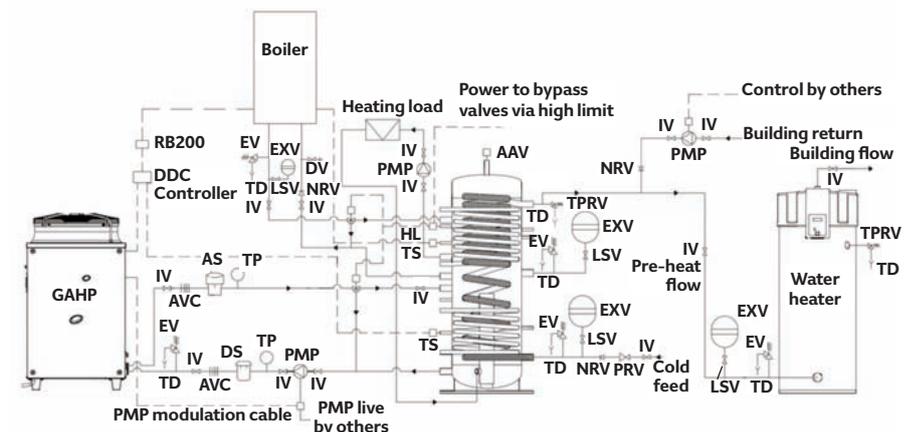


Figure 6: A GAHP combined with a condensing boiler and a thermal store to provide pre-heating for dedicated domestic hot-water heater and heating for low-temperature heating circuit (Source: Lochinvar)

# Module 79

July 2015



**1. In an EVI system, when is the economising refrigerant separated off from the main flow?**

- A Halfway through the compression process
- B After the compressor
- C After the condenser
- D After the expansion device
- E After the evaporator

**2. Which of these is least likely to be true when applying EVI?**

- A Reduces refrigerant superheat at compressor outlet
- B Most beneficial at external temperatures of around 0°C
- C Injects refrigerant part way through the compression process
- D Increases the normal evaporating temperature
- E Increases the refrigeration effect

**3. In a gas absorption heat pump, where is the heat added when using natural gas to 'power' the process?**

- A Absorber
- B Absorber/generator heat exchanger
- C Generator
- D Condenser
- E Evaporator

**4. Compared with a gas fired condensing boiler, what is the potential increase in seasonal performance for a typical GAHP (based on the indicative value in the article)?**

- A 10%
- B 25%
- C 40%
- D 55%
- E 70%

**5. What is a typical 'rule of thumb' size for 'buffer' stores used with heat pump systems?**

- A 10 litres/kW output of the heat pump
- B 20 litres/kW output of the heat pump
- C 30 litres/kW output of the heat pump
- D 40 litres/kW output of the heat pump
- E 50 litres/kW output of the heat pump

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New resistive steam humidifier with advanced scale management

The new Condair RS steam humidifier's patented scale management system makes servicing simple. Scale detaches from the heating elements and falls into the external collector tank where it is easily removed.

As the humidifier has a cleanable boiling chamber, it does not need disposable boiling cylinders, significantly reducing operating costs in comparison to electrode boiler systems.

**Discover more about the new Condair RS**

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[www.eurovib.co.uk](http://www.eurovib.co.uk)

## Remeha Quinta Pro halves fuel consumption at Somerset Cider Distillery

A Remeha Quinta Pro LPG boiler is playing a key part in pasteurising apple juice and fermenting sparkling cider at the award-winning Somerset Cider Brandy Company. Owner Julian Temperley's environmentally-friendly fermentation process involves passing the apple juice through a heat exchanger before bottling. When the atmospheric boiler and heat exchanger package at the distillery began to fail, contractor Gary Turner of GT Building Services recommended the Remeha Quinta Pro for its high efficiencies and ease of installation. Production director Tim Stoddart, delighted with the results, said: 'It's reduced our fuel consumption by 50% in the last six months.'

● Call 0118 978 3434, email [boilers@remeha.co.uk](mailto:boilers@remeha.co.uk) or visit [www.remeha.co.uk](http://www.remeha.co.uk)



## Grundfos TPE2 and TPE3 the energy efficient choice

The TPE2/TPE3 is an extremely energy efficient range of in-line pumps. In fact, all TPE2/TPE3 models with their Minimum Efficiency Index of 0.70 well exceed legislative demand, which currently stands at 0.40.

This family easily meets IE4 demands – even when you include the energy consumption of the integrated frequency converter – regularly delivering a payback that is often less than two years.

The pumps are suitable for use in a range of applications including: one-string heating systems, heat recovery systems, boiler shunt pump applications and domestic hot water recirculation.

With great efficiency savings, wide application suitability and a short payback, every detail of these pumps has been designed to increase your system's performance.

● Call 01525 850 000, email [grundfosuk@grundfos.com](mailto:grundfosuk@grundfos.com) or visit [www.grundfos.co.uk](http://www.grundfos.co.uk)



## Trusted series inspires new development

Aquatech Pressmain has developed a new cost efficient series of cold water booster sets based on its trusted AMV series.

The EMV series boasts flow through pressure vessels, 304 stainless steel wetted components throughout and EuP compliant motors.

Available with two, three or four pumps, the pumps can all run together or in stages depending on demand and will change accordingly, giving you the right pressure at all times with no wasted energy.

● Call 01206 215121, email [sales@aquatechpressmain.co.uk](mailto:sales@aquatechpressmain.co.uk) or visit [www.aquatechpressmain.co.uk](http://www.aquatechpressmain.co.uk)



## EcoMESH adiabatic air inlet cooling

The EcoMESH concept is based on intermittently spraying water onto a mesh placed in front of the heat reduction surface, thus cutting power consumption by as much as 30-40%, while improving the performance of air cooled chillers, dry coolers and condensers and refrigeration plants.

EcoMESH is a unique mesh and water spray system which improves performance, reduces energy consumption, eliminates high ambient problems, is virtually maintenance free and can pay-back in one cooling season.

● Call 01733 244 224 or visit [www.ecomesh.eu](http://www.ecomesh.eu)



## Electric powered heating for art nouveau gem

Atlantic Boilers has supplied its new CER electric boiler for installation at The House for an Art Lover Glasgow. The property is owned by a charitable company whose primary purpose is the stimulation of public interest in art, design and architecture.

To provide space heating for the building, CER 1-12kW modulating electric boiler was chosen to input the heat. The boiler is ultra-efficient (99.5% GCV), provides precise heat input and is whisper-silent in operation.

● Call 0161 621 5960, email [nabeela@atlanticboilers.com](mailto:nabeela@atlanticboilers.com) or visit [www.atlanticboilers.com](http://www.atlanticboilers.com)



## Get higher heat outputs in style with the iVECTOR from Myson

The clever design of Myson's latest fan convactor – the iVECTOR – means it can produce high heat outputs without any compromise on style.

It comes equipped with a large surface area heat exchanger, which allows it to produce greater heat outputs than traditional radiators, while maintaining a compact and stylish appearance.

This makes it a great space saving heating solution, ideal for modern living.

● Call 0845 402 3434, email [sales@myson.co.uk](mailto:sales@myson.co.uk) or visit [www.myson.co.uk](http://www.myson.co.uk)



## Firm launches expanded Multi-Zone product range

Hitachi has launched an updated and expanded MultiZone product range, which includes both indoor and outdoor units. Three new capacity outdoor units have been added, and capacity extended from 3.3kW to 10.6kW. The new 1.5kW indoor unit has been introduced to meet a changing market where smaller buildings and higher levels of insulation mean smaller indoor units can be specified. A big benefit for trade customers is the common indoor wall and floor unit designs used for both MonoZone and MultiZone installations, simplifying installer selection, stock control and improved aesthetics where single and multi combinations are installed within the same building.

● Call 01628 585 394, email [aircon.uk@hitachi-eu.com](mailto:aircon.uk@hitachi-eu.com) or visit [www.hitachiaircon.com](http://www.hitachiaircon.com)



## Spirotech scoops bronze award for innovation

Global defence, aerospace and security company BAE Systems, has granted Spirotech a prestigious award for its design of the world's first marine vacuum degasser.

Installed on two Type 45 destroyers – *HMS Diamond* and *HMS Daring* – the new vacuum degassers represent a first for the industry and, as a result of the success of these initial designs, a further 10 degassers have now been commissioned for installation on additional Navy vessels to improve chilled water distribution.

● Visit [www.spirotech.com](http://www.spirotech.com)



## Wokefield Park updates its hot water supply using Stokvis Econoplate technology

The exclusive De Vere Hotel at Wokefield Park has updated its hot water services with the installation of two Stokvis Econoplate E4B59+1R packaged plate heat exchangers.

These offer very high flow rates direct from the boiler plant, with no need for storage, so problems of cycling to maintain temperature are negated.

The installation at the flagship De Vere venue was carried out by J & B Hopkins, a specialist building services contractor.

● Email [info@stokvisboilers.com](mailto:info@stokvisboilers.com) or visit [www.stokvisboilers.com](http://www.stokvisboilers.com)



## Underfloor air conditioning for Centrica Energy HQ in Aberdeen

Underfloor air conditioning proved to be a flexible approach for heating and

cooling the headquarters of Centrica Energy.

AET Flexible Space was specified by consultant KJ Tait to provide comfort cooling in the upper three floors of the building, with the ability to adapt to future changes being a key factor.

The AET Flexible Space system utilises the plenum beneath a raised floor as the ventilation duct, eliminating the need for ceiling based ductwork.

● Call 01432 310 400, email [lucy@flexiblespace.com](mailto:lucy@flexiblespace.com) or visit [www.flexiblespace.com](http://www.flexiblespace.com)

## Jaga Heating Products (UK) – Spacehus case study

Space Group and Arch Homes have completed four new 'Spacehus' houses in Blyth, Northumberland. Each is equipped with renewable technologies to provide residents with homes so sustainable that their heating and power costs are included in the rent.

Jaga's Strada radiators were chosen to warm the living spaces, while the Sani Bow towel radiator was selected for the bathrooms.

The Sani Bow towel radiator features a minimalist design and blends in with the buildings' contemporary aesthetics.

● Call 01531 631 533, email [jaga@jaga.co.uk](mailto:jaga@jaga.co.uk) or visit [www.jaga.co.uk](http://www.jaga.co.uk)



## A leading performance from the Purmo Compact

The Purmo Compact is a classic, high-performance energy efficient radiator.

With a 33mm profile and high-efficiency convector fins, the Purmo Compact ensures a good performance, even when installed on low temperature systems.

The product range includes type 11, type 21, type 22 and type 33. It is stocked in a wide range of heights and lengths, as well as an extended range of made to order sizes and colours. It is stylish, elegant and practical.

● Call 0845 070 1090, email [uk@purmo.co.uk](mailto:uk@purmo.co.uk) or visit [www.purmo.com/en](http://www.purmo.com/en)

## Rinnai says 'ay caramba' at Maracana Stadium in Rio...

Rinnai, a global leader in tankless, continuous flow gas-fired water heating products for all commercial and domestic sites, recently finished installing its products in the world famous Maracana Stadium, in Rio de Janeiro.

One particular site for the Rinnai units was the players' showers. Continuous flow water heating units can save up to 30% on fuel bills. These savings can be dramatically increased if the units are installed with an integrated controls system.

● Visit [www.rinnaiuk.com](http://www.rinnaiuk.com)





## Adexsi cools the 'Walkie Talkie'

Smoke and natural ventilation specialist Adexsi UK's Veriflow system is playing a key role in the success of one of the City of London's latest landmark buildings.

20 Fenchurch Street – better known as the 'Walkie Talkie' for its distinctive curved shape – is now complete with the opening of its spectacular sky garden.

The Veriflow system features a series of low and high level dampers operating discreetly behind the building's cladding fins and external/internal louvre systems.

● Visit [www.adexsiuk.com](http://www.adexsiuk.com)

## Complete natural ventilation solutions

Ruskin Air Management has launched a new natural ventilation business.

Called Airolution, it will provide full natural ventilation solutions for commercial buildings including system design, supply of equipment, controls, installation and commissioning.

Airolution sees every component in the system tested together to ensure the final system meets the design brief and aspirations of the building owner. It is then delivered to site, installed, tested and commissioned before handing over to the operating team.

● Visit [www.ruskinuk.co.uk](http://www.ruskinuk.co.uk) or [www.airolutionuk.co.uk](http://www.airolutionuk.co.uk)



## THISION WH from Elco UK receives WRAS approval



The THISION WH gas fired condensing hot water generator from ELCO UK has received WRAS approval.

The approval was granted following rigorous testing, during which the THISION WH demonstrated compliance with the Water Supply

Regulations 1999 and The Water Supply Byelaws 2014.

Commenting on the certification, managing director at ELCO UK Ian Bradley said: 'Over the years, ELCO UK has built up a reputation for manufacturing hot water generators that perform to the highest standards.'

● Visit [www.elco.co.uk](http://www.elco.co.uk)

## New Condair RS steam humidifier

Condair is launching a new resistive steam humidifier – the Condair RS.

It has a patented scale management system that allows easy removal of limescale, resulting in reduced maintenance and extended operational periods between major services.

It incorporates the latest touch screen control technology, has BMS connectivity as standard and offers very close humidity control.



This also provides intuitive control over operational and reporting functions. As well as operating parameters, the user can view trouble-shooting suggestions.

● Call 01903 850 200, email [uk.sales@condair.com](mailto:uk.sales@condair.com) or visit [www.condair.co.uk](http://www.condair.co.uk)



## New Zmart panel radiator from Zehnder

Zehnder has launched the new Zmart Flex. This flat-panel radiator is manufactured from polybutane and weighs up to 60% less than a traditional pressed steel panel. It can be lifted, positioned and installed by a single person,

generating savings of 33% in transport and labour costs.

It achieves heat outputs of between 124W and 2621W, is suitable for use with renewable energy sources and has a 25% lower environmental impact than standard radiators.

● Call 01276 605 800 or visit [www.zmart.zehnder.co.uk](http://www.zmart.zehnder.co.uk)

## Moduglass quartet illuminate manuscripts

Four large, high performance rooflights from the Jet Cox range are being installed at Palmers Green Library in Enfield. The set of four, five-section Moduglass rooflights have been manufactured and supplied to the main contractor for installation onto the prepared deck.

The Moduglass Range is available with the choice of two, three, four or five compartment assemblies. The range is compatible with virtually any type of roofing membrane. The rooflights are fabricated from polyester powder coated aluminium extrusions to RAL9010.



● Call 0121 530 4230, email [mrevie@jet-cox.co.uk](mailto:mrevie@jet-cox.co.uk) or visit [www.jet-cox.co.uk](http://www.jet-cox.co.uk)

## Timóleon underfloor heating – the last word in glamping

Campers in the two cedar clad yurts at Little Coombe Farm, Devon, are warmed by Timóleon's LowBoard underfloor heating system.



Timóleon's Technical Design Service created an installation layout to respect the floor plan of the yurts, able to deliver maximum efficiency from minimum pipe lengths. Seven pipe runs connect back to a Timóleon Axios compact manifold, which delivers a flow of 310 litres per hour. The system is designed to have a flow temperature of 550°C and a return temperature of 450°C, optimising boiler performance.

● Call 01392 363 605, email [Chris.Weaver@timoleon.co.uk](mailto:Chris.Weaver@timoleon.co.uk) or visit [www.hydronik.co.uk](http://www.hydronik.co.uk)

## AET underfloor air conditioning for Korea Expressway HQ

In 2013, AET Flexible Space received a contract for underfloor air conditioning equipment at the new Korea Expressway headquarters building. The equipment was chosen for its height saving capabilities, flexibility and speed of construction. The AET underfloor systems utilise the plenum beneath a raised floor as the ventilation duct, eliminating the need for ceiling-based ductwork and reducing the height of new-build construction by up to 10%. The conditioned air is introduced into the space via floor recessed fan terminal units.

● Call 01432 310 400, email [lucy@flexiblespace.com](mailto:lucy@flexiblespace.com) or visit [www.flexiblespace.com](http://www.flexiblespace.com)



## Tigris K1 – a truly adaptable press-fit plumbing system

The Wavin Tigris K1 press-fit system is a multilayer composite pipe system designed to offer quick, safe and reliable connections. Used on potable water, hot and cold water, heating installations and fan coil units, it has specific adaptors for other systems such as Hep20 and copper for ease and speed of installation.

Suitable for use in recirculating systems, it is ideal for health situations. The corrosion and scale-resistant plastic press-fittings also prevent scale build-up.

● Call 07793 578 738 or email [Kelly.Slociak@cfa-group.com](mailto:Kelly.Slociak@cfa-group.com)



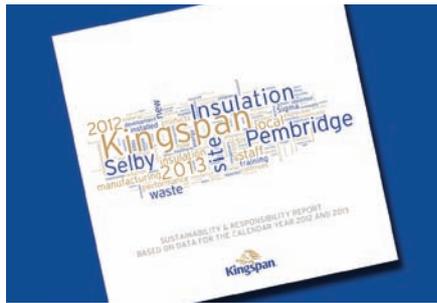
## New slimmer, modular, high seasonal efficiency water-cooled chillers

Hitachi Air Conditioning Europe SAS has launched its modular-concept Samurai RCME-WH water-cooled chillers.

The series offers operators continuous operational security as well as redundancy, future expansion and layout advantages over conventional systems, plus – as it's narrower than the previous version – access for refurbishment projects is much easier.

With continuous capacity control from 3-100% (dependent on module combinations), water outlet temperatures can be controlled to +/-0.5°C.

● Call 01628 585 394, email [aircon.enquiries@hitachi-eu.com](mailto:aircon.enquiries@hitachi-eu.com) or visit [www.hitachiaircon.com](http://www.hitachiaircon.com)



## Kingspan insulation leads sustainability charge

Kingspan Insulation has shown its commitment to improving business processes with the publication of its latest Sustainability and Responsibility Report.

It details progress during 2012 and 2013, including on waste management, the launch of the Kingspan OPTIM-R vacuum insulation panel, and the award of BES 6001 certification for the Kingspan Kooltherm and Therma range. It also covers Kingspan Group's goal to achieve Net Zero Energy across all its sites by 2020.

● Call 01544 387 384, email [literature@kingspaninsulation.co.uk](mailto:literature@kingspaninsulation.co.uk) or visit [www.kingspaninsulation.com](http://www.kingspaninsulation.com)

## Toshiba plans to double air conditioning sales

Toshiba Air Conditioning has revealed plans to double sales by 2020, following five years of double-digit growth amid challenging market conditions.

The company is dramatically increasing stocking capacity at its Plymouth facility to ensure immediate product availability across popular ranges. Toshiba factories are employing 350 additional design engineers to fast-track research and development. Work is already under way on a major extension to the Toshiba Thailand factory, including expansion of its R&D facilities and the creation of a new global Technical Training Centre.

● Visit [www.toshiba-aircon.co.uk](http://www.toshiba-aircon.co.uk)



## GEZE UK appointed to maintain a swift entrance



GEZE UK has secured a service contract to keep the automatic doors at Blenheim Palace's new café and shop operating smoothly. GEZE had installed a pair of automatic sliding glass

doors with Slimdrive SL operators at the main entrance to the visitor centre. When the Slimdrive SL approached the end of its warranty period, the company provided a free maintenance check and won the maintenance contract on the spot.

● Call 01543 443 000, email [info.uk@geze.com](mailto:info.uk@geze.com) or visit [www.geze.co.uk](http://www.geze.co.uk)

## Marflow eases the strain

The Filterball – part of Marflow Hydraulics' range of pipeline valves – takes the strain out of cleaning and maintaining a water distribution system.

A compact combined isolation valve and strainer unit, the Filterball has been designed to allow easy access, while introducing very little air into the system. Its in-built strainer screen removes the need for separate isolating valves up- and downstream of traditional Y strainers, saving more time and money than traditional strainers and isolating valves.

● Call 07896 777 207 or email [lindsay.woodward@marflow.co.uk](mailto:lindsay.woodward@marflow.co.uk)



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The hardwired system is not susceptible to wireless connectivity issues. Residents can top up credit and access their accounts via a web app.

● Call 01372 722 277 or visit [www.evinoxenergy.co.uk](http://www.evinoxenergy.co.uk)



## Mikrofill supplies Co-operative Childcare in Reading

Reading Abbey's medieval dormitory for pilgrims is now occupied by The Co-operative Childcare nursery. During a recent refurbishment of the heating system, Mikrofill supplied an Ethos 90kW natural gas condensing boiler to provide LPHW to the new VT circuit complete with ancillaries. The wall-mounted stainless steel boiler has a modulation of 10>1 and ensures the burner output always matches demand, as well as reducing emissions. The installation was complemented with the addition of an electronic Mikrofill 150 pressurisation package.

● Call 03452 606 020 or visit [www.mikrofill.com](http://www.mikrofill.com)



## Pegler Yorkshire announces industry first

Pegler Yorkshire has received WRAS approval, for its Meibes range of Heat Interface Units. WRAS is the industry standard for UK approved water fittings that are compliant with the UK plumbing regulations. All products are approved by UK water suppliers using the performance requirements set out by the Department of Environment, Food and Rural Affairs.

The Meibes range of HIUs benefits from a patented proportional modulating valve and operate on a 'no demand no flow' basis, minimising demand on the main network, reducing energy consumption and ensuring apartments are not over-heated.

● Visit [www.pegleryorkshire.co.uk](http://www.pegleryorkshire.co.uk)

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### Senior Mechanical Design Engineer

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An opportunity to work on variety of high profile projects covering Healthcare, Laboratories, Data Centres, and Stadia projects both in the UK and across the globe. This is a long term contract with a well-known and well respected consultancy based in Central London. BAR2666/KB

### Intermediate Mechanical Engineer

**Manchester, £28-33k + benefits**

I am working alongside a world class multi-disciplinary engineering consultancy that is at the forefront of building services engineering. Recent examples of work completed include Premier League Football Stadia, a heritage project in the Middle East, and schemes in the aviation and major commercial sectors. Their current recruitment drive is as a result of overseas postings and promotions. BAR2160/JA

### Public Health Principal

**London, £60-65k + benefits**

An international MEP consultancy looking for a talented, technically strong and excellent team leader to start a Public Health department from scratch, building a team of engineers around themselves. You must have a proven track record in Building Services and have experience in the leadership and development of others. BAR2588/MO

### Senior Electrical Engineer

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We are currently working alongside one of the largest building services consultancies with a global presence and reputation for project delivery and engineering excellence across a range of sectors including Residential, Commercial, Data Centres, and Hospitals. BAR2606/PA

### Mechanical & Electrical Rail Engineers

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**BIM Manager (MEP)  
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One of the leading building services consultancies in the UK is looking for an experienced BIM Manager to join their team in Cardiff. You will be in charge of running the BIM protocols for the region, as well as leading a team of technicians on a range of projects from education through to luxury stadiums. Proficiency in Revit MEP and BIM execution is essential.

**Senior Electrical Design Engineer  
 Central / South West London**  
 £50,000 Plus Benefits

A world class, internationally recognisable and architecturally led building services department is looking for a Senior Electrical Engineer to work on iconic projects across the globe. The team has recently won a number of large well publicised projects and now requires a Senior Electrical Engineer to work on these aviation, leisure and residential schemes. This is a fantastic role offering the opportunity to travel the globe whilst working for a pioneer within the industry.

**Associate Director (Electrical Building Services)  
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 £50,000-£60,000 Plus Benefits

Operating within a 70 strong multi-disciplinary office, you will be brought in to lead the development and expansion plans for the Cardiff MEP group. You will be expected to take control of all the commercial, managerial and technical aspects of a wide range of local projects covering a plethora of sectors. Excellent client facing and communication skills are required, as well as high expertise in everything electrical.

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**Mechanical Engineer - SLA00470**

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Hours: 35 hours per week

Housing and Technical Resources wish to appoint a Mechanical Engineer to assist in the effective delivery of a comprehensive service relative to the Council's Capital and Revenue Expenditure programme.

To undertake this role you will require to have a degree in Building Services Engineering and possess equivalent relevant experience in the use of AutoCAD and also experience in the use of computer thermal simulation software programmes would be an advantage.

You should demonstrate a commitment to the principles of customer care, while displaying excellent communication and interpersonal skills and be able to demonstrate previous experience of working to targets and pre-determined timescales along with an awareness of health and safety in the workplace.

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Interview date: Thursday 23 July 2015

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Contact: [katarzyna.murrells@bsvrecruitment.co.uk](mailto:katarzyna.murrells@bsvrecruitment.co.uk)

**Senior Public Health Engineer**

Surrey | £55k + Benefits | Ref: 16049

We have an exciting opportunity for a Public Health Engineer to join and strengthen our Client's team in London. Our Client is working on a variety of high profile projects and need a proven Public Health Engineer who can provide efficient, high quality Public Health designs. Contact: [yasmeen.domingo@bsvrecruitment.co.uk](mailto:yasmeen.domingo@bsvrecruitment.co.uk)

**HVAC Design Engineers (Intermediate & Senior)**

St Albans, Luton & Milton Keynes | £35k+ & Benefits | Ref: 16168

Excellent opportunities for Intermediate and Senior Mechanical Design Engineers specialising in Healthcare, Education and Data Centres who are keen to further their careers and strengthen our consultants teams due to expansion and growth.

Contact: [michaela.hollis@bsvrecruitment.co.uk](mailto:michaela.hollis@bsvrecruitment.co.uk)

**Associate Mechanical & Electrical Design Engineers**

London | £70-90k + Benefits | Ref: 13861

An International consultancy requires senior level Engineers to manage teams working on a variety of over ground Rail projects. These roles provide the opportunity to have a major design impact on live infrastructure projects. You will be based in their modern Central London office and have an attractive remuneration package to match. Contact: [darren.warmington@bsvrecruitment.co.uk](mailto:darren.warmington@bsvrecruitment.co.uk)

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# Events & training

## NATIONAL EVENTS AND CONFERENCES

**Guide A – Environmental Design launch**  
22 July, London

The steering group chair, Derrick Braham, will host an evening of presentations and discussions highlighting important updates to Guide A.  
[www.cibse.org/events](http://www.cibse.org/events)

**CIBSE Building Performance Conference and Exhibition**  
3-4 November, London  
CIBSE's annual event returns for the second year to the Queen Elizabeth II Centre, Westminster.  
[www.cibse.org/conference](http://www.cibse.org/conference)

## CPD TRAINING

For more information, visit [www.cibse.org/mcc](http://www.cibse.org/mcc) or call 020 8772 3640

**Practical project management**  
1 July, London

**Fire risk management systems: PAS 7 2013**  
2 July, London

**Designing water efficient hot and cold supplies**  
3 July, London

**Earthing and bonding systems**  
3 July, London

**Practical controls for HVAC systems**  
7 July, London

**Lighting and energy efficiency**  
7 July, London

**Building drainage explained**  
8 July, London

**Energy strategy reports**  
9 July, London

**Emergency lighting to comply with fire safety requirements**  
9 July, London

**Mechanical services explained**  
14-16 July, Manchester

**Fire safety codes for building design and management: BS9999**  
15 July, London

**Low carbon buildings for local authorities**  
16 July, London

**Electrical services explained**  
21-23 July, Manchester

**Introduction to 11kV (high voltage) distribution and protection**  
23 July, London

**Energy efficiency Building Regulations: Part L (non-domestic)**  
23 July, Manchester

**ENERGY ASSESSOR TRAINING**  
For more information visit [www.cibse.org/events](http://www.cibse.org/events) or call 020 8772 3616

**Lighting and energy efficiency**  
7 July, London

**Energy Performance Certificate (EPC) and LCC design training**  
8-9 July, London

**Energy Savings Opportunity Scheme (ESOS)**  
13 July, London

**CIBSE GROUPS, REGIONS AND SOCIETIES**  
For more information, visit [www.cibse.org/events](http://www.cibse.org/events)

**ANZ Region, NSW Chapter: Staying alive – infection control**  
7 July, Sydney

**WiBSE Peer-to-Peer mentoring: Asking for help**  
8 July, London  
With speaker Sarah Davis.

**North West Region: Summer social**  
10 July, Manchester  
Join CIBSE North West for a summer networking event at the All Star Lanes in Manchester.

**HCNW Region: Resilient buildings – What do we mean, unexpected?**  
15 July, London

Buildings are incorporating more electronics, software and packaged solutions, but with fewer onsite support staff. Kevin Barrett will present examples from actual crisis situations, explaining what worked, and what didn't. Charles Jegar will then illustrate his personal experience of everyday life in a crisis, and why thinking about these possibilities could be relevant to the design and operation of buildings.

**WiBSE: Leadership Part 3: What kind of leader are you?**  
15 July, Manchester  
With speaker Imelda O'Keefe.

**SoPHE: How plastic piping systems can help meet current L8 legionella regulations**  
15 July, Manchester  
With speaker Eric Martin, from Durapipe/Girpi.

**NW Region and SLL: Emergency lighting practices in the UAE**  
22 July, Manchester  
With speaker SLL vice-president, Richard Caple.

**WiBSE: Personal effectiveness 'taster programme' – how to coach yourself**  
30 July, London  
With speaker Dr Helen Zarod.

**HCNW Region: Colourdome in London: The HCNW lighting paper**  
13 August, London  
An introductory talk about colour, with a demonstration from Monocrom on the profound psychological impact of colour.

## Building Performance Conference and Exhibition

3-4 November, London

After the success of last year's event, planning is well under way for the 2015 CIBSE Building Performance Conference and Exhibition programme.

The event will again be held at the QEII conference centre, in Westminster, with more exhibitors than last year, and free CPD sessions being hosted in the exhibition area.

The conference's main focus will be on building performance, highlighting the importance of energy efficiency in achieving well-performing buildings. Programme topics will include: cyber security; lighting and comfort; maintenance; BIM; and new technologies.

The event will also touch on adapting buildings to a changing climate, and will feature real post-occupancy case studies.

Take advantage of the early-bird rate and book your place at [www.cibse.org/conference](http://www.cibse.org/conference)

For information about exhibiting, including packages, visit [www.cibse.org/exhibition](http://www.cibse.org/exhibition)



## Launch of Heat Networks Code of Practice

8 July, London

The new voluntary code of practice on heat networks (district heating) is to be launched at One Drummond Gate, London.

The event, sponsored by CIBSE Patrons, will be attended by CIBSE CHP & District Heating Group chair, Phil Jones, who will be joined by Tim Rotheray, CEO of the Association for Decentralised Energy (ADE), Paul Woods, of Cofely – author of the Code – and representatives from the Department of Energy & Climate Change (DECC). It will be followed by a tour of Pimlico District Heating Undertaking.

Increasingly, district heating networks are seen as key to delivering a low-carbon energy economy. However, if heat networks are to form a significant part of the UK's future energy infrastructure, they need to be designed, built and operated to a high standard to deliver customer satisfaction.

The new code – produced by CIBSE in collaboration with the ADE and DECC – aims to help the industry achieve that goal by raising standards across the supply chain. It covers all forms of district heating, from communal buildings to large, city-wide schemes, and is designed to apply to both new networks and extensions of existing networks.

Members can download the Code from [www.cibse.org/knowledge](http://www.cibse.org/knowledge)

To register for the free launch event, visit [www.cibse.org](http://www.cibse.org)



# CIBSE BUILDING PERFORMANCE CONFERENCE AND EXHIBITION

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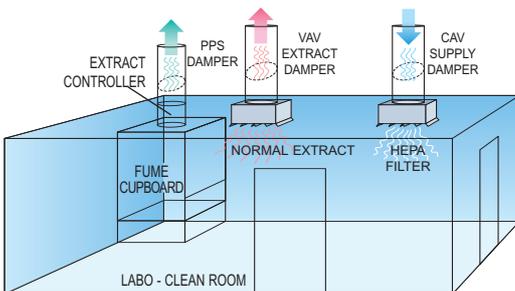


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