

# CIBSE

JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

May 2014



## EMERALD ISLE

Dublin Symposium focuses on sustainability

## CLASS OF YOUR OWN

Engineers go back to school to promote building services

# Natural HABITAT

Atelier Ten's ventilation strategy for WWF's new headquarters

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# Health checks

If the building industry is to tackle the performance gap, it needs more events like the CIBSE ASHRAE Technical Symposium. The two-day conference in Dublin featured numerous research papers pinpointing the reasons for poor building performance, where actual energy use far exceeded the design.

The lack of M&E maintenance and monitoring is a key reason for building failure. With no soft landings buildings are handed over to occupiers who have no understanding of how the systems work, and no way of identifying when services equipment goes out of whack.

A presentation by Aedas' Judit Kimpian on the building performance evaluation (BPE) of three academies and two schools, revealed an alarming degree of dysfunction in the plant room caused by poor commissioning and user ignorance (page 10). For example, unknown to two schools the prime source of energy, the ground source heat pumps, were failing to function. The systems automatically switched to the gas boilers which had a catastrophic impact on energy use.

It's not just the heating and cooling plant that has to be monitored. The interdependence of services with other building components means something as prosaic as leaky doors or disintegrating window seals can torpedo the best of design intentions.

Proof in the value of monitoring has been demonstrated by the iSERV project (page 11) which has monitored thousands of HVAC plant across the EU. By rectifying problematic systems identified through monitoring, the report says electricity savings of up to 33% had been achieved.

The huge potential savings of wide-scale monitoring is plain to see, but engineers must make sure properties are properly metered first. Kimpian's BPEs revealed that energy meters installed in schools, at great expense, were failing to function as expected – it's another commissioning issue that needs ironing out.

The increasing number of recruitment ads in the pages of this magazine is evidence of an industry continuing to emerge from the economic doldrums. At this point in the economic cycle the engineering skills gap becomes more acute. CIBSE's decision to sponsor a school in the Class of Your Own (COYO) initiative will help to point more young people towards a very rewarding career in building services. Read how COYO founder Alison Watson was inspired to promote construction in schools, and find out what CIBSE is contributing on page 26.

**Alex Smith, editor**

asmith@cibsejournal.com



## In brief

### ASHRAE CONFERENCE HEADS TO SEATTLE

ASHRAE's 2014 Annual Conference will take place in Seattle, in the USA, from 28 June to 2 July.

The keynote speakers will be Robert Bryce – one of America's most prominent energy journalists and a senior fellow at the Manhattan Institute – and Denis Hayes, president and chief executive of the city's Bullitt Center.

The conference includes the second ASHRAE Research Summit, which presents HVAC&R research, with particular emphasis on high-performance building design and its role in a clean-energy economy.

For more information, and to register, visit [www.ashrae.org/seattle](http://www.ashrae.org/seattle)

### 'GREEN' IS THE COLOUR OF MONEY

A European project to further integrate energy performance into property valuation has been launched in Brussels.

Studies in several worldwide markets have shown pricing increasingly distinguishes buildings with green features.

RenoValue will develop training for real estate professionals to help them factor in energy efficiency when valuing a property.

Dr Vincent Berruto, head of the energy unit at the European Commission's executive agency for SMEs, said: 'Being able to provide valuers with the right information is essential to accelerate the transition towards nearly zero-energy buildings.'

### A FLUSH OF INSPIRATION

Spending a penny may soon generate an unexpected bonus – renewable energy.

Researchers in South Korea are said to have developed a way to harvest electricity from the movement of water – such as rain cascading down a window, or a loo flushing. The technology is an adapted transducer generated by researchers at Seoul National University and Korea Electronics Technology Institute.

## CIBSE to launch leadership building performance event

### ● Two-day conference to take place on 28-29 October

CIBSE will host a major new conference and exhibition addressing building performance and operation in October at the QEII Conference Centre in Westminster, London.

The two-day Leadership in Building Performance event will enable clients, engineers, designers, contractors and product manufacturers to further explore innovations and best practice to deliver better building performance.



The conference will focus on building performance issues in the private sector during the first day (28 October) and the public sector on day two (29 October). It will also feature case studies from CIBSE's Building Performance Awards.

The event, organised by Step Place Events, is designed to provide 'demonstrable and practical advice' that can be implemented by delegates to improve performance in reality and help to close the performance gap.

The exhibition area will include workshops and 'think tank' forums from leading building services providers, giving real examples of performance benefits with an emphasis on technical development.

Contact Steve Webb on 07545 020458/01892 518877 or email [stevewebb@stepex.com](mailto:stevewebb@stepex.com) for more.

## Embodied carbon database launched

A new, free-to-access web-based tool covering embodied carbon in buildings is now available to all members of the construction supply chain.

The database, developed by the resource efficiency consultancy WRAP and the UK Green Building Council (UK-GBC), will provide embodied carbon values for different building types. It is free to access by the whole building supply chain, including engineers, architects and quantity surveyors, to help them benchmark their designs and identify areas of potential carbon saving.

'Our aim is to create an open, web-based resource for building professionals that will have a real impact

on driving down carbon emissions,' said Gareth Brown, programme area manager at WRAP. 'The resource efficiency that the database will enable brings with it truly measurable gains to the economy, as well as long-term benefits to the environment.'

Arup collected and organised data from across the construction industry and project manager Andrea Charlson said it will 'enable us to take great strides forward in creating greater design sense around embodied carbon, and in meeting challenging carbon reduction targets'.

Visit [ecdb.wrap.org.uk](http://ecdb.wrap.org.uk)



### KING'S CROSS POND DIPPERS SWIM ON THE WILD SIDE

A natural pond for wild swimmers is being created at King's Cross as part of a summer arts programme. The pool, which is currently in planning, has been designed by architect Ooze and artist Marjetica Potrč. The water for the pool will be pumped from Regent's Canal and purified through a natural process using wetland plants. When it closes, the water will be filtered and used to irrigate a nearby park, according to Ooze.

## JOHN LEWIS USES IES TOOL TO MONITOR ENERGY USE

A John Lewis store in Vangarde shopping Park, York is being monitored using a new energy management tool from IES. Low carbon consultants Low Lateral Technologies is importing actual data from the store back into the design model using IES-SCAN. Lateral Technologies design manager Paul Paterson said: 'We're using the tool to import the actual building data into the model so we can continuously analyse the occupied building to identify any performance gaps to deliver a soft landing.' The store features PVs, LED lighting and an energy efficient chiller.



## Poor energy enforcement undermining growth

### ● Government has 'no obvious overall energy strategy', says Hywel Davies

The government regards construction as the 'last unreformed industrial sector', but is failing to enforce the policies that could improve professional standards, according to CIBSE technical director Hywel Davies.

The attitude of Department for Business, Innovation and Skills (BIS) officials is that the industry should either reform itself or 'have reform done to it', said Davies at a recent CIBSE Patrons meeting. He added that the introduction of BIM on public sector projects from 2016 was part of that process.

The government believes that a reformed UK construction sector would have access to a wider range of overseas business opportunities.

But Davies accused the authorities of failing to enforce existing policies and so undermining the industry's attempts to deliver better performing buildings and improved standards. To highlight the point, Davies said that less than 20%



OLURIC / SHUTTERSTOCK

of compulsory air conditioning inspections had been completed, while less than 40% of commercially leased properties had Energy Performance Certificates (EPCs).

Trading standards officers are charged with enforcing these measures and others that fall under the Energy Performance of Buildings Regulations (EPBR), but they have 'more pressing matters to focus on', said Davies.

He pointed out that Landmark Information Group received more than £5 m to compensate

it for the lack of EPCs and DEC's, but the people who trained as energy assessors – encouraged by the government – have not been offered any compensation for the lack of work.

'Organisations like CIBSE that set up certification programmes to help deliver these measures get no support from the government,' Davies told the patrons.

He said that the Treasury was 'absolutely obsessed' with avoiding regulatory burdens. 'They appear to think that being green is in conflict with business growth. You cannot help but conclude that some ministers would like to put most of our sector's regulations in the shredder.'

The absence of engineers from the policy process leads to unintended regulations, requiring people to put renewables on 'hopelessly inefficient buildings because policy-makers did not understand the principle of the energy hierarchy', said Davies, pointing out that many individual measures were in place but 'no obvious overall energy strategy' underpinned them.

● Read Thomas Briault's views about how Part L changes are penalising CHP on page 20.

## Top firms don't understand built environment

Many of the UK's top companies do not have a good enough understanding of built environment issues to make informed investment decisions, according to a new industry report.

A survey of FTSE listed companies, commissioned by University College London's

(UCL) Bartlett faculty of the built environment, found that reducing carbon emissions is the main built environment concern they expect to face over the next 30 years.

However, more than 80% of respondents said there needed to be a better understanding of this subject at board level to preserve

global competitiveness. The survey revealed that most finance directors fail to focus on carbon factors when making financial decisions.

The Bartlett's Dean Alan Penn said that companies would have to harness the built environment to create the products and services

needed by a 'sustainable, resilient and secure world'.

'To do this we will need to educate a new cadre of business leaders, so they are as well versed in the systems that govern the built environment as they are in the administration of business itself,' he said.

## Movers and makers

Send your job moves to  
[editor@cibsejournal.com](mailto:editor@cibsejournal.com)

### Peter Verkempynck



has been appointed general manager of Daikin Europe's Heating Strategic Business Unit with immediate effect. He was previously managing director at Daikin

UK. Dirk Slagmulder becomes managing director of Daikin Airconditioning UK. He joins from Daikin's South Africa operation. Previously, he worked as department manager, finance and a senior corporate planner for Daikin Europe in Belgium.

### Liam Elmore



has joined boiler and water heater manufacturer Lochinvar as UK sales manager. He was formerly northern regional sales manager for Hamworthy Heating and specification

manager for Worcester Bosch.

'This is a key appointment for us at an important time,' said Lochinvar managing director David Pepper. 'We are seeing a surge in demand right across our product portfolio as the recovery picks up. Liam is going to be a busy man.'

### Sophie Chisholm



has joined Acclaro Advisory as principal consultant: energy and the built environment. She is also programme and technical manager at CBX, the public forum for building

energy professionals. Chisholm was previously at Aedas R&D as a building performance specialist where she worked on the CarbonBuzz data platform launch. She lectures at Oxford Brookes University and is also technical officer for CIBSE Young Energy Performance Group.

## Fair payment charter must be properly enforced

### ● Charter promises 30-day payment terms by 2018

Sub-contractors will continue to suffer from late payments unless a new fair payment charter is properly enforced, according to CIBSE.

The Institution welcomed the Construction Supply Chain Payment Charter drawn up by the Construction Leadership Council but said that without proper monitoring there was a risk some contractors would continue to cripple the supply chain with late payments.

Hywel Davies, CIBSE technical director, said: 'In principle this charter is a positive step. However, it needs to be adopted widely to benefit the supply chain, and not widely ignored like air conditioning inspections.'

The charter commits firms to payment terms of 30 days by January 2018, and 60 days with immediate effect. By June 2015 the charter's signatories will have to commit to payment terms of 45 days.

Nine companies have so far signed up to the charter including British Land, Imtech UK, Kier, Laing O'Rourke,



Skanska, Barratt Developments and Berkeley Group.

The Construction Supply Chain Payment Charter contains 11 Fair Payment Commitments including a commitment to use Project Bank Accounts on central Government contracts and an

ambition to move to zero retentions by 2025.

The Construction Leadership Council is the body appointed to oversee the delivery of the government's Construction 2025 strategy.

Contractors have been accused of undermining the economic recovery by failing to pay their supply chain fairly and on time.

Many sub-contractors say they are forced to wait at least six months for payment after completing projects, or more than 60 days for interim payments, despite improvements in workloads and trading conditions, according to industry groups.

## Crowdfunding boost for Liverpool urban park feasibility study

A 'crowdfunding' campaign has raised £40,000 to kick-start a project to turn a derelict flyover in Liverpool into an urban park.

The Friends of the Flyover group raised the money from 360 contributors through the crowdfunding website Spacehive.

It will be used to fund a feasibility study to assess their plan to turn the flyover into a 'promenade in the sky' with space for arts events, markets, cafes, shops and community gardening projects.

The campaign was set up by local business people after the

council announced it would spend £4 m demolishing the flyover.

The group's campaign, which is backed by Liverpool City Council, wants to use the flyover as a catalyst to reconnect the existing residential communities in north Liverpool with the city.

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



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# IPCC predicts huge worldwide residential demand to keep cool



TONIFLAP / SHUTTERSTOCK

## ● Growing middle-class now able to afford technology

The warming climate – allied to improved economic circumstances – will drive rocketing demand for air conditioning, according to the UN Intergovernmental Panel on Climate Change (IPCC).

A growing international middle-class able to afford mechanical cooling will spend more money on the technology to offset the impact of rising temperatures, claims

the latest report from the United Nations-backed scientific body.

It expects demand for residential air conditioning in summer to rise by a factor of more than 30 by the end of the century – from approximately 300 terawatt-hours (TWh) in 2000 to 4,000 by 2050 and then onto more than 10,000 TWh in 2100, scientists said.

The report puts 75% of the growth down to increased spending power in emerging markets – the rest will result from the direct impacts of climate change.

The IPCC also predicts that heating demand in developed countries will fall as winters get warmer, but the potential negative impacts of climate change on global energy supply outweigh any such benefits.

The report also pointed out that ‘thermal power plants’, which provide about 80% of global electricity, are less efficient in higher temperatures and are more difficult to keep cool when local water supplies heat or dry up.

# Egypt bans low-temperature air conditioning imports

The Egyptian government has announced a ban on the production and importing of air conditioning units that can be set to cool below 20°C, as part of an attempt to tackle a looming energy crisis.

Widespread power cuts are expected later this year because of lack of investment in energy infrastructure following the country’s political upheaval. Power generation in Egypt is largely dependent on natural gas, which is now in short supply, according to Reuters news agency.

The government predicts electricity production will fail to meet surging domestic demand once the hot summer months begin. The ban on some types of air conditioning will help to ease ‘the burden on Egyptian families’ according to Trade, Industry and Investment Minister Mounir Fakhry Abdel Nour.



MICHAEL DAWKINER / SHUTTERSTOCK

## Smartphone app ready to control buildings

Building managers should be able to take closer control of their own lighting and air conditioning via a new smartphone app, according to the manufacturer Philips.

An integrated view of a building’s occupancy patterns and energy usage will enable more informed decision-making and improved levels of energy and operational efficiency, the company said.

The app uses Power-over-Ethernet (PoE) to connect office lighting fixtures to a building’s IT network. The lighting system acts as an information ‘pathway’, enabling workers to control and access lighting and other building services, including air conditioning, via their smartphones.

The system can also be fitted with sensors to capture anonymous data on room occupancy, temperature and humidity, so facility managers can use real time and historical data to determine temperature and lighting settings based on occupancy patterns and energy use.



KOSTENKO MAXIM / SHUTTERSTOCK

## Getting on board with BIM

A survey has found that 70% of those who use building information modelling (BIM) believe it has given them a competitive advantage.

However – while awareness of BIM is almost universal, at 95% – only 27% of respondents said they ‘trusted what they hear about BIM’. More than 1,000 people from across the construction industry took part in the annual NBS National BIM survey, and 54% said they now use BIM. Among the benefits they cited are: improved productivity; increased efficiencies; better coordination of information; and higher profitability.

## Green jobs boost

Eight major renewable electricity projects supporting more than 8,000 green jobs have been unveiled by the government.

The government said the projects could generate up to £12 bn in private sector investment, and add 4.5 GW of low-carbon electricity to Britain's energy mix, generating enough clean electricity to power more than 3 million homes.

The projects are expected to provide 14% of the UK's renewable electricity by 2020 and include offshore wind farms, coal to biomass conversions and a dedicated biomass plant with combined heat and power.

Energy and climate change secretary Edward Davey said the contracts marked a 'new stage in Britain's green energy investment boom.'

'These are the first investments from our reforms to build the world's first low carbon electricity market – reforms which will see competition and markets attract tens of billions of pounds of vital energy investment.'

# Poor commissioning major cause of performance gap

## ● Technical Symposium talks identify key issues

Poorly commissioned buildings are a major cause of poorly performing buildings, according to evidence presented at the CIBSE ASHRAE Technical Symposium.

Judit Kimpian, director of sustainable architecture and research at Aedas, spoke about a paper on energy use in non-domestic buildings that featured building performance evaluations (BPE) of two schools and five academies.

The research revealed that actual energy consumption was between 1.2 and 2 times higher than predicted, and heat consumption was between 1.5 and 6 times higher.

The excessive heat consumption was found to be associated with BMS commissioning shortfalls and



Read more on the Symposium on page 24

lack of seasonal commissioning, meaning set points and hours of operation were often higher/longer than that assumed in design calculations.

Poor commissioning meant ground source heat pumps at two schools failed to operate. The report says good M&E aftercare and energy monitoring would have avoided this issue.

Fans unnecessarily running at maximum power increased energy use as well as noise issues.

The paper said the research highlighted the risks of opting for mechanical ventilation where commissioning and maintenance expertise is unlikely to be available.

Another BPE of an 'exemplar eco-housing' development revealed a host of problems, caused primarily by poor installation and commissioning of low carbon technologies, plus complexity of control interfaces. The paper by Rajat Gupta, professor of sustainable architecture and climate change at Oxford Brookes University, said some discrepancies were due to errors or omissions in briefing, specification and construction, while others were the result of occupants not understanding the design intentions and systems operation.

**L**OWER  
**P**RICE  
**G**UARANTEE

# Monitoring has potential to cut building electricity use by 33%

## ● iSERV project reveals potential annual savings of £6 bn across the EU

Closely monitoring buildings can cut electricity use by 33%, a European research project has revealed.

The iSERV project analysed energy use data from 1,854 HVAC systems in operational buildings across 16 EU Member States.

The project demonstrated annual building electrical savings of between 19% and 33%, or 61 to 100 kWh/m<sup>2</sup> per year. This meant savings of €7 to €13/m<sup>2</sup> per year (£6 to £11/m<sup>2</sup> per year), were delivered.

iSERV works by analysing real sub-hourly automatic meter data to detect if various HVAC components are exceeding their energy and power outputs.

It provides bespoke energy consumption benchmarks for individual HVAC systems by drawing on a continuous and growing data pool from buildings around Europe.

At an iSERV workshop last month, project coordinator Ian Knight said that adopting the programme could lead to potential annual EU savings of more than £6 bn, and could save up to 4% electricity use across Europe.



PHOTOHOUSE / SHUTTERSTOCK

'We do not see a building as a building. We see a building as a collection of activities and spaces,' Knight said.

However time and cost investment is required, he added, as well as motivation for people to get involved. 'But once people get information that's specific to their system, they are more likely to take action.'

Consultant Roger Hitchin said that the programme provided diagnostic information and flagged up issues that an inspector may miss on a single visit.

Over time, iSERV will look to link climatic information to the anonymously supplied data sets.

● To sign up, visit [www.iservcmb.info](http://www.iservcmb.info)

## FETA fights off 'extreme' F-Gas proposals

The new F-Gas Regulation is an example of what positive lobbying and industry unity can achieve, according to the Federation of Environmental Trade Associations' (FETA) chairman.

Speaking at the federation's 30th anniversary lunch in London, Mike Nankivell said the industry had managed to 'challenge the most extreme proposals' put forward by some pressure groups, so the final version of the revised regulation was more practical and sensible.

'The outcome of the F-Gas Review illustrates very well what a trade body can do,' he said. 'We were never going to win on every point, but by being tenacious, by working with colleagues in other national and European organisations, and through our close ties with officials in DEFRA, we were able to influence the review to the benefit of our members.'

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## Hydraulic link lifts New South Wales

New South Wales (NSW) chairman, Paul Angus ACIBSE, based in Sydney, was recently invited to a meeting of the Association of Hydraulic Services Consultants Australia (AHSCA).

The AHSCA NSW president, Roger Chance, talked of forging international links with CIBSE – and, in particular, the Society of Public Health Engineers, with which Angus has a long association.

Angus then presented AHSCA with a complimentary copy of the newly revised *CIBSE Design Guide G Plumbing and Public Health Engineering*.



## Test yourself on Part L regs

Part L of the 2013 Building Regulations, which came into effect last month (April) should be of interest to everyone involved in the energy performance of buildings community.

To help you assess your understanding of the changes to the regulations, CIBSE Certification has developed an online assessment.

For more information – or to register for the exam – visit [www.cibse.org/partlexam](http://www.cibse.org/partlexam)

## Extreme environments explained

CIBSE has developed a new publication, *Buildings for extreme environments: Arid*, the first of a three-part series that will also deal with polar and tropical climate zones. *Arid* replaces *TMO4*, and is available from [www.cibse.org/knowledge](http://www.cibse.org/knowledge)

# Classroom air quality still worryingly high

## ● CO<sub>2</sub> levels cause for concern says Chris Iddon

Concerns voiced by Florence Nightingale over air quality in schools in the 19th century are still relevant, according to SE Controls design manager Chris Iddon. He told the CIBSE Natural Ventilation Group that CO<sub>2</sub> levels were worryingly high in classrooms, 154 years after the founder of modern nursing described classroom air quality as 'horrid'.

More than 100 delegates attended the Developments in Indoor Environmental Control seminar at the RIBA-award-winning Loughborough University Design School (LDS), which is naturally ventilated using advanced control technology.



The event, sponsored by SE Controls, explored the design and operation of natural ventilation control strategies – from both technical and end-user perspectives – and the interrelationship between CO<sub>2</sub> levels, building design and energy management.

Senior lecturer Victoria Haines

(LDS) showed what can be learned about non-domestic building design from the way people use their homes, while Kevin Couling, Aecorn associate director, took the audience on an tour of the BSRIA Soft Landings framework. Mike Entwisle, Buro Happold director, provided a valuable reminder that building performance success comes from 'simple stuff done well'.

Hoare Lea gave a presentation on the design of the LDS, and Ben Jones (University of Nottingham) presented 20 'rules of thumb' for delegates to take away. The day ended with a tour of the LDS, led by the building's users. See images from the conference at [www.cibsejournal.com/app](http://www.cibsejournal.com/app) or on your browser/Android device via [www.cibsejournal.com](http://www.cibsejournal.com)

## YEPG dragons tackle ratings schemes

Environmental rating systems were dissected at a *Dragon's Den*-style event organised by the CIBSE Young Energy Performance Group (YEPG) last month. Held in conjunction with Buro Happold and the UK Green Building Council (UK-GBC), the event focused on how the current ratings could remain relevant and encourage truly green building.

It follows a previous debate, held by the UK-GBC, which found that rating tools weren't fulfilling their objectives. In response, YEPG looked at what might improve the system.

Seven experts pitched ideas that they thought could enhance the ratings with regards to design, assessment or operational performance. Strong themes included: the need for engaging and up-skilling occupants; better benchmarking; the issue of residential stock; the significance of using existing mechanisms rather than reinventing the wheel; and the need for a standardised approach.

The YEPG will work with the UK-GBC to develop a position paper building on these activities. Follow us on Twitter @CIBSEyepg

## CIBSE backing energy exhibition

CIBSE is supporting the Energy Management Exhibition (Emex) – which takes place at ExCEL, in London, on 19 and 20 November 2014 – and is offering members exclusive event discounts.

Emex is aimed at anyone who is responsible for reducing their organisation's energy consumption, and will look at

how companies can address the challenge of rising energy bills.

The exhibition will include four educational seminar theatres, with case studies, research, and expert presentations providing essential knowledge and information on important legislative changes and industry developments.

CIBSE Certification experts will

be available on the CIBSE stand throughout the event to answer your questions regarding EPCs, DEC's, air conditioning inspection reports, and Green Deal advice reports, and to offer carbon-reduction advice.

For more information, and to register your interest, visit [www.cibse.org/emex](http://www.cibse.org/emex)

# For they are jolly good Fellows – and so say all of us!

## ● Recognising CIBSE Fellows' contribution to the Institution and the industry

CIBSE would like to acknowledge the substantial contribution its 950 plus Fellows make to the Institution.

As well as being active members, they help to shape the future of the building services industry.

We recognise that there are a large number of members – working at a senior level – who may be eligible to apply to be a Fellow, but have not thought about upgrading their membership.

The Fellow grade is CIBSE's most senior level, and recognises excellence in engineering achievement in the building services sector. It also acknowledges that a significant contribution to the profession has been made. There are many ways you could be giving back to the industry and the Fellow grade recognises this, in addition to your technical expertise.



You can consider fellowship at any stage of your career, if you meet the criteria – visit [www.cibse.org/fellow](http://www.cibse.org/fellow) for full details. Our youngest Fellow is 35, which demonstrates that you can achieve a substantial level of responsibility at an early stage of your career.

You could be: working in industry or academia, and shaping the future of the industry; be providing advice and mentoring to others interested in building services; supporting colleagues/staff members with

professional development; attending careers events and encouraging young people into the industry; sitting on CIBSE panels and working groups; or volunteering in your region.

If you are already MCIBSE the process is easy. CIBSE Fellow Jennifer Bousfield said: 'Having sat down and put pen to paper, I found the application process relatively straightforward. I would advise others considering upgrading to Fellow to go for it – don't put it off until tomorrow.'

CIBSE accepts applications for Fellow any time during the year. CIBSE Fellow Geoff Prudence said: 'You will be surprised at how much you have achieved when you sit down and reflect on it.' Bousfield and Prudence's case studies are available at [www.cibse.org/membercasestudies](http://www.cibse.org/membercasestudies)

Interested? Contact us on [membership@cibse.org](mailto:membership@cibse.org) or call +44 (0)208 772 3650. We will be arranging Fellows briefings in the UK for those interested in upgrading – details will be available soon on [www.cibse.org/briefings](http://www.cibse.org/briefings)

## Hong Kong celebrates 35 years

CIBSE Hong Kong branch celebrated its 35th anniversary with a dinner held at the JW Marriott Hotel in Hong Kong. It was attended by more than 470 guests, including government officials, university representatives, and 35 firms of building services consultants, contractors and suppliers.

The guest of honour was Dr York Chow, the former secretary for food and health of the HK SAR government, and now chair of the Equal Opportunities Commission of Hong Kong.

Dr Chow said CIBSE had helped to shape high-quality, safe, reliable and efficient building services engineering practices for Hong Kong, evidence of which he had seen through the completion of the



many complex hospitals in the region.

CIBSE President George Adams praised the branch's achievements and growth over the past 35 years, and shared its vision of CIBSE as being a truly international institution.

The gala dinner also featured the award of scholarships to outstanding students from four universities. Visit [www.cibse.org/hk](http://www.cibse.org/hk)

## YEN debates will embrace other institutes

The Young Engineers Network (YEN) has announced a series of centre-based debates on topics affecting the global built environment. These have been designed to increase awareness of the Network, and to build relationships with other institutes and industry organisations.

The move comes after the annual YEN chairs' conference, which followed the ASHRAE/CIBSE Technical Symposium 2014. Fifteen YEN chairs and vice-chairs – as well as Andrew Saville, YEN mentor, and Hywel Davies, CIBSE technical director – met over two days in Dublin.

Delegates included Lindy Stephens, chair of YEN ANZ, and Chris Kwan and Mandy Wong, chair and vice-chair of the Hong Kong Centre. The talks concluded in a proposal to hold next year's conference in Hong Kong, to reinforce the international status

of YEN. The Hong Kong Centre attends many UK conferences, and support to progress with the proposal has come from CIBSE chief executive Stephen Matthews.

Carla Bartholomew (below), YEN South West chair, said: 'The effort and dedication of YEN chairs in attending these conferences highlights the unity among YEN. The conferences encourage sharing of ideas to help support our centres, the network and increase membership.' For more details, visit [www.cibse.org/yen](http://www.cibse.org/yen)





## New members, fellows and associates

**FELLOWS**

- Benn Robert David**  
Purley, UK
- Conaghan Patrick Roger Thomas**  
London, UK
- Featherstone David**  
Kettering, UK
- Goodwin Colin John**  
Sevenoaks, UK
- Hawes Andrew Mark**  
Tunbridge Wells, UK
- Jones Darren Anthony**  
Worthing, UK
- Kwong Kar Sing**  
New Territories, Hong Kong
- Lagos Arcangel**  
London, UK
- Lo Man Wai**  
Lai Chi Kok, Hong Kong
- Lyndon Karl**  
Bath, UK
- Morgan Belinda Catherine**  
Redditch, UK
- Mumovic Dejan**  
London, UK
- Shack Hon Ying**  
Lamma Island, Hong Kong
- Smith Graham Philip**  
Ivybridge, UK
- Steed Simon David**  
Alcester, UK

- Wheal Richard James**  
London, UK
- Wright Andrew John**  
Oakham, UK

**MEMBER**

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Midway City, Singapore
- Connelly Horsley Andi**  
Newcastle upon Tyne, UK
- Bujwid Marcin Zygmunt**  
Glasgow, UK
- Cheung Ricky**  
Tsuen Wan, Hong Kong
- Choy Tat Sang Eddy**  
Tsing Yi, Hong Kong
- Chu Chi Kin**  
Kowloon Tong, Hong Kong
- Corless Gerard Anthony**  
Lantau Island, Hong Kong
- Dobson Philip**  
Kampala, Uganda
- Drain Francis**  
Belfast, UK
- El Choufani Elie**  
Dubai, United Arab Emirates
- Flynn Damien**  
North Sydney, Australia
- Fong Kam Kin**  
Shatin, Hong Kong
- Garcia Garcia Mariano**  
Ilford, UK

- Heugh Nigel Philip James**  
Addlestone, Surrey, UK
- Hubbard Stephen James**  
Ipswich, UK
- Hung Kong**  
Kowloon, Hong Kong
- Jam Yiu Pong**  
Hung Hom, Hong Kong
- Jones Christopher Thomas**  
Dubai, United Arab Emirates
- Lam Hui Shan**  
Tsuen Wan, Hong Kong
- Lam Chi Chung**  
New Territories, Hong Kong
- Lam Chun Ning**  
Tseung Kwan O, Hong Kong
- Lam Ka Leung**  
Hung Hom, Hong Kong
- Lau Mei Wan**  
Kennedy Town, Hong Kong
- Leung Ming Fai**  
Tsuen Wan, Hong Kong
- Liu Yee Mei**  
Siu Sai Wan, Hong Kong
- Man Wing Leung**  
Tai Kok Tsui, Hong Kong
- Mohammed Imran Khan**  
Doha, Qatar
- Mohammed Husam**  
West Bay, Qatar
- Morris Andrew James**  
Bingley, UK

- Naguib John**  
Doha, Qatar
- On Hing Yip**  
New Territories, Hong Kong
- Pinillos Villaescusa Ricardo**  
London, UK
- ShamHo Kai**  
Cheung Sha Wan, Hong Kong
- Singh Harbinder**  
Redditch, UK
- Tsang Hon Po, Paul**  
Tai Po, Hong Kong
- Tse Shun Kit**  
Ma On Shan, Hong Kong
- Wegner Marc**  
Westport, Republic of Ireland

**ASSOCIATE**

- Houlker Matthew**  
Preston, UK
- Miyangar Rickesh**  
Leeds, UK
- Norton Michael Robert**  
Hull, UK
- Saunders Alan David**  
Pershore, UK
- Ujoodha Neeteel**  
Montagne Blanche, Mauritius

**LICENTIATE**

- Bennett David**  
Southampton, UK
- Burfit Andrew Brian**  
Newton Abbey, UK

- Culling Ashley James**  
Norwich, UK
- Dady Harry James**  
Sittingbourne, UK
- DeLuca Richard**  
Oxford, UK
- Fenwick Sion**  
Cardiff, UK
- Fems Edward**  
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London, UK
- Hickman Mark**  
Rowley Regis, UK
- Huggins Stuart**  
London, UK
- Ramsook Amy Jennifer**  
London, UK
- Stewart Callum**  
Glasgow, UK
- Thompson Philip**  
Norwich, UK
- Upton Richard**  
Gosport, UK
- Vieira Nicolas**  
London, UK

**FELLOWS**



**Belinda Morgan** has 30 years of experience in the building services industry, creating

successful teams to deliver quality solutions for her clients. She has been a partner/director for the

past 14 years, and has extensive experience in numerous sectors. After 25 years with her previous company, Morgan recently joined Cundall as a partner, and will be helping them to build their Birmingham presence after a very successful first 10 years. Morgan is proud to have joined Cundall, which she describes as a proactive business with technical excellence at its heart.



**Dr Arcangel Lagos** is a passionate energy sector professional, with a PhD in

thermofluids science and a Master's in energy engineering from South Bank University. A consultant with more than 25 years' experience,

he carved out a successful building services career within a global blue-chip organisation, and now works with a 'Big Six' UK energy supplier. Dr Lagos has been involved in mentoring schemes, bringing new talent to the industry and developing future leaders in the energy sector. He is a CIBSE-certified low-carbon consultant in building design, and holds numerous professional accreditations.

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EXTERIOR BUILDING PRODUCTS

# @ Feedback

On LinkedIn this month: The task of developing new laws and methods to guide a building's relationship with its neighbours; and what is causing the skills gap in our industry?



PCRCATTI / SHUTTERSTOCK

## Thinking outside the box and beyond the building

*Mike Barker*

The effectiveness of a building's design – and hence its running cost – is increasingly dependent on its surrounding neighbourhood.

As CIBSE members we should consider the difficult task of stepping forward to lead the development of new laws and methods to guide a building's relationship with its neighbours.

*Michael Ney*

It's not just sunlight 'stealing' that is the problem, but sunlight redirection as well. Buildings that have functioned perfectly well for 100 years without air conditioning suddenly find themselves subjected to searing reflected sunlight, and their building is not suitable for retrofitting with air conditioning. Buildings with north light roofs, to give diffuse lighting to a machine shop, for example, suddenly find dazzling glare

from rotating chucks on lathes, saw-blades and other shiny bits of machinery that can cause injury because another glazed building now reflects sunlight from its south-facing façade into their north-facing roof lights, which never got any sun before. Where does the liability lie for injuries caused to a tool-operator because he was dazzled by the reflected sunlight? Who pays for the diffusing screens to protect the north lights from unwanted solar gain?

*Julie Ann Fletcher*

If a building's view of the sky is blocked by another surface at any point, there will be an interdependent energy relationship that will have an implication for both building energy management and pedestrian comfort. These relationships are both dynamic (governed by the sun's path) and static (blocking outgoing radiation, resulting in the nocturnal canopy layer urban heat island). Managing these relationships is incredibly problematic on several counts, including;

- There are no tools to evaluate the

resultant performance patterns

- UK cities are already built, therefore new buildings have to fit in with existing infrastructure
- There is no current methodology to evaluate either building or urban form as an energy management parameter, where form is driven by planning laws and net-floor area.

Building energy management is considered to be resolved through the regulated load and, as highlighted by the selfish [building] giants, the net-effect on urban energy management is overlooked.

## Is the industry about to fall off a skills cliff?

*Rob Boyer CEng MCIBSE*

I must stress, anecdotally, there appear to be fewer and fewer top-level engineers. Of course, the higher up the pyramid you go, you would always expect a smaller choice, but a chasm of experience seems to be developing.

*Rob Farman CEng MCIBSE*

If the perception is borne out by fact, then there are, possibly, two explanations. Firstly, it may be the effect of 'baby-boomers' retiring; and, secondly, in that generation, there was much more investment in technician apprentices and undergraduate sponsorship (sometimes, the former became the latter). In the 1970s, 80s and 90s, many organisations cut back on such 'seed corn' investment and people warned it would have an effect like that described. Only now are apprenticeships coming back, and more people taking engineering degrees.

*Catherine Simpson CEng FCIBSE*

I think this began to happen a while back when we stopped valuing and replenishing our 'engineering stock' and skills became second grade to virtual skills, such as IT and finance. The demise of industry as a foundation to the economy was when we fell off the

Without responsibility, no quest for excellence will be complete

cliff. We need to recognise the problem we have and plan for our ascent. A nationwide marketing campaign would be great to show that there still are a lot of skills reviving and emerging, a process which is essential to start rebuilding the industrial economy and our engineering stock.

**Jeanne Parker-Weekes**

Encouraging registration with professional bodies would also assist. I have seen a growing trend with junior technicians who would prefer not to become registered because ‘they do not want the responsibility’ of signing off on their own work.

If business were to offer a financial recognition of those individuals who are willing to accept responsibility, it might encourage a change in mindset to respect all ‘professional’ knowledge that previous generations acknowledged. Without responsibility, no quest for excellence will be complete.

**Eric Asquith**

I have given a number of presentations to colleges and schools and, compared to the glamour of other career choices, building services comes way down the list! I like to think that I have satisfied that doubt as a ‘motivational speaker’, as I can gradually bring them up-to-date with all the changes and inspiring things that are happening now, with new technologies being introduced and more opportunities to bring buildings alive than ever before.

We are a bit set in our ways, but this is changing as youngsters come into industry with their own way of seeing things, and we ‘baby-boomers’ are helping them ease into a very difficult profession. Integration of the two

spectrums ensures our industry for many years to come.

**Graham Hazell**

The UK attitude to engineers (being undervalued) is a significant factor, but all in the industry must take individual and collective responsibility. We have not invested adequately in training, allowing numerous courses to close. The frequent lament of not providing training because trainees leave afterwards would not hold water if you valued them and kept their pay and conditions commensurate with their replacement cost.

While our institutions have promoted only one, very academic route to ‘qualification’, those excellent HND/HNC-type personnel have all but disappeared. We need skills at all levels, but there has been too much elitism and segregation. What exists between craft apprentice and undergraduate?

**Parker-Weekes**

A paper qualification does not necessarily denote expertise, but it has encouraged many professionals to disregard the skills base that exists among craftsmen. Professionals require hands-on experience to discover the ‘realities’ of the building industry, and this is where the old apprentice system worked really well: junior professional staff interacted with craftsmen, and learnt from on-site experience.

*CIBSE Journal* welcomes readers’ input, whether it be letters, opinions, news stories, events listings, humorous items, or ideas and proposals for articles.

**Please send all material for possible publication to: editor@cibsejournal.com**, or write to Alex Smith, editor, *CIBSE Journal*, CPL, 275 Newmarket Road, Cambridge, CB5 8JE, UK. We reserve the right to edit all letters.



# Your letters

This month: The phonetic interpretation of technical terms, and the way tracing paper can be used to explore design solutions



**Say what you see**

Following my letter some time ago on the perils of engineers’ spell-checker roulette, I have uncovered a few more unlikely images [one above] arising from what must surely be a phonetic interpretation of technical or contractual terms. Although they are all genuine – in the sense that I found them in emails, rather than made them up – some may be due to a (necessarily nameless) individual’s unique approach to spelling, rather than totally down to his computer mangling the sense of his words. To quote a distant colleague: ‘It’s a good job he is not working in Norfolk because you know how he would spell that’.

*Peter Hill, MCIBSE*

**Tracing paper – a simple platform to explore ideas?**

The following is a response to *Don’t Bin the Yellow Trace Just Yet* from the February 2014 *CIBSE*

*Journal* by Geoffrey Palmer.

I must compliment the author for his excellent position about the use of simple and inexpensive tracing paper to explore and challenge design solutions.

Design is all about exploring multiple ideas and concepts before they become concrete. Tracing paper is a simple platform to doodle or sketch on, overlay competing solutions and, if necessary, throw away.

It can be done at a desk, at a conference table with a colleague or even at a pub on a napkin or coaster.

I know that engineers love technology. I’m no exception,

Our architect friends do understand design better than we do. Maybe it’s because they use tracing paper to develop ideas

as I’ve been a proponent of BIM since the 1990s. However, engineers default to BIM as the alternative for design. They create a BIM model but have no understanding of the relationships between the numerous engineering

components, architecture and operation and maintenance requirements. And, once the BIM model is created it’s almost impossible to change it.

I’m afraid that our architect friends do understand design better than we do. Maybe it is because they use tracing paper to develop and formulate ideas prior to committing to technology.

*William T. Freeman, PE LEED AP BD+C*

*President, Soli Deo Gloria*

# OPPORTUNITY OR CHALLENGE?

The government is about to implement Article 8 of the Energy Efficiency Directive, requiring large organisations to undertake energy audits. Hywel Davies explains what this may mean

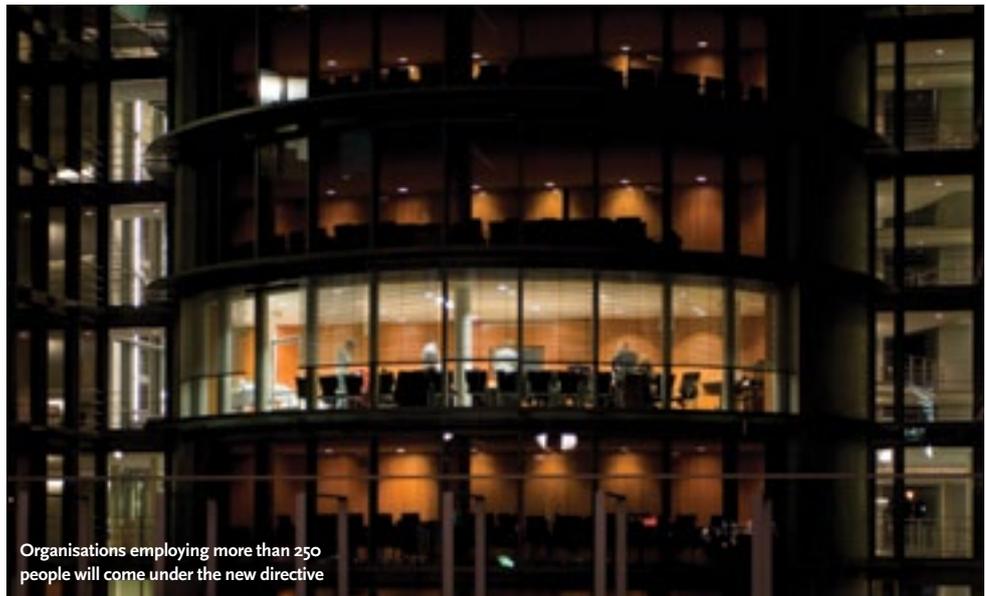
Article 8 of the Energy Efficiency Directive (see box), adopted in November 2012, requires the introduction in all EU Member States of regulations for energy audits in all large organisations to assess their energy use and how to reduce it.

The Department of Energy and Climate Change (DECC) is introducing the Energy Savings Opportunity Scheme (ESOS) to implement Article 8. ESOS will establish a programme of regular energy audits for large organisations. The Directive defines these organisations as those that are not SMEs, so ESOS is likely to cover all organisations, including partnerships and non-profit-distributing bodies, employing more than 250 people or with a turnover exceeding £42.5m, or who belong to a corporate group containing a large organisation. ESOS is not expected to cover public bodies.

Those who meet the definition on 31 December this year are expected to fall within the scope of the scheme, so what will they have to do? In the simplest terms, they will have to measure their current energy use, in buildings, for transport and for industrial processes, identify cost-effective measures to improve their energy efficiency, and report that they have done this to the appointed scheme administrator.

The ESOS assessment will have to be overseen by an accredited lead assessor. This is expected to be someone already on, or who joins, an existing register of individuals competent to assess energy efficiency. DECC has listened to advice from many in industry – and to professional bodies such as CIBSE – and decided that there are already sufficient competent individuals available, and schemes which recognise their competence, so there need not (yet) be another government scheme for ESOS assessors.

Instead, schemes such as CIBSE's



KASPAS GRINAUDS / SHUTTERSTOCK

Organisations employing more than 250 people will come under the new directive

## WHAT THE ENERGY EFFICIENCY DIRECTIVE SAYS ABOUT ENERGY AUDITS

Article 8 of the Directive covers 'Energy audits and energy management systems'. It says that 'Member States shall promote the availability to all final customers of high-quality energy audits which are cost-effective and:

- (a) carried out in an independent manner by qualified and/or accredited experts according to qualification criteria; or
- (b) implemented and supervised by independent authorities under national legislation.'

These may be carried out by in-house experts or energy auditors.

Annex VI of the Directive sets out the minimum criteria for energy audits under Article 8, and states that organisations already certified to ISO 50001 meet the requirements of Article 8. Audits are to cover energy used in 'buildings or groups of buildings, industrial operations or installations, including transport'.

Member States must require 'enterprises that are not SMEs' to have 'an energy audit carried out in an independent and cost-effective manner by qualified and/or accredited experts or implemented and supervised by independent authorities'. The first audit must be carried out by 5 December 2015, and then at least every four years. They must also 'encourage' SMEs to do likewise.

'SMEs' means enterprises which employ fewer than 250 and which have an annual turnover not exceeding €50 m, and/or an annual balance sheet total not exceeding €43 m, which means that some organisations with a small number of staff but a large turnover or balance sheet will need to have an audit.

registers of Low Carbon Consultants, or the IEMA Environmental Auditor Scheme, or the Energy Institute Register of Certified Energy Professionals, will be assessed against the competence requirements for ESOS lead assessors, and those schemes that cover the competences for ESOS will be so recognised. Those already belonging to the schemes will then be able to act as ESOS lead assessors, subject to undertaking some induction training and assessment.

Lead assessors are not expected to be experts in all aspects of energy use. They will be allowed to bring in specialists to cover specific aspects of an assessment, where needed. They will also be able to use existing data. So where an organisation already has data on the energy its buildings use, it may use this data for its ESOS assessment. It will also be able to use Display Energy Certificates or Green Deal assessments to provide data, as well as recommendations on cost-effective improvements. And those organisations that are certified to ISO 50001 will be able to use their certification to demonstrate ESOS compliance.



DECC estimates that implementing ESOS could lead to £1.7bn in net benefits to the UK, with the majority of these being directly felt by businesses as a result of energy savings. Whilst there is some concern about the potential costs of ESOS, it is hard to argue that it is good management not to understand the total energy use within a business, not to know how to reduce it by cost-effective measures, and not to have a plan for adopting those measures.

ESOS is an opportunity to deliver significant energy savings at a reasonable cost, cutting business costs and UK energy demand

Recognising existing energy auditing competence, and not creating a new, ESOS-specific, scheme and adopting multiple routes to demonstrate compliance should minimise the costs of ESOS. But some organisations have received advice suggesting that the cost of ESOS compliance could run to six figures for one organisation.

Once the regulations and summary scheme requirements are available, probably in early June, those claims can be tested and will probably be found to exaggerate the costs of scheme compliance significantly.

CIBSE will seek approval for Low Carbon Energy Assessors to act as ESOS lead assessors, providing additional value for those on that register. As more detail is published, we will be keeping members informed. Meanwhile, ESOS is an opportunity to deliver significant energy savings at a reasonable cost, cutting business costs and UK energy demand.

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

## OVERHEATING CLAIM UNDERMINES FAITH IN PART L



*RICS analysis claims buildings designed to new Part L will overheat, says David Fitzpatrick*

We need a serious pause for thought over the Building Regulations.

It seems that many buildings designed to conform to the new Part L will actually be less energy efficient than those built to the 2010 version. How crazy is that?

This extraordinary claim has emerged from analysis carried out by RICS. It concludes that the combination of a warming climate together with increased insulation and airtightness standards will lead to overheating. This, in turn, will prompt occupants to retrofit air conditioning, leading to increased energy use.

RICS estimates that many new buildings will have to add mechanical cooling of some kind by 2030 because of our warming climate. Those built to the 2010 Part L would not need additional cooling until 2050 because they are more adaptable to rising temperatures.

The research revealed that this increased cooling will outweigh any carbon saving benefits from reduced heating demand as our winters become milder. Not only that, it claims that the embodied carbon in the construction phase required to meet Part L is 10% higher than the 2010 version.

Regulations usually start in the right place, but far too often end up in a mess of compromise and half measures leading to damaging unintended consequences. How else could you explain why some local authority planning officers continue to insist that 20% of a building's energy comes from renewables when the

underpinning design dictates that the heat demand is too low?

It is clear that more emphasis needs to be placed on passive designs that work in tandem with properly engineered building envelopes – natural ventilation in particular. However, this is a hard concept for politicians to grasp and, let's face it, regulations are political. They are driven by the government's agenda – they are not led by engineers, who could explain the detail.

Regulations are prescriptive, which doesn't make them good engineering tools. They encourage engineers to design using tick

boxes, particularly if their client simply wants to comply, and to spend as little money as possible to do so.

Pause. Step back. Set targets

by all means, but also be wary of unintended consequences. Make rules flexible – and let the engineers innovate to find the right solution for each building.

Without that flexibility, the very tools designed to achieve a low carbon future will actually take us in the opposite direction.

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# DISTRICT HEATING CAUGHT IN A PART L TRAP



Part L changes have made district heating a less viable way to meet low-carbon targets. **Thomas Briault** says this penalises developers who have followed local planners' guidance



Wind power could be a way of offsetting emissions from gas CHP under new Part L

BILDAGENTUR ZOOMAR GMBH / SHUTTERSTOCK

Developers risk being caught in the middle of a significant conflict between current planning policy and Part L 2013 of the Building Regulations, which came into force in April. Under many local and regional planning systems, new urban developments are encouraged to make use of district heating systems to help reduce their carbon impact.

But the new carbon emission factors within the newly introduced building regulations (Standard Assessment Procedure 2012) make today's widely used district heating technology – gas-fired combined heat and power systems (CHP) – much less impactful. In fact, the newly introduced long-term factor will mean CHP would add to a development's carbon footprint. Developers risk being caught in a policy Catch-22.

The new building regulations are laudable, and – if the UK is to meet its commitment to reduce carbon emissions by 80% by 2050 – the construction industry needs government to provide a level playing

field, and a consistent policy framework. But to understand the challenge ahead, it helps to take a closer look at current-generation district heating systems.

### Behind every good intention...

Over the past five years, gas-fired CHP has become a major tool in the low-carbon arsenal of regional and local planning authorities and developers. It is also a major part of the urban heat strategy of the Department of Energy and Climate Change (DECC), and the centrepiece of DECC's new £10m Heat Networks Delivery Unit. Compared to today's carbon-intense national power grid, building regulations calculations consider gas-fired CHP more efficient – and, therefore, lower carbon – especially because the waste heat is reused close to where it is generated.

Developers have also latched onto gas-fired CHP because they can take advantage of a dual revenue stream: selling any surplus electricity – plus any waste heat – to the national grid at a profit. Because gas CHP is a tried

and tested technology, it has been the most cost-effective way for urban developments to mitigate carbon emissions, and to meet planning policy and building regulations. This changes with Part L 2013 of the Building Regulations. The carbon factors used for compliance reduce the carbon savings from CHP by a factor of three.

The regulations also assume that the national power generation network will significantly reduce its carbon intensity over the next 15 years, and – therefore – they provide a long-view carbon factor that would, most likely, be used for larger, phased developments, for which compliance is sought over several years.

As a result, the new calculations bring forward the point at which gas-fired CHP becomes more carbon intensive than connecting to the national grid for electricity, and generating heat from an efficient gas boiler. Effectively, all district heating systems phased over a period of more than three years will no longer be able to use gas-fired CHP as the sole means of providing low-carbon heat.

District heating systems phased over more than three years will no longer be able to use gas-fired CHP as the sole means of providing low-carbon heat

### Where there's a will...

So what can be done about it? In London, we're working on two pilot schemes that would provide developers with ways of making existing district heating models economically viable and still low carbon. In the first – a development of several thousand homes in south London – we're developing a commercial model for the client whereby bio-methane from anaerobic digestion is injected, off site, into the national gas grid. This is then accounted for and offset against the carbon emissions generated by the use of a gas CHP and gas boilers.

The second – a commercial scheme in north London – will be connected to an existing district heating system powered by gas-fired CHP. One possibility is to supplement this with a wind-twinning solution. The power generated by a remote wind-turbine

would be offset against the CHP carbon emitted.

The proposals address the reality that many buildings will never generate all of their heat and electricity on-site, and will have to off-set some carbon emissions. This approach is known as an ‘allowable solution’, and is close to being accepted as a model for use in domestic building regulations, which will require all new homes to be zero carbon by 2016. Arup is campaigning – with the UK Green Building Council – to have this approach accepted for non-domestic buildings, too.

We’re also undertaking, with a national power company, a research project that will look at which is the most cost-effective way to reduce carbon emissions – upgrading the national electricity grid or investing in

local district heating schemes. Even if you completely decarbonise electricity generation, you would need to increase the capacity of the national network by up to six times to cater for peak winter heat demands.

District heating systems can reduce the need to upgrade urban electricity networks because hot water can be created when the power-generation (wind/waste energy) allows, and then stored much more efficiently than electricity, and distributed as demand requires. You would still need to upgrade rural electricity networks, but there comes a point when district heating schemes are a more viable low-carbon heat solution. This relates to how much heat demand there is in any given location, and resources – such as the Arup-produced London Heat

Map – will help developers to work out potential demand.

**Help is still needed...**

If we’re to break through this impasse between planning and building regulations, without derailing attempts to decarbonise heat, then gas-fired CHP needs to be championed by DECC and the Department for Communities and Local Government. Government also needs to ensure the carbon factors in the regulations don’t jeopardise the rollout of district heating systems. Developers also need to start thinking now – in partnership with energy firms and companies such as Arup – about ways to provide zero-carbon heat.

● **THOMAS BRIAULT** is an associate at Arup



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# TALES OF THE UNEXPECTED



**Matt Fulford's** talk on plant room failure at Ecobuild offered stark evidence of buildings falling short during operation. Engineers must focus on simplifying systems, he says – starting with controls

Many engineering projects can look well designed and efficient on the drawing board, but – in reality – operate hugely below the efficiencies expected. This 'performance gap' – evident from offices to schools, and in both new build and refurbishment – has been highlighted in a number of reports. But why does it occur?

When looking for energy savings, the first stop is almost always the controls system. Whether it is a fully networked and centralised BMS – or a small stand-alone controller – it is almost always poorly set, and wasting both energy and money. But who in the design process details the exact settings on the system to maximise efficiency?

All too often, the major settings – detailed by the engineer – are focused more on ensuring comfort levels are easily achieved, rather than optimised. The gaps in some of the background detail are filled in by the BMS commissioning engineer, using 'industry defaults' – plus a little bit – because they don't want to risk being called out on a repeat visit. Finally, the system is operated by a facilities

manager, who is seeking to minimise complaints – not energy use – and is not looking to achieve the best balance.

The controls also fall down because, all too often, they are operated by someone who does not understand how they work. Optimisers, compensators, and proportional-integral-derivative (PID) loops make sense to engineers, but are a foreign language to most caretakers and FMs, who have not been trained, and will not know which questions to ask.

The BMS maintenance company will check the system works and is backed up, and that the sensors and field devices are reading and operating properly – but it will rarely do much more than superficial checks to improve the efficiencies. So are we making our controls systems too complicated?

'Keep it simple and straightforward' needs to prevail. No one has ever trained me to use the air conditioning system in my car, yet I manage to use it only when required, shut my windows before turning it on, and press the buttons and turn the dials to achieve the condition I want. While buildings

Engineers must design with operational simplicity in mind, specify the detail of all the settings, and not leave the detail to the whim of the installer

are more complex, the controls need to be simple to operate, and – when they cannot be – those who use them need to be trained, and provided with clear user guides, with instructions placed on the boards. Knobs, for example, are often labelled 'hand' rather than 'constantly on' – but, to a lay person, 'hand' is the thing on the end of their arm!

So engineers must design with operational simplicity in mind, specify the detail of all settings, and not leave details – such as warm-up limits on optimisers – to the whim of the installer on site that day. When it comes to providing simple labels and instructions, they should do the 'school caretaker' test: ask themselves whether the friendly old caretaker at their school could correctly use the system. Engineers also need to play a key role in undertaking detailed – and technically based – pre-occupation checks, before the project is signed off.

Such 'soft landings' will be of great benefit when it comes to forming the right approach, whether to a major new build or a more modest plant room refurbishment.

But, with every project, the starting point should always be how you, yourself, would use the building. This will give you a good understanding of the reality of the building's operation, rather than relying on what the design codes suggest should be happening.

Go back a year later and ask how they are getting on with the system – then scratch beneath the surface to see if it is being used the way the designer intended. You may find some surprising answers, but the learning process will – most likely – help you to become a far better engineer than any distance-learning module.

**MATT FULFORD** is founder and director of Inspired Efficiency, which specialises in reducing energy and carbon emissions, and improving the sustainability of the built environment, advising existing operations and new builds with practical and commercially viable solutions. Visit [www.inspireefficiency.co.uk](http://www.inspireefficiency.co.uk) or Twitter @matt\_LE



Look out for more 'Tales from the plant room' in future issues

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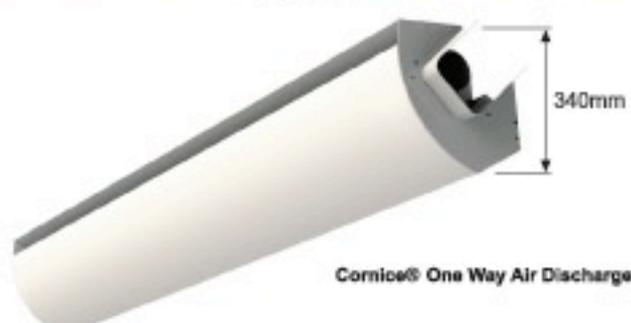
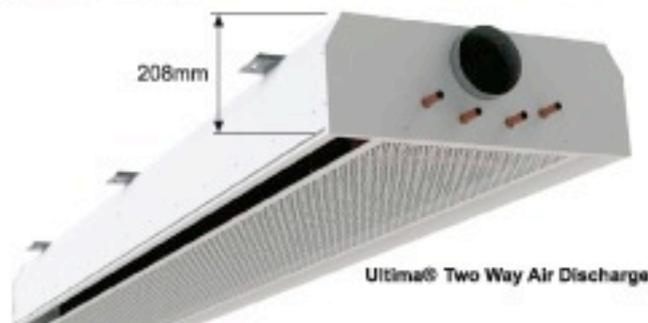
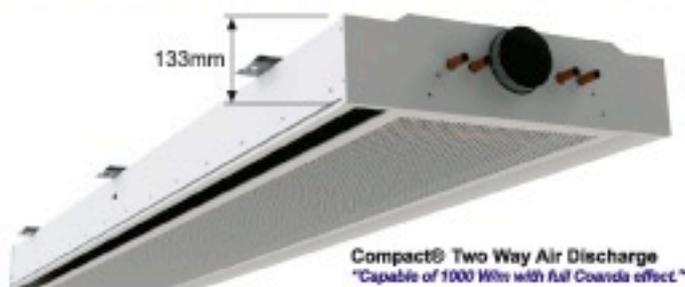


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# GOOD HEALTH

Creating healthy, sustainable cities was top of the agenda at the 2014 CIBSE ASHRAE Technical Symposium. **Alex Smith** reports from Dublin

6 The way forward is not about scaremongering. It's about understanding the issues and the need to change and move forward in a measured, collaborative way



#### WATCH NOW

Video interviews featuring Sue Illman on urban planting, Benjamin Skelton on net-zero design, and Bill Bordass on benchmarking. See the app at [www.cibsejournal.com/app](http://www.cibsejournal.com/app) or on Android/browser via [www.cibsejournal.com](http://www.cibsejournal.com)

The challenge of creating healthy, sustainable cities in the face of fundamental changes in the global climate was the key theme of the 12th CIBSE ASHRAE Technical Symposium, held in Dublin last month.

The Symposium, titled 'Moving to a new world of building performance', saw more than 50 speakers from around the world share their findings on best practice, technical innovation and post-occupational evaluation.

Papers from both industry and academia were selected by a panel of more than 60 expert reviewers, and were presented over two days at the Dublin Institute of Technology. (See 'Role of the reviewers', right).

CIBSE President George Adams launched the event with Landscape Institute President Sue Illman, and called for a joined-up approach to 'grey' and 'green' infrastructure in cities. Adams said the urban heat island (UHI) effect in cities could be reduced by between 3°C and 5°C with more planting in urban areas.

'Climate change is happening much faster than we anticipated,' said Adams, adding that, during the heat wave in 2003, around 70,000 people died from heat stroke-related conditions in Europe. 'The way forward is not to scaremonger. It's about understanding the issues and the need to change, and moving forward in a measured and collaborative way.'

Illman stressed that urban planting reduces air pollution and mitigates against flooding – citing remediation and landscaping of contaminated land on the London Olympic site, taking 9,000 homes out of flooding risk.

'Green infrastructure is as important as grey,' explained Illman. 'It's important that the whole design team understand the concept.'

The importance of clean air was pertinent to those who had travelled to Dublin from South East England, which, at the time, was experiencing very poor air quality caused by



Dinner was served at Dublin's Guinness Storehouse



pollution, Saharan sand and still weather conditions. During his presentation on minimising nitrogen oxides (NO<sub>x</sub>) emissions in combined heat and power (CHP), Huw Blackwell reminded delegates that 25% of NO<sub>x</sub> was caused by power generation for buildings.

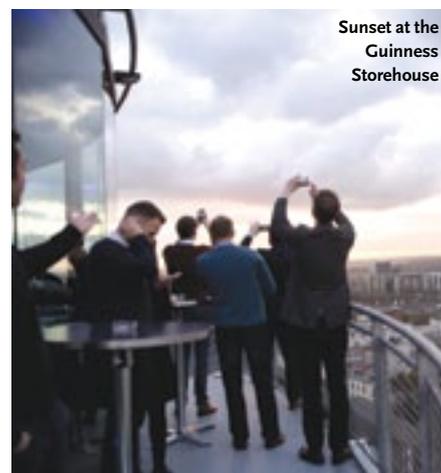
Illman gave an example in Seoul, South Korea, of how air pollution could be lowered by more urban planting. The Seoul mayor had tackled traffic pollution by replacing an elevated highway with a linear park featuring a restored stream. Thermal imaging revealed that the temperature in the park was more than 3°C lower than other parts of Seoul.



The main auditorium at the Dublin Institute of Technology



The event's organiser, Tim Dwyer



Sunset at the Guinness Storehouse



Removing the highway also helped reduce car use, and boosted public transport numbers.

In Manchester, research by Emeritus Professor Geoffrey Levermore, of the University of Manchester, revealed that rising temperatures in UHIs were quite dramatically reduced by blue (water) and green spaces.

The same session on delivering sustainable cities heard from assistant professor Daniel Wright, of the Pratt Institute, on how New York City could reduce its carbon footprint by 90% by 2050. According to a report by the Urban Green Council, deep energy efficiency retrofits costing between around \$12,000 (£7,000) and

\$22,000 (£13,000) per housing unit, could reduce building energy use by 50% by 2050. The report said the electrification of transport and the widespread introduction of electric heat pumps and renewables would help New York meet the 90% target.

**North Atlantic rift**

Sustainable cities was the subject of a debate between grandees from opposite sides of the Atlantic. The North American team of Larry Spielvogel, Don Beaty and Bill Bahnfleth had to argue that 'Cities are not sustainable' (whether they agreed with the notion or not), while Richard Rooley, Ant Wilston and George Adams argued the opposite.

Spielvogel argued that cities were not sustainable because engineers had 'sacrificed themselves on the alter of sustainability' and were more interested in gaining plaques than delivering good buildings. He said standards were preventing engineers from using sound engineering principles.

People who live in cities have to learn to cooperate and share energy loads, according to Aecom's Wilson. He said infrastructure and public transport were key to making cities

**ROLE OF THE REVIEWERS**

The Technical Symposium relied on more than 60 reviewers to ensure that a suitable standard of material was presented at the Symposium. The reviewers are anonymous to the authors and presenters, but are key to ensuring the success of the event.

Hywel Davies, technical director of CIBSE, keenly acknowledged reviewers' work at the meeting, pointing out that their selfless role underpinned the Technical Symposium's integrity, and that their dedicated work (without any obvious glory) was a clear example of the role that senior professionals can play in safeguarding the standards of CIBSE and those of the wider engineering discipline.

Commenting on the Dublin Symposium, Davies said: 'The response to the posters and oral presentations that volunteers have spent time and effort reviewing has been excellent.'



From left: Richard Rooney, George Adams, Bill Bahnfleth, Sue Illman, John Field and David Arnold



Winner of 'Most significant contribution' Benjamin Skelton (centre)

6 A lack of benchmarking means designers are wearing blinkers when it comes to predicting in-use energy performance  
*Bill Bordass*

## Cyclone and Teambuild papers scoop prizes

The story of Walgreens' first net-zero energy store in Chicago scooped the prize for 'Most significant contribution to art and science of building services engineering'. Benjamin Skelton's paper, *It's not easy being green*, gave an honest and open account of his involvement as president of the Cyclone Energy Group.

The project features LED lighting, a heat pump system taking energy from refrigerators, and a 256 kW peak photovoltaic (PV) array, the performance of which was severely hampered by America's harsh winter weather in January and February.

work, and believed advances in technology, such as super grids, would enable cities to cope with energy demands.

Bahnfleth said that London could not currently call itself sustainable when it was drawing more than 80% of its food from outside the United Kingdom.

Adams cited Curacata, Brazil as an example of a sustainable city, where 80% of people travel by train and the same percentage of waste is recycled. But Adams questioned whether society is capable of arriving at inclusive solutions. 'Engineers have to step outside the box and take the moral view,' he said.

### Northern Ireland makes its mark

The importance of benchmarking in improving the performance of buildings was flagged by consultant Phil Jones, and by Bill

The building was monitored and special attention was paid to ensuring an airtight barrier. Walgreens plans to update its specifications, based on lessons learnt at the store, for both its existing 8,000 stores and the 200 new stores it builds every year.

The 'Most effective delivery of material' prize was awarded for the *Teambuild: training for collaboration, human failures and success in a technical industry* paper, written by consultant Richard Rooney and Teambuild director Alex MacLaren.



ASHRAE's new face of engineering Rebecca Delaney with George Adams (left) and ASHRAE President Bill Bahnfleth



Award for 'Most effective delivery of material' went to Richard Rooney and Alex MacLaren

Bordass, who said: 'It's extraordinary how little investment there is in communicating benchmarking, despite its importance. A lack of benchmarking means designers and modellers are wearing blinkers when it comes to predicting in-use energy performance.'

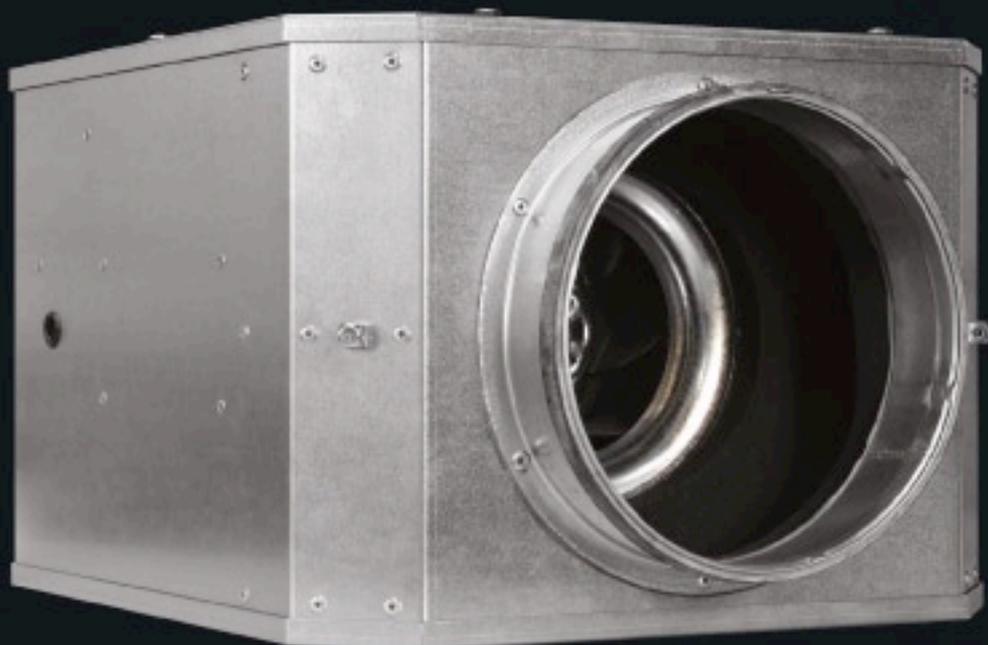
Jones said that industry desperately needed 'more hard data' to form benchmarks. In his presentation he revealed updated energy benchmarks for public sector buildings in Northern Ireland. The analysis of around 2,000 properties found a trend for higher electricity consumption since 2000, caused by a growth of electrical equipment in buildings and the subsequent need for more air conditioning. There was a trend for lower fossil fuel use, reflecting improvements in insulation, boiler efficiency and controls.

The Symposium featured a wealth of data and real life examples garnered from post-occupancy analyses. Judit Kimpian presented an analysis of building data fed into the CarbonBuzz website, while Rajat Gupta, professor of sustainable architecture and climate change at Oxford Brookes University, gave an entertaining, but disconcerting, evaluation of an 'exemplar' eco-housing development. (See news on page 10.) **CJ**

● Next year's Symposium will be hosted by the Energy Institute at UCL and will take place on 16-17 April. For the full programme of speakers and posters from 2014, go to [www.cibse.org/symposium2014](http://www.cibse.org/symposium2014) Supporting documentation is available from [bit.ly/Dublin2014](http://bit.ly/Dublin2014)

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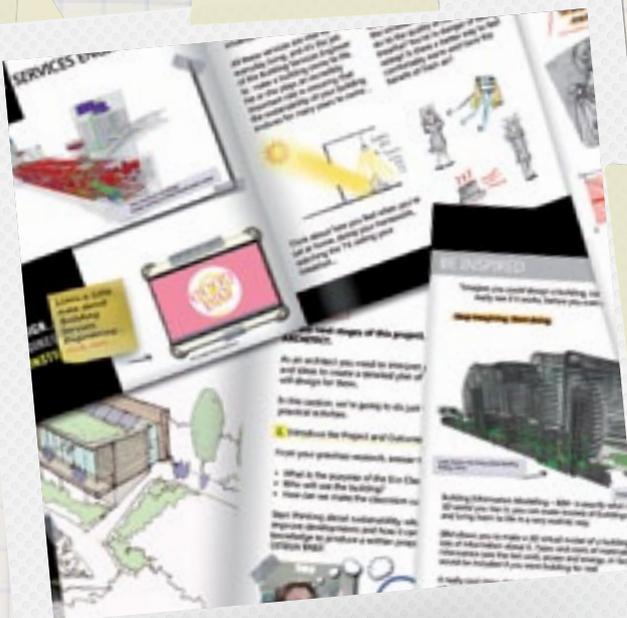
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\*Information based on typical installation



# A class of your own

We're constantly confronted by headlines about a skills gap and a shortage of engineers coming into the industry. **Alison Watson**, founder of Class of your Own, tells **Liza Young** how this can be tackled in schools

**W**hat we need is pukka construction, says Alison Watson, land surveyor and founding director of Class of Your Own (COYO). 'We need somebody to make it cool to work in construction – there are plenty of Jamie Olivers in the construction industry, we just don't celebrate them.'

Watson is on a mission to get the built environment onto the school curriculum. Drawing on her own experience of school – which lacked career guidance – Watson set up Lancashire-based company COYO with architect Dan Gibson, to try to promote professional careers in the built environment in schools and colleges.

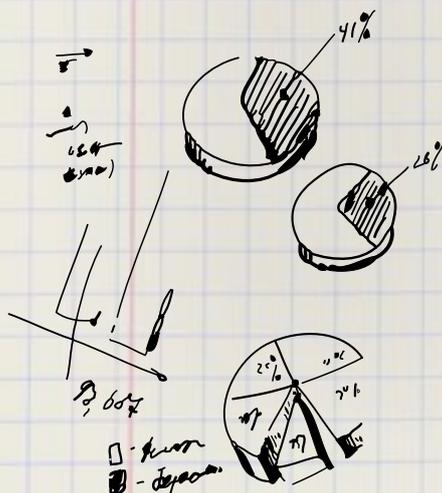
In 2011, COYO launched its curriculum, Design Engineer Construct! – supported by design software company Autodesk – which was piloted in a few secondary schools. The programme was recognised as a standalone qualification by the Department for Education

(DfE) at the September 2013 academic year.

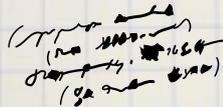
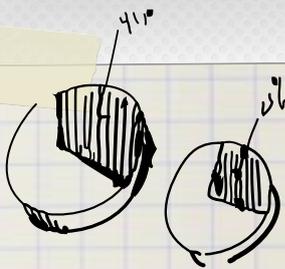
The company works with industry organisations and institutions, which are encouraged to support or adopt schools to help youngsters understand the impact buildings have on the world around them. CIBSE joined the programme last November – when it adopted Graveney School, in Balham, south London – and launched a campaign to encourage CIBSE regions to follow suit.

## Taking the lead

The journey that led to the creation of COYO began, fittingly, in a school. While working as a land surveyor at a Hackney school in 2003 – as part of the £20bn Building Schools for the Future (BSF) programme – Watson was mobbed every break time by curious schoolchildren wanting to have a go on her £30,000 robotic total station. She realised that the children knew nothing about being a land



ANDREW SCHERBACKOV / SHUTTERSTOCK



surveyor, or the career opportunities presented by the construction industry.

'I was quite disappointed – verging on appalled, actually – to find that teachers had little idea as well,' Watson says. 'I thought, if people like me were more hands on at school, and got them into technology, children might see the fun and usefulness in mathematics.'

Watson says she was that 'maths kid' who went through school never understanding how or why it's used. 'I ended up joining a bank, because no one told me otherwise.'

That lack of guidance – which Watson discovered is still missing in schools – became the driver for COYO; to raise awareness of architecture, engineering and construction professions before career paths are formed.

**Grassroots scheme**

At the end of 2008, Watson wrote a workshop, A Class of Your Own, that gave children the opportunity to become architects and engineers for a day, to design a sketch scheme and socio-economic case for an eco classroom.

'It was like a mini version of the school that was being built on their site, but they had to think about all the people who needed to work there, all the materials and energy efficiency challenges that they would have,' she says.

'And everything would have to be done entirely sustainably, with the community in mind. It was, effectively, a mini BSF.'

The workshop proved popular as an enterprise day for 11- to 14-year-olds. 'But that wasn't enough,' says Watson, 'I wanted the children to be able to build what they were designing.'

She realised the only way this could be done was by using professional 3D modelling software. 'On the basis that gaming and IT is second nature to children, I saw no reason why they shouldn't use the same software programs as we do in industry,' she says.



CIBSE joined the COYO programme last November, when it adopted Graveney School, in Balham, and launched a campaign for regions to follow suit



**What is COYO and Design Engineer Construct?**

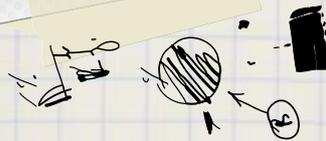
Delivered by COYO, Design Engineer Construct! is a curriculum platform for industry to bridge the skills gap by supporting local schools.

The curriculum leads to a Level 1 qualification – generally taken by the age of 14 – then Level 2, which students usually take at age 16 (equivalent to a GCSE), and Level 3, beyond 16 (equivalent to an A-level).

By signing up to the COYO 'Adopt a School' scheme – either individually or as a consortium – members commit to funding a two-year

programme of study, which includes up to six days' engagement with the students per year, either in support of a project or through site visits and other links with industry.

Alternatively, employers can support schools through the COYO workshop programme, which means they can use the contact for recruitment purposes when the students graduate. The COYO programme is currently also making waves around the globe after being launched in Australia last month.



Spending time with professionals opened the students' eyes to the many opportunities in engineering. It moved them away from the celebrity culture and pie-in-the-sky aspirations' – Tracey Hemming

After taking four children from Accrington Academy, in Lancashire, to meet Autodesk bosses in California, Watson was given 10 free licences of Autodesk Revit, which she gave to schools around the country.

'No surprise, the results were fabulous,' she says, 'but I also needed them to understand the process of a construction project – the before, during, after and eventual disposal.'

After gathering enough material to create a curriculum, the programme – The Design Engineer Construct! suite of qualifications at level 1, 2 and 3 – was accepted by the Qualifications and Credit Framework (QCF). It has also been included on performance tables by the DfE.

Watson collaborated on the curriculum with a small organisation – TLM, in Tamworth, Staffordshire. 'It's enough if you can change one person's life, and they can evangelise and tell their friends – and, before you know it, construction goes viral. I decided to work with somebody who cares about the kids, not the bottom line.'

**Changing aspirations**

COYO is also helping schools in deprived areas – such as Clacton-on-Sea, in Essex – to raise children's aspirations. Headteacher of Clacton Coastal Academy, Tracey Hemming, says that the Jaywick community in Clacton didn't have gas, electricity or even a sewerage

system until the 1990s. 'It's moved on,' she says, 'but we've got a whole area in Britain of deep deprivation and deep poverty.' This social decline, adds Hemming, is mirrored in Clacton's dilapidated housing, and the sobering facts that 54% of its population are on benefits, and 33% are unemployed. But – in conjunction with the school's sponsor, RICS – Hemming says the COYO programme brought tangible benefits to its students. 'Spending time with professionals opened up their eyes to the many opportunities in construction and engineering. It moved them away from the celebrity culture and pie-in-the-sky aspirations,' she says.

Watson agrees: 'Most of these kids are never going to become footballers, so design a stadium, look after a stadium, see it through its lifetime, manage it, market it – that is the built environment.'

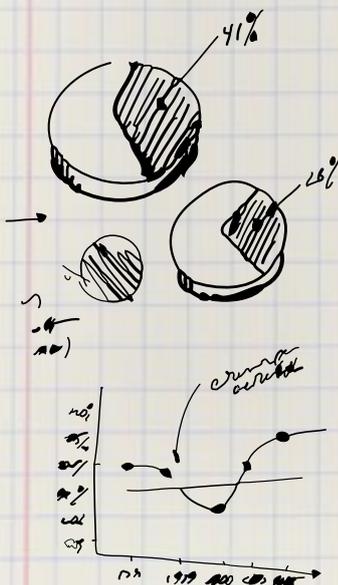
**Skewed perception**

A recent survey by educational organisation the Edge Foundation found that youngsters were being actively discouraged from opting for vocational education by parents and teachers, who regarded them as 'too clever' to pursue a career in construction. Watson says it will take a few years to change the perception that 'building' is just for bricklayers, but 25 schools are already signed up to deliver the curriculum. Among them are Tauheedul Islamic Boys School, in Blackburn, and Plumstead Manor Girls' School, in south-east London, which is waiting for a sponsor.

That such schools are becoming involved is a massive culture shift, says Watson. 'Walk the walk,' she adds. 'Industry could make this happen overnight. I get frustrated because we all recognise the problem, we all want to do something about it, but we all need to work together to make a real difference.'

Reaching children before they finish school is imperative, she says. 'You don't just wake up at 16 and want to be an engineer. If kids can channel a better idea of a career path when they are younger, their university career would be more useful.'

Paul Sperring, associate director at Mott MacDonald – which sponsors The Compton School, in North Finchley, London – says that 46,000 people graduate with engineering degrees each year, but finding apprentices and graduates to work in the building services sector is challenging. 'Part of the reason is that the majority of the population don't know what building services engineers do,' he says. 'This includes teachers, parents,



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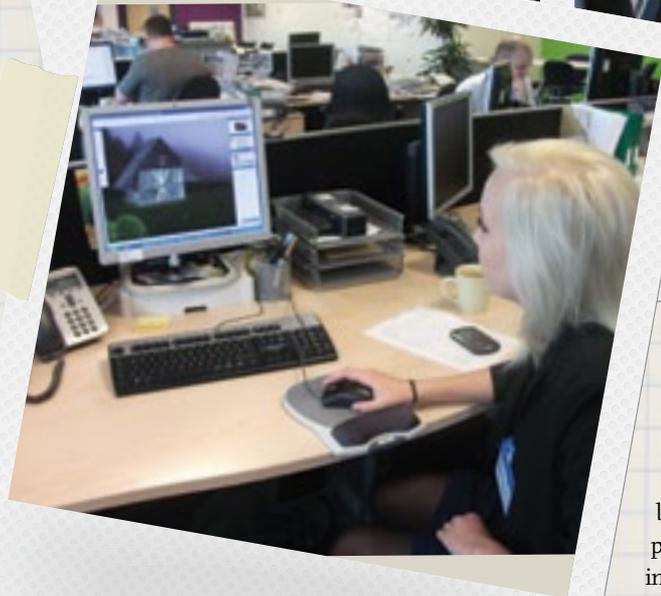
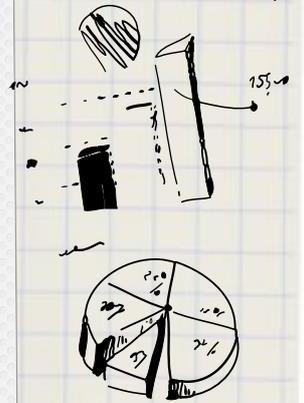
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**Teacher focus**

As a textile costumes specialist, Rachel Carter, head of product design at

➤ The Compton School, says she was daunted by the prospect of teaching Pythagoras' theorem, how to measure ground levels, and how to create buildings using BIM. 'But I saw this as an opportunity for students that I was yearning for,' she says. 'A year on, I am still teaching COYO, and my students are happy

and enthusiastic – and have become advocates for the built industry.'

Watson hopes to develop the built environment specialist teachers (BEST) programme. 'Behind every great student there's always a great teacher,' she says, 'and behind every great teacher – just like behind every great architect – there has to be a great engineer.'

'It's been the hardest thing I've ever done – and it's still hard because the industry has a "We'll see how it works first, and then we'll do it" mentality. It's got to be that the industry takes the lead, and I believe we've created a mechanism for this to happen.'

It doesn't feel like rocket science, Watson adds. 'Let's just do it. If you want to be an engineer, you've got to have the right tools for the job. The tools are there – so use them.' CJ

**CIBSE gets involved**

Graveney School, which has been adopted by CIBSE, rolled out COYO in September 2013. Neil Pinder, head of resistant materials at the south-east London school, said integrating BIM into his lessons was an easy transition for his students. 'I call Revit the *Grand Theft Auto* for architecture,' he says.

'When delivering to students, we have to speak their language, because kids are technod up – they spend hours on their PlayStations; they know about technology.'

Pinder says that, in the past 10 years, at least eight students from Graveney have gone on to become architects, with one returning to help design the school's new sixth-form classroom. He says that, this year, 12 Graveney students were accepted into Oxbridge, making the school the 'perfect catapult for COYO'.

CIBSE HQ adopted Graveney School last November, with sponsorship from president George Adams' company, Spie. It also launched a campaign for each CIBSE region to follow suit.

A £1,000 contribution from the CIBSE Education Fund was offered to any region that raised the rest of the sponsorship to run COYO for two years in a local school. The Yorkshire region has agreed to support Butterworth School, in Bradford – with sponsorship from NG Bailey – and will also be one of three partners supporting the Archbishop Sentamu Academy, in Hull.

Adams says: 'Buildings are fundamental to society. Things that make society tick aren't just the classic subjects.'

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# WHEN THE LIGHTS GO OUT

As power outages in the UK become more likely, businesses need to examine the issues around potential energy shortages. **Bill Wright** explains why taking action now is imperative

**C**onsider the following scenario: it is 4pm on 15 January 2015, and – after a recent storm, followed by a cold snap – the lights have been dimming and flickering all day. Then suddenly, as if someone has pressed a switch, the lights go out, electrical appliances turn off, as does the heating. Outside, even the street lights and traffic lights are out, and everything is bathed in eerie darkness. After half an hour, normal service has not resumed and news feeds through of a major power outage with no idea about when it will be fixed. Those organisations with back-up generators don't know how long they will last, and in the meantime people are having problems getting to and from work.

#### **Reality check**

Is this simply scaremongering or a very real possibility? Unfortunately, it's the latter. The recent wet and windy winter highlighted

just how fragile our power infrastructure is against the elements, even if generating capacity was anywhere near a comfortable level.

The reality is that it isn't. Ofgem undertakes an annual assessment of whether the United Kingdom has enough generating capacity to produce the electricity it needs and, when this was done last year, it warned that the gap between supply and demand could be as low as 4% by 2015. Now it estimates that the gap is down to 2% and, as a result, the risk of blackouts has trebled from the one every 12 years it estimated last October to just one in four.

#### **State of play**

We haven't arrived in this precarious position by accident. There has been no major investment in large power stations since privatisation in 1990, and some large coal-fired stations that are the backbone of

our generation capacity are now at the end of their useful lives.

The UK distribution system has also suffered from significant under-investment, and it is estimated that around £110bn is required to renew our ageing infrastructure. The EU Emissions Directive has stated that old polluting power stations must be shut down before 2016, and closures have already taken place. Rather than being mothballed, they have been demolished, sometimes because land is regarded as more valuable.

The UK's nuclear power stations – once world-leading – are scheduled for closure as they reach the end of their useful lives, and the proposed new nuclear power station for Hinckley Point is not due for completion until 2023. That is not going to be much use if we get power shortfall problems in 2015.

Furthermore, our increased reliance on renewable energy sources such as wind power – while providing greener non-

polluting power – leave us at the mercy of the elements. If a prolonged period of high pressure covers the UK and there is little or no wind, this will be the equivalent of switching off three or four power stations.

#### Words of warning

In addition to building services plant, IT and the internet are vital for all types of organisations, so coping with outages of a few hours' duration is likely to have a serious impact upon business continuity.

To make matters worse, as well as lost data, there's also a strong possibility of lost custom.

We are so used to reliable power supplies that most people simply take it for granted – including some building services engineers. Ask anyone who lost power over Christmas 2013 – the impact even a short period of downtime can have on a building's ability to function properly, and meet the needs of its occupants, can be seriously impaired.

Renewable energy sources aren't always the answer either. There is a common misconception that just because a building has technology such as solar PV, it will have 'always on' power. Not so – the inverter relies on incoming mains for synchronisation and stops if there is no grid energy. No power

Reliance on renewable energy sources such as wind power – while providing greener non-polluting power – leave us at the mercy of the elements



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Taking a chance ... the risk of UK blackouts has trebled

➤ means no building services and plant, no PCs or televisions, no charging phones or tablets, and no business being conducted.

Skilled electrical contractors are able to provide a range of possible solutions to ensure business continuity in the event of an extended power outage.

Alternative energy supplies – such as generators and uninterruptible power supplies (UPS) to provide power to the IT infrastructure – should be top of the list, and emergency lighting and safe evacuation systems should be installed to keep building occupants safe.

### Regular servicing

Even buildings that have back-up power generation technology must ensure that it is fully maintained and fit for purpose. Many hospitals are powered by diesel generator sets that require inspections.

Regular servicing can help to detect potential problems, leaving time to acquire parts, make repairs and provide substitute power during the entire process.

At least a full load run every month should keep the generator in running condition, and batteries charged for starting. UPS equipment should be tested as per manufacturers' recommendations, although many modern UPS units are self-testing.

Competent electrical contractors will be able to assess the ability of a generator to provide secure and reliable power in any

situation, and take any necessary action.

The worst-case blackout scenario might never happen – we could have mild weather with no risk of power failure. But is that a risk worth taking?

Organisations that take action now and make the necessary investment will be in a good position to get through any power outages with minimal disruption.

Those that choose to stick their heads in the sand and simply ignore the problem are dicing with disaster. **CJ**

**BILL WRIGHT** is head of energy solutions at the Electrical Contractors' Association (ECA)



### Differences of opinion

Although the government has recognised there is a problem with the UK's energy generation infrastructure, it has appeared at times to be reluctant to resolve it.

Ed Davey, energy and climate change secretary, has admitted that 'without timely action, there would be risks to security of supply' but his department believes the Ofgem calculations slightly overstate the dangers of power shortages. Through the introduction of the Energy Bill, Davey has, however, outlined measures including a £10 bn guarantee to underwrite new nuclear plants, tax incentives for shale drilling and more long-term help for those building wind farms.

Meanwhile, Shadow Energy Secretary, Caroline Flint, has accused the government of not taking the impending energy shortfall seriously. She said: 'We have known for some time that we are facing a capacity crunch in the middle of this decade, but the fact the government has taken so long to introduce its energy market reform proposals has hardly helped.'

Sir John Armitt, the former Network Rail boss who chaired the Olympic Delivery Authority (ODA), has also stated publicly that he thinks power cuts could jolt the government out of its complacency and get a construction programme moving.

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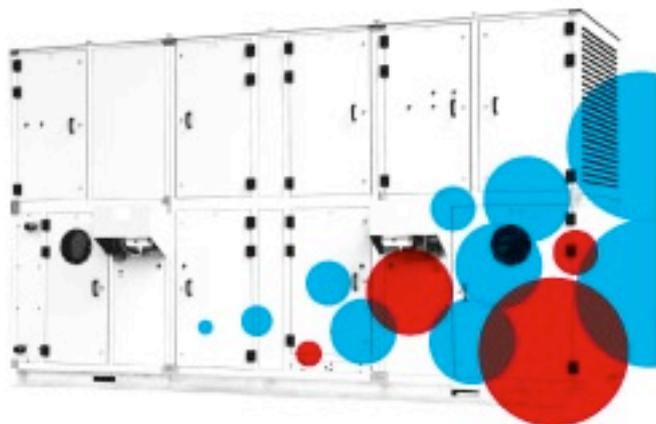
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# SPECIAL FEATURES

## ● AIR CONDITIONING, AIR MOVEMENT AND VENTILATION

This month: Atelier Ten focuses on natural ventilation at new WWF HQ; fans upgraded at Britain's 'giant microscope'; and Max Fordham specifies Nuaire award-winner in Cambridge office



Nuaire's XBOXER XBC heat recovery system is designed to be quieter, more efficient and smaller than previous ranges

## BOXING CLEVER

Nuaire's XBOXER XBC heat-recovery system won a CIBSE Award last month – and another accolade came when a prestigious UK engineer commissioned the system for one of its offices. **Andrew Bott** reports



Nuaire won Energy Saving Product of the Year at the 2014 CIBSE Building Performance Awards. Read about all the finalists in our Products Special

**M**ax Fordham is renowned for its environmental engineering on projects such as London's Tate Modern, and the Hive, in Worcester. But it is also willing to get stuck into the green retrofitting of less spectacular constructions that make up the vast proportion of Britain's building stock.

It is just such a building that Max Fordham chose to repurpose as one of its offices in Cambridge. Occupying 250m<sup>2</sup> on the fourth floor of a 1950s city centre office block, the premises had been given a Cat A fit-out in 2011 – but without any energy improvements. It was clear that the office space required a complete upgrade to its

heating and ventilation systems, glazing, and thermal insulation.

To help meet energy targets on the refurbishment, Max Fordham specified a system that, in spring, was named Energy Saving Product of the Year at the 2014 CIBSE Building Performance Awards. The Nuaire XBOXER XBC heat recovery system is designed to be quieter, more efficient, and smaller – and have more control options – than previous ranges. Its high mass, double-skinned wall construction, with integral acoustic barrier, makes the product particularly popular in schools and universities.

Joel Gustafsson, senior engineer at Max Fordham, has worked with Nuaire for several years, and has specified its energy efficient XBOXER XBC heat recovery range on a variety of projects – including on high-profile university developments where low breakout noise is an important factor in the choice of ventilation. He says: 'I choose Nuaire

products because they are reliable, and the build quality is excellent. We selected the XBC fan for our office redevelopment due to its high heat-exchange efficiency and low power consumption. The office is heated by direct electric, and was originally fitted with 36kW storage heaters, which were swiftly removed. Our aim was to achieve a zero heating load, and we got very close, with a calculated total heat loss of 4kW.’

With such low heat losses after the fabric improvements to the roof, insulation and glazing, there was virtually no need for space heating – the open-plan office relies on one small, 2.4kW space heater. The XBC was critical to achieving this because of its high-efficiency, counter-flow recovery block, which is capable of raising the incoming fresh air from -5°C to above 17°C, without the need to energise its electric reheat coil.

A mechanism was also devised to provide a triple lock on the use of electrical energy to heat the incoming fresh air: first, office staff must select the heating mode on their wall-mounted control switch; then they have to turn on the 2.5kW space heater; finally, the XBC’s internal sensors must detect supply air temperatures lower than a target set-point, before using its internal 4.5kW electrical heater battery as a last resort during extreme cold weather.

The original office glazing is sliding sash windows, so – to meet building conservation restrictions – Max Fordham engineers designed unobtrusive narrow-profile, high-performance secondary double glazing. This reduced thermal loss without compromising



“ We selected the XBC fan for the office redevelopment because of its high heat-exchange efficiency and low power consumption

aesthetics, and the design allows staff to make use of natural ventilation by removing the glazed panels in the summer. In colder months – when openable windows are sealed behind secondary glazing – the heat gains within the offices should maintain the desired room temperature, providing the incoming fresh air is sufficiently tempered. The XBC’s counter-flow heat-exchange block is capable of this, recovering almost all of the required energy from outgoing exhaust air.

The XBC takes full advantage of Nuaire’s Ecosmart control solution, using multiple room-based CO<sub>2</sub> sensors, and a control interface pack to orchestrate connections to and from other devices. The amount

of fresh air delivered at any given time is governed by the levels of CO<sub>2</sub> detected in the main office or meeting rooms, although several thermostats also provide a ‘boost’ override function if extremely high room temperatures are detected.

The system offers three user-selectable modes – supply air warming, neutral, and fresh air cooling, which bypasses the heat exchanger using the XBC’s integral summer bypass damper. Fan speeds are automatically regulated according to demand.

‘The Ecosmart control has helped us create a scenario that is quite specific,’ says Gustafsson. ‘It has given us control of our CO<sub>2</sub> levels, the ability to increase fan speed for ventilation-free cooling [when the secondary double glazing prevents natural cross-flow ventilation], and the ability to interface with our space heater through the triple-lock mechanism.’

The addition of the XBC has helped Max Fordham achieve the final 5% of its energy reduction plan (based on 2011 figures), which equates to a 50% reduction in the remaining space-heating load, once the fabric improvements are taken into account. The office is now expected to run on just 2MWh per year. Success in keeping to these targets will be proven over time, with variables such as changing occupancy levels and weather being critical to the actual energy use.

Andrew Bott, consultant sales engineer at Nuaire, worked closely with Max Fordham to develop the Ecosmart control solution. ‘The main challenge was to achieve a stand-alone solution that could self-regulate its airflow rates and temperatures, with minimum user interaction,’ he says. ‘We wanted the system to be intuitive for the office users and, by using Ecosmart to automate all common functions for flow rate and supply air temperature – and employing a simple wall-mounted, mode-selection switch and time clock – this was achieved quite elegantly.

‘I am particularly pleased with the mechanism developed to interlock the small electric space heater with the XBC’s heater-enable function, so – when a user turns on the heating device in the room – the XBC automatically enables its heating mechanism, eliminating the need to operate numerous switches on separate devices.

‘When a consultancy as highly reputed as Max Fordham includes your equipment in its company offices, you know you have a really good product.’ **CJ**

Annual energy use at Max Fordham’s Cambridge office should be 2 MWh



**ANDREW BOTT** is a consultant sales engineer for Nuaire

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# ENVIRONMENTAL

An innovative natural ventilation strategy – featuring underground air ducts and thermal cooling – enabled Atelier Ten to achieve a net zero-carbon headquarters building for WWF with minimal mechanical heating and cooling. Atelier Ten's **Patrick Bellew** explains the BREEAM Outstanding design to Andy Pearson



IMAGES COURTESY OF @WWF



WWF, founded in 1961, is a global conservation charity, operating in more than 100 countries. It aims to find ways for people and nature to share the Earth's resources fairly. [www.wwf.org.uk](http://www.wwf.org.uk)

**A** public car park in Woking, Surrey, is not the most obvious location for a headquarters building. For conservation charity WWF, however, the site was perfect. The organisation wanted its new headquarters building to have a positive impact on the local environment, so placing it on a raised platform above a municipal car park was ideal.

The building's site is not the only unusual aspect of this project. WWF wanted its £13m Hopkins Architects-designed home to show others that –

through the smart use of design, materials and technology – it is possible to make the building an exemplar of low-carbon office design. To this end, the client's brief was for the office to be certified BREEAM Outstanding, and to be net zero carbon in operation.

The brief was made even more challenging by WWF's requirement for the designers to optimise their selection of components used in the build, based on minimising embodied carbon and whole-life emissions over a 60-year period. 'In addition to cost, carbon was made one

# MOVEMENT



of the main value systems for the project,' says Patrick Bellew, principal of Atelier Ten, the scheme's building services and environmental engineer.

Despite the challenging brief, Bellew describes the scheme as evolutionary rather than revolutionary. In particular, it is an evolution of the solution Atelier Ten developed with Hopkins Architects for Yale University's Kroon Hall. This was a LEED Platinum scheme, completed in 2009, which makes extensive use of timber, and which has won numerous design and sustainability awards. 'We already had

some of the shorthand resolved: we were looking for a building with high thermal mass, with – principally – underfloor air-type solutions, and as much thermal storage as we could achieve,' he explains.

References to Kroon Hall are apparent in Hopkins Architects' design for WWF's HQ. Like Kroon, the building features an arched, timber roof as part of the architectural statement. In Woking, the huge 80m-long, curved timber gridshell roof is the building's most striking feature – and it defines the construction. The roof springs from inclined external steel



## PROJECT TEAM

- **Client:** WWF
- **Building Services Engineer:** Atelier Ten
- **Architect:** Hopkins Architects Partnership
- **Cost consultant:** Gardiner & Theobald
- **Structural engineer:** Expedition Engineering
- **Whole life carbon assessment:** Sturgis Carbon Profiling
- **Contractor:** Willmott Dixon



► columns to span the entire 37.5m width of the concrete podium that holds the two-storey building above the car park.

Beneath the roof, the building's walls and end elevations are fully glazed. The advantage of being one floor up is that workers on the lower level are at the height of the tree canopy that borders the adjacent Basingstoke Canal. Double doors along the length of the building lead out – either side – onto five-metre-deep balconies, to allow occupants to take in the view. These balconies are lined with planters, and incorporate rainwater-retention tanks for irrigation.

The second floor of office space is tucked under the arched roof. It is formed of two concrete platforms, raised on columns and set either side of a central atrium. There are no glazed walls at this level; instead, the occupants have views of the sky, through three rows of skylights running the length of the building. These are fitted with automated blinds that are controlled by the BMS, based on daylight levels. 'We were keen to maximise daylight for health and wellbeing, and to cut down lighting loads, so we pulled apart the first floor to let light flood the lower level,' explains Bellew.

The roof overhangs the fully glazed east- and west-facing end elevations to provide shade. Additional protection against glare is provided by angled wooden louvres, tucked beneath the arch of the roof. The louvre blades are inclined at a different angle for each elevation, in response to the angle of the early morning and late evening sun. With so much glazing, the office is a bright, light-filled space, with a daylight factor of four or more over 90% of its floor plate.

The light and airy feel to WWF's new open-plan office is in stark contrast to the charity's previous home – a cellular office space on an industrial estate in Godalming, Surrey. The new office has far fewer desks for its 300 staff than its former home, after surveys revealed only about 40% of desks were occupied at any one time; a figure that increased to a maximum of 60% at peak times.

To optimise the use of space in its new 3,700m<sup>2</sup> office WWF has adopted a hot-desking strategy based on 200 workstations. 'If you had designed the office to fit all the employees it would have been at least 2,000m<sup>2</sup> bigger,' Bellew explains.

The result of this hot-desking strategy is a more densely populated office and a greater reliance on an effective mixed-mode ventilation strategy. 'We wanted the building to be naturally ventilated,' says Bellew. However, modelling showed that this would



only be possible for about eight months of the year – mechanical ventilation is used for the remaining four months.

On a day when the office is naturally ventilated, air will enter the building through small, manually openable windows, set above the glazed doors lining both sides of the lower floor. The air is drawn across the deep-plan office and upwards, around the chamfered edges of the two floating first-floor platforms and into the central atrium. Four roof-mounted cowls, made from recycled aluminium, expel the air. 'We modelled the building to show that natural ventilation would function effectively in such a deep-plan building,' says Bellew.

The effectiveness of the natural ventilation system is enhanced by the heat-absorbing properties of thermal mass, cleverly incorporated into what, initially, appears to be a predominantly wooden building. The exposed concrete soffits beneath the first-floor office bays are one such area. Less

Predicted consumption figures from WWF	
Energy for heating, cooling and lighting	26.7kWh/m <sup>2</sup> per year
Energy for small power	48.2kWh/m <sup>2</sup> per year
Fossil fuel	65.2kWh/m <sup>2</sup> per year



The building benefits from the shade provided by surrounding trees



obvious are the panels of Du Pont's Energain phase change material – attached to the underside of the roof behind both the solid timber and acoustic panels – to add thermal mass. 'It helps keep overhead temperatures cooler, so means radiant temperatures are lower,' explains Bellew. The thermal mass is recharged at night using a night-cooling strategy, with air supplied through the earth ducts and underfloor air system, and expelled via the roof cowls.

Natural ventilation can be increased by opening the rows of double doors leading onto the balconies. Discreet green and red lights above the doors tell the occupants whether or not it is a natural ventilation day, so they know when the doors and windows can be opened. This was a solution Atelier Ten pioneered at Kroon Hall, and which – according to Bellew – has been very successful. In addition to the traffic lights, occupants also get a message sent to their computer to inform them when the building is switching to mechanical ventilation mode.

A displacement system provides the mechanical ventilation. This will operate primarily in winter – when heat recovery is beneficial to energy demand – and in warm weather, when the supply air will be cooled.

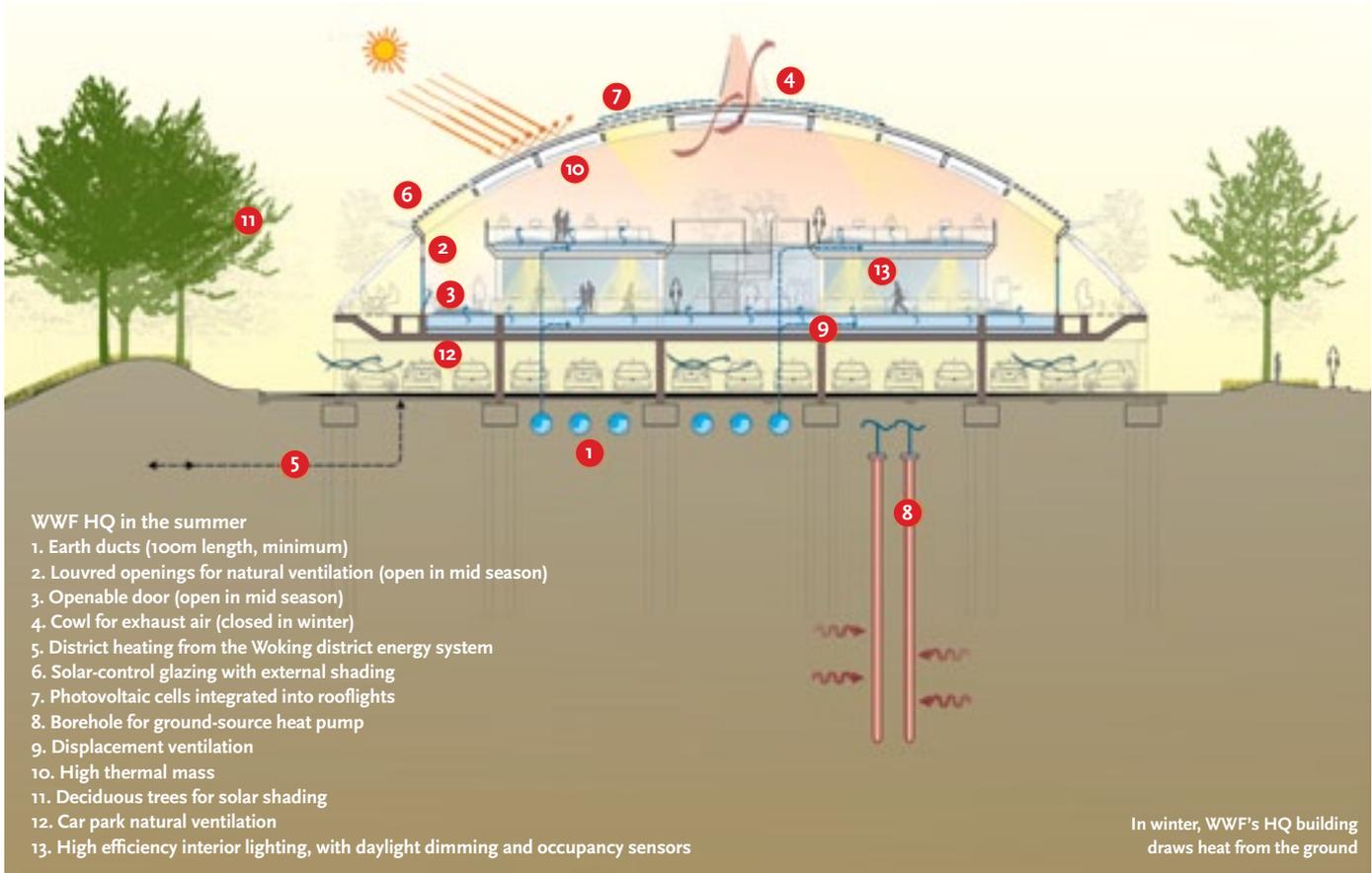
Air is drawn into the building through

six, 80m-long earth ducts, constructed from 900m-diameter concrete drainage pipes buried in the ground beneath the car park – thus connecting the building back to the earth. The tempered air passes through one of two heat-recovery air handling units (AHU) – situated in the car park beneath the office – and the primary distribution ductwork, concealed within a 500mm-deep floor void. Variable air volume (VAV) boxes control the quantity of air supplied to floor-mounted swirl diffusers. Air is returned to the AHU through grilles in the ceiling, above a series of first-floor meeting rooms. 'The system works because the office is so open plan,' Bellew says.

The ventilation system runs all year round to supply fresh air to a series of first-floor meeting rooms and a 150-seat conference room on the entrance level. However, the VAV boxes supplying the main office floors are programmed to switch off when the building is in natural ventilation mode, and the speed of the supply air fans will wind down accordingly.

Heating and cooling to the AHUs is provided by a Groenholland ground-source heat pump connected to 20, 100m-deep boreholes. The heat pump uses two separate plate heat exchangers – one for heating

“The engineers were helped in their mission to create a comfortable internal environment by nature: the tree canopy provides shade in summer to keep heat gains low; in winter, when leaves have fallen, the trees allow passive solar gain



► and one for cooling – to deliver heating and cooling to the space. ‘In winter we draw heat out of the ground, in summer we use the ground as the heat exchanger condenser,’ explains Bellew.

The building’s heat demands are minimal;

the large areas of glass, however, mean that heat gains have to be carefully controlled to keep cooling loads to a minimum. Solar gains on the glazed southern elevation are kept low by a projecting shelf, and by the louvred brise soleil on the end elevations. The engineers were helped in their mission to create a comfortable internal environment by nature: the tree canopy provides shade in summer to keep heat gains low; in winter, when leaves have fallen, the trees allow passive solar gain.

The lighting load is only 5.5W/m<sup>2</sup> installed capacity – Atelier Ten made extensive use of LED lamps linked to movement sensors, and perimeter daylight-dimming controls.

Power for the scheme is from Thamesway Energy’s CHP plant. It also has photovoltaic (PV) panels: 410 covering 510m<sup>2</sup>. The two rows of panels are positioned between the skylights on the curved roof – which is on an east-west axis, meaning some of the PV panels are orientated to face north. Nevertheless, the PVs have an estimated peak output of 55kW, and are predicted to provide about 20% of the building’s regulated energy needs from fans, pumps and lighting. Any unused PV-generated electricity is sold back to Thamesway.

The PV panels were one of 1,700 components – including 271 M&E elements – that were assessed in terms of embodied

## Thermal mass in Turkey

The Turkish Contractors Association wanted its new Ankara headquarters building to be a showcase for construction, and to demonstrate progressive environmental design. It also had to achieve LEED Gold.

Engineers Atelier Ten, working with Avci Architects, developed a solution for the six-storey building based on exploiting thermal mass, to take advantage of the large diurnal temperature range experienced, year round, in the Turkish capital. There, August temperatures can soar to 34°C during the day, but drop to a chilly 10°C at night as a result of the city’s elevation and inland location.

The scheme incorporates a giant labyrinth built into the ground beneath the building’s basement to act as a thermal store. During the day, fresh air passing through the labyrinth will be cooled by its contact with the ground. At night, the labyrinth is purged using cool night air to pre-cool it before the start of each day.

Thermal mass is also used on the office floors. Small-bore ductwork has been cast into the concrete floor slabs and these provide a surface to absorb internal heat gains. At the same time, they use this absorbed heat to warm the supply air, reducing energy usage at the air handling unit. Accurate control of the internal temperature is achieved by using chilled beam terminal units. For more images, go to [www.cibsjournal.com/app](http://www.cibsjournal.com/app) or [www.cibsejournal.com](http://www.cibsejournal.com)





The flooring was chosen for its low embodied energy

carbon by Sturgis Carbon Profiling. To pass muster, a component's embodied carbon had to be lower than the RICS standardised figure for that particular material. For example, the metal-and-timber floor was selected because it had the lowest embodied energy of any raised-floor system. 'If there was a variation in the design, it was assessed in terms of cost and carbon savings,' says Bellew.

One of the biggest carbon savings was in the cement used to back-fill the piles dug to house the ground-source loops. Normally a Gunitite-type mixture of dry, loose sand and cement is used. However, by changing



Timber dominates the interior of the building

the specification of the cement, the team has managed to achieve significant carbon savings.

Another major carbon saving was achieved by substituting a natural polymer for synthetic glue in the glulam beams. Bellew says the team saved 42% of embodied carbon on the whole project, which equates to 5,400 tonnes CO<sub>2</sub>e, at no additional cost.

According to WWF, the basic building cost £2,609/m<sup>2</sup> and the services £1,039/m<sup>2</sup>. Not bad for an exemplar building, which reflects the WWF's values by treading as lightly as possible on the planet – and car park. CJ

The award-winning Gardens by the Bay Atelier Ten scooped the International Project of the Year award at the 2014 CIBSE Building Performance Awards. To read about the project on the app or website go to [cibsejournal.com/app](http://cibsejournal.com/app) and [cibsejournal.com](http://cibsejournal.com) respectively.

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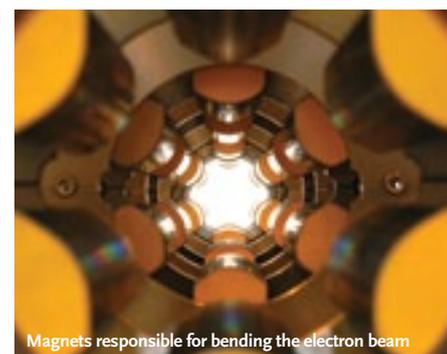
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The new Crac units at the synchrotron have resulted in energy savings of 54%

# EC DOES IT

The Diamond Light Source synchrotron needed to reduce its computer rooms' cooling load without compromising its research. **Andrew Smith** explains why electronically commutated fans were the answer



IMAGES COURTESY OF DIAMOND LIGHT SOURCE

Magnets responsible for bending the electron beam

Despite being encased in a 37,000-tonne steel and concrete shell, the synchrotron can be adversely affected by temperature, noise and vibration

**W**hen any company decides to upgrade its computer room air conditioning (Crac) units, there are challenges. But when that company is one of the UK's leading scientific research organisations – and the computer rooms are next to a electron beam facility – it makes things even more complicated.

The Diamond Light Source synchrotron is a vast doughnut-shaped structure in the south Oxfordshire countryside. Within this mysterious building is a particle accelerator that fires extremely bright light beams around a 560m circular tunnel. These beams can be used for everything from high-intensity X-rays to microscopic investigations of the cellular structure of various products.

The synchrotron's work is extremely delicate and – despite being encased in a 37,000-tonne steel and concrete shell – it can be adversely affected by temperature, noise and vibration. It is also highly energy-intensive work, and Diamond Light Source was looking to reduce the cost of the cooling load. So when – in 2012 – computer-room specialist Stultz

asked ebm-papst UK to carry out a site survey for upgrading some of the building's Crac units, it was clear that something more than a conventional solution would be needed.

## Put to the test

Phase one of the project involved upgrading 27 downflow Crac units – a type of unit normally used in data centres – from their traditional AC forward curved centrifugal blowers to electronically commutated (EC) backward curved impellers.

The initial site survey was to ascertain what the current solution delivered in terms of power draw and performance. Suitability for upgrade also had to be considered. Because of the limitation of the scoop that feeds the air into the room, the EC solution had to be mounted within the Crac unit enclosure, rather than below it.

The proposed solution was ebm-papst's RadiCal 560mm impeller. The fans would be mounted in bespoke metalwork frames to angle the airflow to assist with the air delivery into the room. Across the 27 units, ➤

➤ the predicted energy saving of this approach was 39%.

In January 2013, a single-unit trial was undertaken by Cinque Energy Solutions. The aim was to confirm the bespoke design, and prove the potential energy saving and benefits to the customer.

Initial results showed a 43% reduction in power use (kVA) compared with the original AC fans. For the trial, the unit was not physically modified, allowing the possibility of reverting to the original setup if desired. It was agreed that – for complete upgrade purposes – the floor of the Crac unit would be opened up further to allow the new fans a less restrictive system resistance, thereby further increasing efficiency.

The measured parameter of greatest importance to the customer was the temperature at rack level. The trial unit airflow was adjusted to match the previous ambient conditions. A simple manual 0-10v controller was fitted to the Crac unit to allow each unit to be tuned to the room requirements. Over the course of a few months, the maintenance team adjusted the fan speed to optimise the solution even further.

**No time to waste**

The upgrade of the 27 units was scheduled for a shutdown period in August 2013. It had to be finished within two weeks, so two teams from Cinque Energy Solutions were deployed to work on units simultaneously. All 54 fans – two for each unit – were delivered to the site and positioned near the units to cut down on delays during the conversion. There were four key stages to the implementation process:

- Removing the original AC fans and motor system
- Enlarging the outlet holes in the floor void to maximise airflow with the EC fan solution



- Fitting the new EC fans and frames

- Reconnecting supply to fans and fitting manual speed controller.

After the installation, the opening up of the floor pan and the fine-tuning of the fan performance, the unit was remeasured. Even with the skew of improvement in power factor (0.6 to 0.9), the energy savings were higher than initial estimates, reaching 55%. This equates to 46 tonnes of carbon dioxide a year, and an annual cost saving of £32,000 (based on an industry average of 10p/kWh).

As well as these energy savings, the conversion to EC fans has had other benefits for the customer. These include:

- Reduction of noise and vibration
  - Extended fan and unit life
  - Reduced maintenance – no belts
  - No belt dust being blown into the equipment rooms
  - Controllability of cooling capacity
  - Greater flexibility for capacity management.
- Phase 2 of the project, to convert the rest of the cooling units, is scheduled for the next shutdown period – but the customer certainly seems impressed with the work carried out so far. Diamond Light Source says the significant reduction in noise and vibration means an operator has to use the ‘cuddle test’ to confirm a unit is running. CJ



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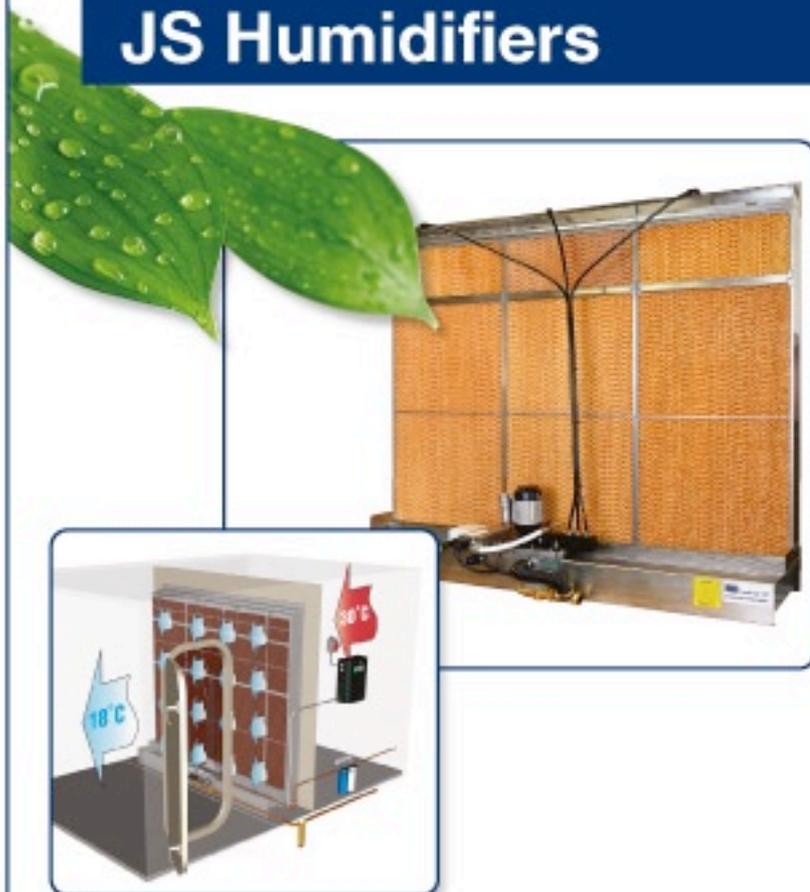


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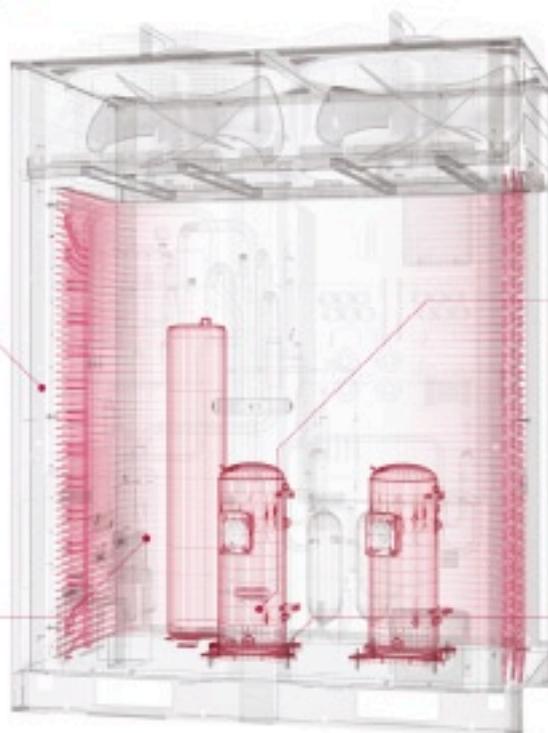
MULTI V IV, unlike other VRF's, increases energy efficiency by controlling the amount of refrigerant depending on the outdoor temperature and its operating mode.

#### HiPOR™ in Compressor

Normal VRF's generate energy loss from collecting oil and refrigerant at the same time, through the pipe connected to the compressor's entrance. MULTI V IV, on the other hand, boosts the efficiency with LG's patent HiPOR™ technology by collecting oil from the oil separator directly to the compressor.

#### Smart Oil Return

Past VRF's have used unnecessary energy from regularly operating the oil return system and generate sudden operation stops. MULTI V IV, however, runs the oil return system with the oil sensor only when it's needed.



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The four key elements of any effective VRF system are the compressor, the heat exchanger, the oil and the refrigerant. LG's Multi V IV employs cutting-edge technologies in all of these areas, enabling it to go beyond the standard and claim the title as the true leader of 4.

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## Evaluating and improving the performance of variable refrigerant flow air conditioning systems

This module explores measures underpinning the system of energy performance labelling for space air conditioning systems, and how equipment is evolving to become more effective

The largest growth area in the European market for active air conditioning is in variable refrigerant flow (VRF) systems, presenting an important area of application for building services professionals. This builds on previous CPD articles looking at underlying systems and technology, and considers current measures that underpin the system of energy performance labelling for space air conditioning equipment – and how that equipment is evolving, specifically to overcome areas that can potentially reduce operational effectiveness.

In Europe, over the next 10 years, growth in unit sales of VRF systems is expected to outstrip growth in other air conditioning systems.<sup>1</sup> Coincident with this is the implementation of increasingly stringent performance requirements that allow these products to carry a CE mark and, hence, allow their use in the EU. The product labels carry the evidence of compliance with the energy performance requirements of Ecodesign directives, by incorporating the numerical indices of seasonal coefficient of performance (SCOP) and seasonal energy efficiency ratings (SEER) – terms that, in the proliferation of performance indices, may cause some uncertainty.

### SCOP for VRF heating performance

When considering the efficiency or effectiveness of a piece of HVAC&R equipment

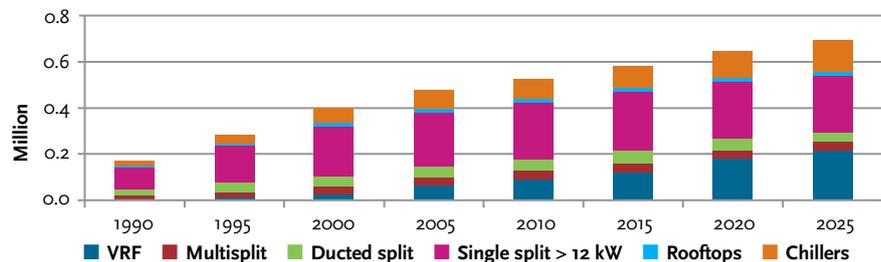


Figure 1: Estimated number of sales of air conditioning products in EU. Note that this is in terms of unit sales and not cooling capacity – further analysis is in source report<sup>1</sup>

or system, the simple relationship of useful work done/supplied energy provides the basis of all the common measures. Coefficient of performance (COP) is typically the basis – the higher the COP the better the performance. So, considering an air to air heat pump application when heating a space:

$$COP_H = \frac{\text{Useful heat supplied to internal space}}{\text{Power consumed by heat pump}}$$

Now, considering that the performance of any 'heat engine' is limited by Carnot's theorem<sup>2</sup> that provides a relationship for the efficiency of a 'perfect engine' as

$$\frac{T_H}{T_H - T_C}$$

where the cold source is at  $T_C$  kelvin (K) and the hot output is at  $T_H$  K, to maximise the efficiency, the values of  $T_H$  and  $T_C$  should be as close to each other as possible. Practically, for a system running at full capacity, the effect of

this will be to reduce COP by between 2% and 4% for every 1K increase in the heat output temperature (at the refrigerant condenser) or for every 1K reduction in source temperature (at the refrigerant evaporator). Therefore, for performance testing, so that systems may be compared, BS EN 14511<sup>3</sup> specifies 'standard' sets of design/operating temperatures that are used when manufacturers are determining the standardised COP for their heat pump device.

But such COPs will not necessarily reflect the operational performance at conditions that vary from the design condition – which, of course, is most of the time. The range and frequency of outdoor temperatures can usefully be shown by employing 'banded' or 'binned' data sets. Figure 2 shows example binned outdoor dry bulb temperature data for Edinburgh, London and Strasbourg. So, for example, the 7°C bin (6.0°C to 7.9°C) occurs just under 1,000 hours

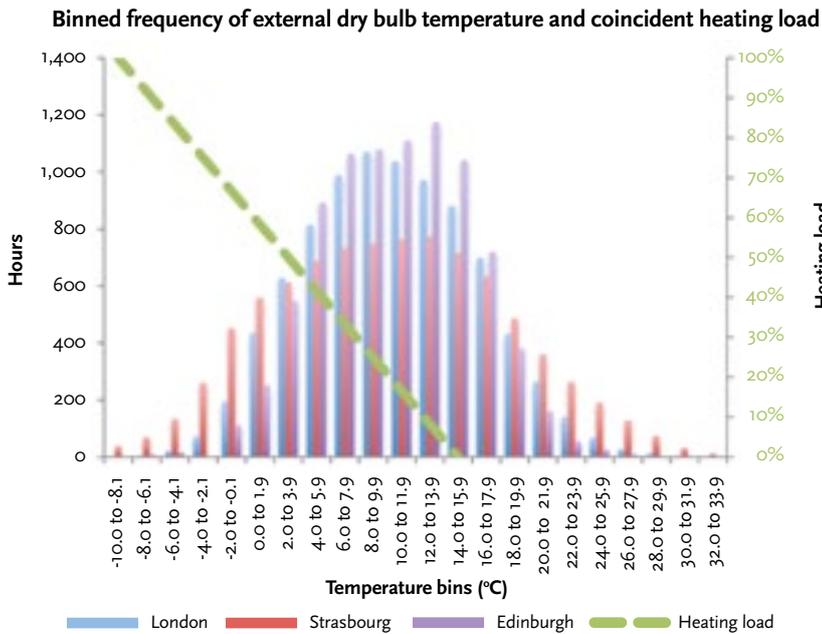


Figure 2: Example of 'binned' dry bulb temperatures (2K intervals) for Edinburgh, London and Strasbourg

a year in London and just over 700 hours in Strasbourg. As an instance of COP would only reflect a single point of operation at a particular outdoor (and indoor) temperature that would only exist for a few hours per year, the seasonal COP (SCOP) was introduced – as defined in BS EN 14825:2012\* – that attempts to get closer to a measure of seasonal operation.

The SCOP effectively describes the average annual efficiency for a given heating profile. Based on a heating demand at each binned temperature, the COP is evaluated (by the manufacturer) for the heat pump operating at that condition, weighted by the number of hours in each bin, and summed to produce the SCOP. The power consumed by the heat pump includes internal parasitic loads such as controls and fans, as well as an assumed COP of 1 for any additional heat when the heat pump is unable to meet the full heating loads at lower temperatures (below the so-called 'bivalent point' for the heat pump).

For standardisation purposes, three European locations have been chosen to represent typical seasonal operating conditions – warmer (W), average (A) and cooler (C), relating to Athens, Strasbourg and Helsinki. The climate for Strasbourg is probably the most similar to that of the UK, although there are rather more extreme heating and cooling days in Strasbourg.

The SCOP is recorded as part of the product energy label that is a requirement under the EU Ecodesign regulations for air conditioners under 12 kW, as in Figure 3.

### SEER for VRF cooling performance

When considering the cooling performance of a heat pump, the coefficient of performance

again provides the starting point, where  $COP_c = \text{useful cooling supplied to internal space} / \text{power consumed by heat pump}$ . The traditionally quoted 'full load' COP for a system has been determined for an outdoor temperature of 35°C and indoor temperature of 27°C.

In the European regulations, the energy efficiency ratio (EER) – as defined by BS EN 14511 – is the ratio of the cooling energy delivered by the cooling system divided by the energy input to the cooling plant. This is effectively the same as the  $COP_c$ . However, just as with heating, the performance of the cooling will vary throughout the operating season. Unlike heating, though, the building cooling load – and the demand on the air conditioner – will not tend to vary simply (or linearly) with changes in outdoor temperature, as it will also be affected by occupants, equipment and solar radiation.

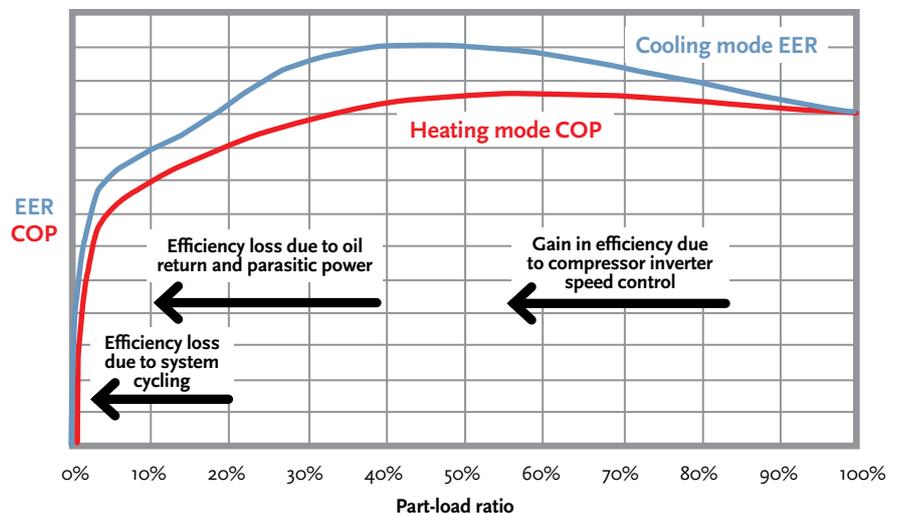


Figure 4: Indicative performance of a 'base case' VRF unit, drawn showing identifiable areas that impact on effectiveness from data defined in Ecodesign Lot 6: Air conditioning and ventilation systems

Data from Contract No. ENTR/B1/35-2009/LOT6/ Sl2.549494 Final report of Task 4, July 2012

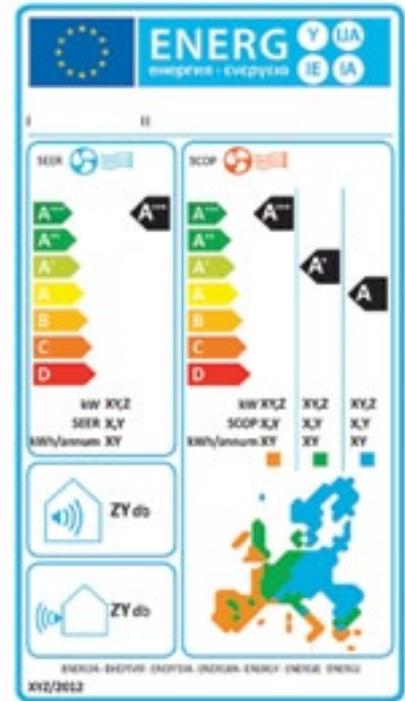


Figure 3: An EU energy label for a heat pump air conditioner under 12 kW, indicating the SCOP and SEER (as well as the cooling and heating capacity, and annual cooling and heating energy use)

To take account of all this, the SEER was introduced to combine the output of a pattern of cooling demands (for a typical 'office' building throughout the cooling season) so that different systems can be compared.

The SEER could be evaluated for a specific building/application from historical (or modelled) data of the total amount of delivered cooling energy divided by the total energy input to the cooling summed over the year. However, a standardised value is used so that it is not dependent on a specific application for the European SEER (ESEER). The climate data for Strasbourg was taken as a single reference point for the whole of Europe for the SEER, as

determined from:

$SEER = A \times EER_A + B \times EER_B + C \times EER_C + D \times EER_D$   
 where for air cooled systems, such as VRF, the factors used are given in Table 1.

This is also the SEER as referred to by the UK Building Regulations<sup>5</sup> and simplified building energy model (SBEM)<sup>6</sup>, and is that used on the product label shown in Figure 3. It would normally be supplied by the manufacturer, together with the full load cooling capacity and power input.

**Improving VRF performance**

The research<sup>7</sup> that was undertaken to underpin the Ecodesign legislation identified specific areas where the effectiveness of multi-split type systems – including VRF – was being impaired.

This is generalised in Figure 4, but it identifies two particular areas – oil recovery and compressor cycling – as contributing to reduced EER and COP at low load factors.

**Oil recovery** – As with all vapour compression refrigeration systems, lubricating oil is carried away from the compressor with the high-pressure, high-temperature refrigerant gas.

Most systems will incorporate an oil separator that minimises the amount of oil passing into the distribution system. If the oil is not reliably returned to the compressor, it can collect – particularly in the colder sections of the system – reducing the performance of evaporators, and potentially starving the compressor of lubricant.

Due to the extensive network of pipework that is associated with VRF systems, a specific (automatic) oil-retrieval mode is needed. The individual electronic expansion valves are opened and the compressor is cycled to pump the oil back around the system. This cycle will degrade the system performance, particularly when the indoor units are heating – since the recovery mode will provide a few minutes of cooling – and so should be performed as infrequently as practical. The normal method has been to run such a cycle at the some pre-determined operational interval (for example, every eight hours). However, this can lead to unnecessary operation – so needlessly degrading the overall performance – or, in extreme cases, potentially starve the compressor of required lubricant. This has been overcome by mounting a (failsafe) oil level sensor – such as the one shown in Figure 5 – within the compressor: this actuates the oil recovery cycle only when needed, so reducing the loss in system effectiveness. Depending on the temperature, the oil in the crankcase of the compressor will be combined with varying amounts of refrigerant, so it is not simply a matter of checking levels, but also – through the capacitance sensor in this example – determining the constituency of the fluid.

Operating point	A	B	C	D
Weighting	A = 0.03	B = 0.33	C = 0.41	D = 0.23
EER load factor	100% full load	75% full load	50% full load	25% full load
Outdoor temperature	35°C	30°C	25°C	20°C

Table 1: Weightings, load factors and outdoor temperatures used in determination of SEER for VRF

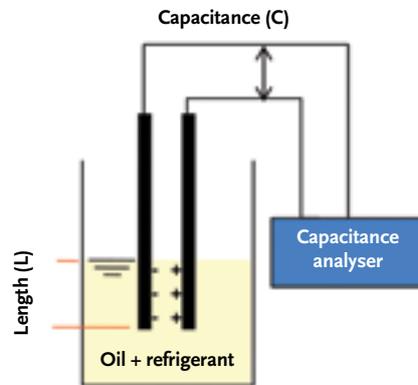


Figure 5: A sensor measures the capacitance of the refrigerant/oil mix and, with a knowledge of the temperature in the compressor crankcase, is able to optimise the oil-recovery cycle actively. [Source: LG]

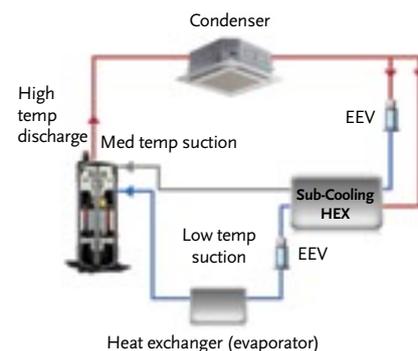


Figure 6: The application of split liquid flow and heat exchanger (economiser) with ‘two-stage’ compression provides improved performance, particularly at low outdoor temperatures (simplified diagram). [Source: LG]

**Improving compressor efficiency** – Previous CPD articles have spoken about the application of improved speed controllers for VRF, but there is still opportunity to improve the performance, particularly at low outdoor temperatures.

In traditional refrigeration systems, the application of a ‘booster economiser’ has been used to reduce the ‘flashing off’ of refrigerant and to enhance the amount of useful work that can be produced by the compressor. As shown in Figure 6, this effectively splits the flow of refrigerant as it leaves the condenser, and passes the smaller part through an expansion valve (reducing its temperature and pressure to an intermediate value), vaporising that part of the refrigerant and then exchanging sensible heat with the (larger flowrate, hotter) path of

condensed refrigerant, so sub-cooling this main refrigerant flow before it enters the evaporator. Intermediate pressure refrigerant gas from the diverted stream enters a second stage of the compressor (or, in some traditional refrigeration systems, a separate compressor).

Wang<sup>8</sup> and Yonghee<sup>9</sup> showed that the same principles could be applied usefully with the scroll compressor at the heart of the VRF system.

This has now been applied in commercially available VRF systems (referred to as ‘vapour injection’), where it can increase both the COP and EER. It is particularly beneficial at lifting the COP at low outdoor temperatures and, for one manufacturer’s range, has increased the capacity by more than a quarter, and COP by more than 10%, compared to earlier systems. © Tim Dwyer, 2014.

**Further reading:**

The fully explained method for determining the constituent elements of the EU Energy Label for air conditioners <12kW can be seen in Notice 2012/C 172/01 of the Official Journal of the EU.

More details on the determination and application of SEER is given in the *Non-Domestic Building Services Compliance Guide*.<sup>5</sup>

An interesting comparison of international benchmarking was undertaken by CLASP and is available at <http://clasponline.org/Resources/Resources/PublicationLibrary/2012/Cooling-Benchmarking-Study> This includes a detailed comparison of global SEER equivalents and the relative performance of global air conditioning unitary equipment.

**References:**

- 1 Ecodesign Directive – Energy-Using Product Group Analysis, Lot 6: Air conditioning and ventilation systems, Final report of Task 2, July 2012 – [www.ecohvac.eu](http://www.ecohvac.eu)
- 2 <https://www.khanacademy.org/science/physics/thermodynamics/v/carnot-efficiency-3--proving-that-it-is-the-most-efficient>
- 3 BS EN 14511:2013 Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling.
- 4 BS EN 14825:2012 Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling. Testing and rating at part load conditions and calculation of seasonal performance.
- 5 *Non-Domestic Building Services Compliance Guide: 2013 Edition* – DCLG, [www.planningportal.gov.uk/](http://www.planningportal.gov.uk/)
- 6 National Calculation Method for the EPBD – DCLG, [www.ncm.br.co.uk/](http://www.ncm.br.co.uk/)
- 7 Ecodesign Directive – Energy-Using Product Group Analysis Lot 6: Air conditioning and ventilation systems, Final report of Task 4, July 2012 – [www.ecohvac.eu](http://www.ecohvac.eu)
- 8 Wang, X, et al, *Two-stage heat pump system with vapor-injected scroll compressor using R410A as a refrigerant*, International Journal of Refrigeration 32 (2009) 1442–1451.
- 9 Yonghee, J, et al, *Effects of Flash and Vapor Injection on the Air-to-Air Heat Pump System*, International Refrigeration and Air Conditioning Conference, 2010.

Turn over page to complete module ➔

# Module 64

May 2014



1. For a theoretical heat engine, what would be the approximate maximum Carnot COP when it is acting as a heat pump with a cold temperature of 5°C and a hot temperature of 45°C?

- A 4
- B 5
- C 6
- D 7
- E 8

2. From the data in this article, what is the most frequently occurring temperature band for Edinburgh?

- A 0°C to 1.9°C
- B 6.0°C to 7.9°C
- C 12.0°C to 13.9°C
- D 22.0°C to 23.9°C
- E 30.0°C to 31.9°C

3. On the standard energy label for units under 12kW, what is the measure used to indicate seasonal cooling effectiveness?

- A SEER
- B SEEV
- C SBEM
- D SVRF
- E SCOP

4. Which of these is not noted as being one of the identifiable areas that affects the operating effectiveness of VRF systems?

- A Compressor cycling
- B Oil return
- C Parasitic power
- D Orientation of heat transfer coil
- E Inverter speed control

5. Which secondary measurement is used to determine the amount of refrigerant in the crankcase oil for the automated oil-recovery cycle?

- A Voltage
- B Resistance
- C Capacitance
- D Inductance
- E Permittivity

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## Grundfos pumps given top marks by university

As part of an ongoing evaluation of its estate, the University of Bolton took up the offer of an energy check by Grundfos Pumps to assess the efficiency of its pump stock. The results of the check – by a member of Grundfos' energy solutions sales team – showed there were substantial energy savings to be made by replacing a number of the existing circulator pumps with Grundfos Magna 3 equivalents.

The Magna 3 range delivers medium and large circulator pumps, which come with electronically controlled motors based on permanent magnet (PM) and compact stator technology. They already meet the Energy Efficiency Index (EEI) level set for 2015.

Within weeks of the energy check, an order had been received for the full project, and installation took place soon afterwards. During a post-installation visit, the customer advised that they were 'astounded' at the level of savings, the noise reduction, and the slickness of the transfer to the new pumps.

● Call 01525 850000, email [grundfosuk@grundfos.com](mailto:grundfosuk@grundfos.com), or visit [www.grundfos.co.uk](http://www.grundfos.co.uk)



## Trio of wins for Steven Hunt Associates

Building services engineering specialist Steven Hunt Associates has reason to celebrate this month, thanks to a trio of project wins. The company has been awarded the building services design project for the University of Liverpool's new £6 m management suite. Meanwhile, for Liverpool Hope University, it is developing building services proposals for an ambitious £4 m plan to extend the sports hall, and build a sports science block around the adjacent departmental building, to increase its size and link it to the sports hall facilities. Finally, the company has been awarded the building services installation contract, by Halton Borough Council, for a new £2 m community sports facility at Widnes Recreation Ground.



● Call 0151 427 8009, email [anne@stevenhunt.com](mailto:anne@stevenhunt.com) or visit [www.stevenhunt.com](http://www.stevenhunt.com)

## LG's spring training dates

Air conditioner manufacturer LG strongly believes, that – as technology rapidly advances – training is more important than ever. The company offers free courses, aimed at contractors, that give them the opportunity to develop practical and theoretical knowledge of the firm's products. The courses cover LG VRF, split systems, and the MCS-accredited Therma V air-to-water heat pump systems, and are held in LG's training academies in Slough and Leeds. Dates for LG training courses are available on [uk.lgeaircon.com](http://uk.lgeaircon.com).

● Visit <http://partner.lge.com/uk>



## Big Foot Systems joins the NBS National BIM Library

Big Foot Systems' rooftop building services support structures have been added to the NBS National Building Information Modelling (BIM) library. Specifiers can now download Big Foot's BIM objects at the click of a button – via [www.nationalbimlibrary.com/bigfoot](http://www.nationalbimlibrary.com/bigfoot) – allowing simple visualisation of designs. As the UK moves towards the government mandate that all construction companies tendering for government work should achieve level 2 BIM by 2016, momentum is growing for BIM.

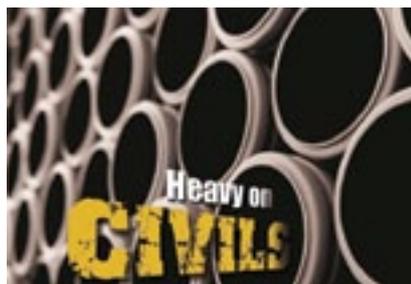
● Call 01323 844355 or email [enquiry@bigfootsupport.com](mailto:enquiry@bigfootsupport.com)



## University of Salford Energy House makes 63% energy savings

Energy savings of 63% have been achieved after the installation of multiple Saint-Gobain systems in a world-first retrofit research project. Saint-Gobain worked with the Energy House at the University of Salford – and leading academics from Leeds Metropolitan University – to prove that whole-house, fabric-first retrofitting of homes can deliver significantly reduced energy costs. It can also lower CO<sub>2</sub> emissions and remove 50% of air leakage, leading to benefits in the overall comfort and wellbeing of occupants.

● Visit [www.saint-gobain.co.uk](http://www.saint-gobain.co.uk) or follow @SaintGobainUK



## New 2014 Jewson civils catalogue is launched

Jewson, which has more than 600 branches in the UK, has launched a new civils catalogue after its significant investment in a national network of 43 enhanced civils branches. The catalogue offers a comprehensive overview of available products and materials, as well as full details of the merchant's tool hire service. Products featured in Jewson's

2014 civils catalogue include: geosynthetics; concrete, clay, plastic, and linear drainage; flexible couplings; ductile and steel covers; flags, kerbs, and edgings; ducting and access boxes; reinforcement; water management; waste-water solutions; and damp-proofing and barrier membranes.

● Visit [www.jewson.co.uk/working-with-you/dedicated-civils-service/](http://www.jewson.co.uk/working-with-you/dedicated-civils-service/)

## New international award scheme celebrating industry excellence launched



Panasonic, a leading brand in the heating and cooling sector, has announced the inaugural Panasonic PRO Awards. The new initiative will celebrate excellence in the design, specification, installation and commissioning of Panasonic heating and cooling systems. Panasonic is inviting entries from architects, consultants, distributors, engineers and installers, whose projects demonstrate flair and innovation, and showcase sustainable design, efficiency, cost effectiveness and aesthetics.

● Call 01344 853390 or visit [www.panasonic.eu](http://www.panasonic.eu)

## Simpler, faster testing with new Fluke Earth Ground Testers

Fluke – a leader in compact, professional test tools – has introduced two new Earth Ground Testers, indispensable troubleshooting tools to help maintain uptime and lower the risk of electric shock to personnel. The Fluke 1623-2 and 1625-2 GEO Earth Ground Testers offer automated data collection and storage, with download capabilities via a USB port, eliminating data entry and recording errors. The choice of models targets electrical contractors, and industrial maintenance technicians, as well as power utilities and telecom engineers.

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



## ABEC debunks BMS myths with new packages



ABEC has announced a new series of maintenance and energy services for organisations seeking to reduce the cost – and increase the efficiency – of their building and energy controls. The eight packages set out a logical route to securing an optimum level of services according to the business and its buildings' needs, and suit a variety of budgets. ABEC has broken down its building and energy services, with a view to debunking the myths surrounding building controls. Now a phased approach enables clients to construct a package of services, from ABEC, that is entirely tailored to their individual requirements and operational targets.

● Visit [www.abec.co.uk](http://www.abec.co.uk) or follow @ABEC\_uk

## Ramsgate train depot upgraded with Castel intercom solution

Over the past year, Southeastern trains has upgraded security at its Ramsgate engineering depot, where its trains are maintained, cleaned and serviced. It is also the main location for many of the company's staff. The requirement for the project was to increase security at barriers in and out of the site, ensuring access is strictly monitored. The installer, ICL, approached Castel because its Softphone intercom product perfectly fitted the client's requirements. The CAP IP V1B (single-button video) intercom has now been installed at the depot's gates and barriers.

● Call 01376 556010, email [sales@castel.co.uk](mailto:sales@castel.co.uk) or visit [www.castel.co.uk](http://www.castel.co.uk)



## The right-sized PICV

Whichever size of pressure independent control valve (PICV) you need, Marflow Hydraulics can help. Marflow Hydraulics supplies a complete range of PICVs – from ½ in to 2 in screwed, and 65 mm to 150 mm flanged. Understanding that every project is different, and every customer has unique requirements, the company has expanded its range. Marflow Hydraulics also has axial, rotary and electronic valves within its portfolio of products. In addition, the company has considered the longevity of the products, and has ensured that the valves are easier to install and maintain.

● [www.marflowhydraulics.co.uk/great-solution](http://www.marflowhydraulics.co.uk/great-solution)



## Get cool and save, with HygroMatik's adiabatic pressure systems

With rising energy costs and environmental concerns, HygroMatik's adiabatic range offers precision, reliability and a large reduction in running costs. Adiabatic systems take heat energy from the air to create the humidifying mist. Atomisation has a cooling effect on the room temperature, reducing the energy requirement. HygroMatik's adiabatic systems offer a free cooling effect of up to 30% – useful for taking load from existing cooling systems, and providing a further cost saving.

● Call 02380 443127 or visit [www.hygromatik.com](http://www.hygromatik.com)



## Prysmian FP PLUS protects the 'Walkie Talkie'

Fire protection within the dramatic Sky Garden that tops the so-called Walkie Talkie building at 20 Fenchurch Street, London, is assured by 2,000 m of Prysmian FP Plus fire-resistant cable. The Sky Garden is a three-storey leisure and exhibition space. Its façade is created from a 980 tonne, complex steel frame, with integrated photovoltaic cells. Prysmian FP Plus is installed in the essential safety systems, including emergency lighting and smoke exhaust ventilation systems, all of which are integrated within the façade structure.

● Email [jessica.howe@ridgemountpr.co.uk](mailto:jessica.howe@ridgemountpr.co.uk)



## Saint-Gobain proves popular at Ecobuild

The Saint-Gobain stand and seminar theatre at Ecobuild, in March, delivered a range of presentations from industry bodies, including one on the results of its world-first Energy House retrofit project (see page 57). This seminar was the most talked-about session among visitors to the three-day event at ExCel in London. Richard Halderthay, director of communications for Saint-Gobain UK, Ireland & South Africa, said: 'To have so many people visit the stand – and show their interest in Saint-Gobain and our partners – was absolutely great.'

● Visit [www.saint-gobain.co.uk](http://www.saint-gobain.co.uk) or tweet @SaintGobainUK



## Gaia – experts in underfloor heating

Focusing on providing a comprehensive range of high-quality underfloor heating (UFH) systems, Gaia – formerly DEVI Electroheat – designs, supplies and installs hydronic UFH, as well as the electric alternative. The hydronic, ultra-efficient, wet UFH system is suitable for a wide range of applications. It provides high comfort levels by circulating water at low temperatures through a series of pipe loops laid within a screed, or between timber joists, beneath the floor surface. The ultra-flexible and lightweight pipes are simply unrolled and clipped into the supplied tracks.

● Call 0845 434 9488 or visit [www.gaia.co.uk](http://www.gaia.co.uk)



## Remeha boilers go down a storm at Somerset theatre

Two fully modulating Remeha Gas 310 Eco Pro 6 section gas-condensing boilers were specified by Slade Associates to replace a failing oil boiler at Yeovil's Octagon Theatre – thus meeting South Somerset District Council's brief for affordable, greener heating. 'Remeha products are impressively reliable, and their service is excellent,' said consulting engineer Mike Slade. With tight access to the theatre's basement plant room, the ability to disassemble the Gas 310 Eco Pro boilers was highly beneficial. They were then reassembled and installed inside the plant room by Watertite Heating. The Remeha boilers are sequence-controlled from an updated BMS, for maximum operational efficiency.

● 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)



## Vent-Axia's Lo-Carbon Response quietly delivers high-pressure efficiency

The new Lo-Carbon Response from Vent-Axia is a discreet, near-silent, continuous-running, constant-volume dMEV solution. Designed for both the private new-build and social housing sectors, the SAP Appendix Q-listed Response is ideal for kitchen and bathroom applications. Providing excellent pressure – while still maintaining high energy efficiency – it features an innovative digital display that confirms airflow and system pressure of the installed product. Offering peace of mind to developers and installers, the unique Response provides optimum performance and clarity.

● Call 0844 856 0590 or visit [www.vent-axia.com](http://www.vent-axia.com)



## Remeha Commercial announces partnership with CHP specialist ENER-G

Leading UK commercial heating manufacturer Remeha Commercial has announced its partnership with cogeneration specialist ENER-G, to offer combined heat and power (CHP) systems – up to and including 90 kW – as part of Remeha's unique 'one-stop shop' commercial heating product range.

The CHP systems create electricity and heat simultaneously, reducing greenhouse gas emissions by 20% and electricity costs by about one third. They are particularly suitable for new-build or refurbishment applications that require significant, consistent demands for space heating and electricity generation.

● 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)



## Louvre is tiny but tough

Gilberts has developed a small-scale, high-performance weather louvre suitable for even the smallest of applications.

The WH-38 series is based on a new 38 mm blade and is only 32 mm deep, so can be mounted into a window frame rebate or aperture. Options also include a frame specifically designed to enable it to bead into popular window apertures.

Gilberts' 38 mm louvre has a high degree of weather resistance and – with an insect screen – achieves a Class A weather rating up to 1 m/sec.

● Call 01253 766 911 or email [sales@gilbertsblackpool.com](mailto:sales@gilbertsblackpool.com)

## Uninterrupted sounds of war at Bannockburn Experience

Air handling and heat recovery specialist Air Design is helping visitors get the most from a new attraction. The Battle of Bannockburn Centre, in Stirling, commemorates the famous battle between the Scots and the English, and has a 3D simulation that allows visitors to lead a division of medieval soldiers. Low-noise air handling units were a must in the building, so two manufactured by Air Design were chosen. They feature a single phase AC backward curved fan, with 45 mm double-skinned panels, mineral wool infill, and silencers to further reduce noise from the HVAC's ducting.

● Call 01384 720460 or visit [www.air-design.com](http://www.air-design.com)



## Communications centre uses latest heat and power technology

Atlantic Boilers has supplied two Atlantic Euromax 1455 kW, large hot-water boilers to Hanslope Park, Buckinghamshire – home of Her Majesty's Government Communications Centre. The boilers' three-pass design gives balanced heat transfer and stable performance at low heat loads. The upgraded boilerplant was specified by consulting engineers WSP, and installed by EV Bullen. The boilers come with Dunphy TH37 ZM RT digital modulation B100 bio-liquid burners, which marry together for excellent green combustion and seasonal efficiency of 85% GCV.

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

## DRU Art series gas wall heaters selected by Dudley church

Primrose Hill Congregational Church, in Dudley, near Birmingham, has been in existence for 160 years, and its present building has stood for more than 130 years. After its old boiler was condemned in the autumn of 2013, the church embarked on a search for a new, modern heating system to replace the existing central heating. After taking advice from their local gas installer, the committee selected DRU Art series balanced flue gas wall heaters, which have an efficiency rating of 78%.

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



## BREEM Outstanding building chooses Remeha boilers

Remeha Quinta Pro boilers have been chosen to provide energy-efficient space heating at one of the country's most innovative and sustainable business centres: the multi-award-winning One Trinity Green – also known as 'The Green Incubator' – in South Shields, South Tyneside. This state-of-the-art, £5 m development – which has achieved a BREEM 'Outstanding' rating, and an Energy Performance Certificate of 'A' – was built on a brownfield site for South Tyneside Council, to provide flexible office space and business support for new companies in the low-carbon and environmental sectors.



● 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)

## All-singing, all-dancing and interactive – Rinnai's new website

Rinnai, the leading continuous-flow, gas-fired water heater manufacturer, has launched its redesigned, extremely user-friendly website – an invaluable resource for contractors, installers, merchants, specifiers and architects. Rinnai makes the energy-efficient Infinity range of water heaters and space heaters. The Infinity brand carries the widest range of condensing water heaters on the market – with the most impressive efficiencies in operation – and leads the field in technological innovation.

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

# Rinnai

WATER HEATING PRODUCTS



## Hitachi Air Conditioning Europe launches new Hi-ToolKit

Hitachi Air Conditioning Europe SAS

has released its new chiller selection software, Hi-ToolKit for Industry, complementing its existing domestic heating and commercial air conditioning selection software – Hi-ToolKit for Home and Hi-ToolKit for Business. The new software is designed as a technical specification and financial tool, specifically for air conditioning professionals working in the field of commercial and industrial chillers. Users can select the most appropriate chiller unit, creating a broad technical and financial proposal for their customers.

● 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)



## Mikrofill chosen for Sloane Court East

No1 Sloane Court East is part of a beautiful residential building, in

London SW3, that has recently undergone a plantroom refurbishment. A pair of Ethos stainless steel 130 kW wall-mounted boilers – with associated ancillaries – now provides LTHW to heating, in addition to the indirect supply of primary water to 2No HWS Extreme loading systems. The loading systems ensure a delta T of 30°C across the primary circuit, thus ensuring maximum efficiency is attained whenever HWS is produced.

● Call 03452 606020 or visit [www.mikrofill.com](http://www.mikrofill.com)



## CP Electronics launches new range of KNX microwave detectors

Leading UK lighting-control expert CP Electronics has introduced a new range of microwave detectors. The detectors are specifically designed for KNX applications, and provide flush-mounted detection, while offering many advantages over standard passive infrared sensors (PIRs). Main features include: two switch inputs; programmable logic block; full scene selection via the easy-to-use handset; and set up via KNX ETS software. The KNX microwave detector range includes the MWS3A-KNX with an adjustable, lockable head.

● Call 0333 9000671, email [enquiry@cpelectronics.co.uk](mailto:enquiry@cpelectronics.co.uk) or visit [www.cpelectronics.co.uk](http://www.cpelectronics.co.uk)

## Discovering the industry's next generation

Global fire safety and security systems provider Tyco recently held a discovery day for local GCSE pupils at its head office in Manchester. The event was designed to provide pupils with an overview of the fire side of Tyco's business. The young people were introduced to various job functions and given product demonstrations, to encourage interest in a possible career within the fire and security industry. The Tyco Discovery Day aims to assist schools with employability programmes.

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



## Vent-Axia receives double nomination in prestigious Housebuilder Awards

Leading British ventilation manufacturer Vent-Axia is delighted to announce that it has been shortlisted in two categories for this year's prestigious Housebuilder Product Awards 2014. The Sussex-based company is celebrating its award-winning, Lo-Carbon Solo Plus centrifugal bathroom/toilet fan reaching the final in the Best Kitchen and Bathroom Product of the Year category. Meanwhile, Vent-Axia's Lo-Carbon Response dMEV solution has been nominated in the Best Brand New Product of the Year category.

● Call 0844 8560590 or visit [www.vent-axia.com](http://www.vent-axia.com)



## Remeha Commercial announces new area sales manager

Heating manufacturer Remeha Commercial is delighted to welcome back Paul Stokes as area sales manager for Kent, Suffolk and Essex. 'I'm delighted to have rejoined Remeha,' said Stokes, 'and I am looking forward to building on the company's reputation for quality products and excellent service.' Chris Meir, national sales manager at Remeha Commercial, said: 'We are pleased to welcome back Paul Stokes. His extensive industry experience in the commercial heating sector – and in-depth knowledge of the Remeha product portfolio – will be invaluable in helping us to continue our growth path and unrivalled quality of service.'

● 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)



## New from Elco UK – Thision S

After the huge success of the Thision L, Elco UK (formerly MHS Boilers) has launched Thision S – a new light-commercial, gas-fired, wall-hung condensing boiler. The new model is available in three outputs – 25 kW, 35 kW and 50 kW – and offers net efficiencies of up to 111%. It also features a high-efficiency, inbuilt pump as standard, as well as a stainless steel heat exchanger – providing a unit with excellent lifetime performance and reliability, at a highly competitive price point.

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

## SE Controls provides smoke and ventilation solution for Airbus

Leading aircraft manufacturer Airbus is using an advanced smoke and natural ventilation system from SE Controls in its new 25,000 m<sup>2</sup> building near Bristol.

Four atrium spaces in the four-storey building each incorporate 84 Schüco AWS 102 projected top-hung vents. These are automatically operated by 336 SCCO 24 30 concealed actuators, which were supplied, installed and commissioned by SE Controls, in partnership with specialist façade contractor Northing Aluminium. SE Controls also supplied, installed and commissioned the interface control panels, as well as the fire-rated cabling.

The natural ventilation system is controlled by sensors linked to the BMS to ensure a comfortable working environment for the 2,500 employees on site. In the event of a fire, the building's alarm system prompts the closure of all the vents to restrict the flow of oxygen into the building, and so help to suppress the fire.

SE Controls' commercial director, Martin Oates, said: 'The Airbus project is an excellent example of how a fully compliant, safety-critical smoke ventilation system can also provide a controlled natural ventilation solution.'

● Call 01543 443060 or visit [www.secontrols.com](http://www.secontrols.com)



# PRODUCTS & SERVICES

Telephone: 020 7880 7614 Email: Patrick.Lynn@redactive.co.uk

## Innovations from Kingspan Tarec

Kingspan Tarec is offering specifiers even greater freedom and flexibility with the latest developments in its premium performance Kooltherm FM Pipe Insulation. The market-leading manufacturer has introduced slotted-board technology to complement its award-winning continuous pipeline manufacture process, creating a range of fully bore-coated products for pipe sizes from 15 mm to 610 mm. An architectural, 'Theatre Black' facing option has also been launched, providing an ideal alternative to exposed-to-view applications.

● Call 01457 890400, email info@kingspantarec.co.uk or visit [www.kingspantarec.com](http://www.kingspantarec.com)



## Holophane LED lighting system is smash hit at Tunbridge Wells tennis centre

Holophane's award-winning Haloprism high bay luminaires and HOLOS2 controls system have been combined to create a state-of-the-art, LED lighting system for the indoor tennis courts at Tunbridge Wells Sports Centre. This application is a first, and sets new benchmarks in user- and eco-friendly excellence for sports centres. The new lighting and controls system offers superb visual comfort and playing conditions by utilising the award-winning Haloprism LED high bay, which delivers a powerful 40,000 lumens.

● Call 01908 649292, email info@holophane.co.uk or visit [www.holophane.co.uk](http://www.holophane.co.uk)



## Wago's Braker is KNX Champion of the Year

Members of KNX UK gathered at Lily Hill House, Bracknell, in mid-March, for the association's AGM. The day culminated in the presentation of the 2014 KNX UK Awards and board-seat elections. Andrew Braker, of Wago, received the accolade of KNX Champion of the Year for his outstanding contribution to the association's marketing activities, while The Crystal, in London's Docklands, was voted KNX Installation of the Year. Product of the Year was ABB's Busch-Jaeger Comfort Touch.

● Call 0845 869 5908, email admin@knxuk.org or visit [www.knxuk.org](http://www.knxuk.org)

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Applications are encouraged from experienced sales and business development professionals currently active in commercial specification environments who are able to demonstrate a proven track record in a sales environment.

Salary and package will be commensurate with individual experience and qualifications. Full product training will be provided. If you are interested in the role please forward your CV and covering letter to Chris Meir, National Sales Manager at [chris.meir@remeha.co.uk](mailto:chris.meir@remeha.co.uk)



# BARTLETT

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### Intermediate Mechanical Engineer

London, £28 - 35k + benefits

This is not just another advert... This is an advert for an engineer with the aptitude and adeptness to succeed. I am working alongside a leading name in the consultancy market. They are searching for an engineer with clear career aspirations to utilise their current skills, and develop their engineering capabilities and experience by working with some of the best engineering brains in the industry. BAR 1762/JA

### Senior Mechanical Engineer

London, £45 - 50k + benefits

Are you a chartered Senior Mechanical Engineer looking for a consultancy with the platform to make your stamp on the industry? Then look no further! This opportunity with one of the UK's most advanced Consultancies, will offer access to some of the world's most prestigious projects and enable you to become an integral part of an award winning design team. BAR1763/TA

### Senior Electrical Design Engineer - DC/SC Cleared

Berkshire, £50 - £55 p/h

We are working in partnership with an independent, multi-disciplined consultancy in their search for a DV/SC cleared Senior Electrical Engineer for a minimum 1 year contract. To be considered for this role applicants must have previous MOD/ Nuclear project experience and hold a valid SC/DV clearance. BAR 965/WS

### Principal Electrical Design Engineer

Central London, £48 - £54k+ car + benefits

This is a fantastic opportunity for a Principal Electrical Design Engineer to join a leading international multi-disciplinary consultancy at the forefront of building services. With years of experience working on some of the most high profile and technically challenging projects based both in the UK & Internationally, our client can offer unrivalled career progression and project exposure. BAR 1683/CB

### Contract Electrical Design Engineer

Central London, £33ph - £35ph

This is a fantastic opportunity for a Senior Electrical Design Engineer to join an international consultancy with an outstanding reputation specializing in the education, healthcare, commercial, and high end residential sectors on a long term rolling contract. With continuous project wins they need someone who is committed to run with projects until completion. BAR1748/NA

### Contract Mechanical Engineer

Hertfordshire / Home counties, £29ph

Specialist Building Services design consultancy, looking to expand their Mechanical offering by the addition of a contract engineer with long term prospects. If you're looking for the freedom of a contract position, the support of a well-respected firm, and have a background in the residential, education, and healthcare sectors; then this one is for you. BAR1720/MA

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# Are You Looking to Further Your Career?

For a confidential chat,  
Call us **8am to 8pm** on **0203 159 5387**

## Senior Associate (Electrical) | Reading £55,000 Plus Car Allowance + Benefits

A well-established multi-disciplinary engineering consultancy with an office near Reading are currently looking for a Senior Associate to lead their Electrical Building Services Design team. This consultancy is currently undergoing a major expansion phase, due to recent project wins and company acquisitions which will offer the right candidate the opportunity to be promoted to a very senior level within the company.

## Mechanical & Electrical Design Engineers | Peterborough £35,000 Plus Benefits

Due to continuous growth, this busy consultancy is currently looking to expand their electrical & mechanical teams. Well known within the Building Services industry, they work on high profile projects for sought after national clients. Working on leisure complexes and sports stadiums, these positions will be both varied and challenging. They are seeking motivated and driven engineers who will be given the chance to progress and develop within the company.

## Design Project Leader (Electrical) Manchester | £40,000 Plus Benefits + Healthcare

A leading building services consultancy is currently offering an opportunity to join them working on projects for internationally known brands and clients. A strong understanding and passion for design is essential for this role, that will include working with their most prestigious clients. With a string of awards behind them, this consultancy holds an enviable reputation and is continuously growing due to the constant demand for their expertise and knowledge.

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- + Best Industry Advice
- + Nationwide Service
- + Open 8am to 8pm for confidentiality

## Principal Electrical Design Engineer City of London | £50,000-£55,000 Plus Car Allowance + Benefits

A well-known property consultancy with an established building services department working within Education, Healthcare and Banking sectors are seeking a Principal Electrical Engineer. Reporting to the Director, this Principal will have full responsibility for their own projects as well as building and maintaining client relationships. Candidates will be in charge of a small team of Electrical Engineers, who will work under your supervision.

## Principal Mechanical Engineer | Oxford £45,000 Plus Car Allowance + Benefits

A well-known international building services consultancy is seeking a Principal Mechanical Engineer for their Oxford office. You will lead projects and manage more junior Mechanical Engineers. This award winning consultancy are proud to be working on some of the most iconic projects in the UK, and are renowned as one of the best employers in the industry. This is a great opportunity for career progression due to expansion of this office.

## Senior Mechanical & Electrical Design Engineer | Birmingham £40,000 Plus Car Allowance + Benefits

Our client, an award winning Consultancy with over 20 years' experience in the industry, is looking to add to their dedicated electrical team. Their national offices have developed strong relationships with many prestigious clients. They currently require an experienced leader to assist in the running of large projects within their portfolio, to include residential, healthcare and leisure sectors.

## Senior Building Services Mechanical Design Engineer | Leeds £40,000 Plus Benefits

A rewarding and progressive opportunity has become available for an experienced and motivated Mechanical Engineer to join an industry leading Consultancy. Due to continuous successful project wins they are seeking an experienced leader to help deliver high quality design work to their prestigious clients. You will need to be an excellent communicator and be confident supporting a team and meeting with clients.

## Associate Director (Mechanical) London, Farringdon £65,000-£70,000 Plus Package

Great opportunity to join one of the major players in the building services industry, who have recently won some of the most lucrative projects within the UK. You will lead a team of Mechanical Engineers on iconic Residential, Education and High Rise commercial projects in the South-East. The role will provide challenging and well publicised project work.

## Senior Mechanical Engineer London | £45,000-£50,000 Plus Car Allowance + Benefits

A young up and coming building services consultancy, which has been formed by directors of well-known engineering consultancies, is currently looking for a Senior Mechanical Engineer to join their team of 20 building services engineers in Central London. This consultancy has recently won a number of major commercial, hotel and education projects and now require an Engineer to lead projects and take on a client facing role.

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

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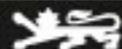
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jobs@greentomatoenergy.com**

## Dorset County Council



dorsetforyou.com

### Senior Engineer (Mechanical)

Dorchester

£33,128 - £38,422

Ref: 60012304

We are looking for an experienced Senior Mechanical Engineer to work as part of our multi-professional design team to take the lead on major capital and refurbishment projects bringing innovation and new ideas to the process.

You will be a Chartered Engineer with extensive experience since qualification.

You will be able to work independently, under pressure and to deadlines with an ability to work on a number of different projects at once and have experience of supervising technical staff.

Experience of using AutoCAD, Electrical Computer Aided Design packages and Microsoft Office applications will be essential. The role will require the development and implementation of expertise in a wide range of technologies.

Knowledge of applicable legislation and British Standards, H&S, CDM, Building Regulations, CIBSE and DFES design codes is essential.

Experience on school design and construction and partnering contracts would be advantageous.

For an informal discussion please contact Steve Rufus, Principal Engineer on 01305 225236.

This post has a significant travel requirement and you are contractually required to have a vehicle (or transport deemed to be suitable by the County Council) available for use as required.

This post involves working with children or vulnerable adults and/or having access to significant information about them and will be subject to a Disclosure and Barring Service check.

Please note Dorset County Council does not accept CVs in place of an application form as we require the same range of information from all our candidates.

Closing date: 1st June 2014

To view the relevant details and apply online please visit [www.dorsetforyou.com/jobs](http://www.dorsetforyou.com/jobs) or ring the application hotline on (01305) 228535

We value diversity and welcome applications from all parts of the community.



INVESTORS IN PEOPLE Bronze

## Dorset County Council



dorsetforyou.com

### Senior Engineer (Electrical)

Dorchester

£33,128 - £38,422

Ref: 60012305

We are looking for an experienced Senior Electrical Engineer to work as part of our multi-professional design team to take the lead on major capital and refurbishment projects bringing innovation and new ideas to the process.

You will be a Chartered Engineer with extensive experience since qualification.

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Experience of using AutoCAD, Electrical Computer Aided Design packages and Microsoft Office applications will be essential. The role will require the development and implementation of expertise in a wide range of technologies.

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We value diversity and welcome applications from all parts of the community.



INVESTORS IN PEOPLE Bronze



### Mechanical Design Engineer | Birmingham | to £50K | ref: 5140

Exceptional opportunity to join one of the most diverse multi-disciplinary consultancies operating in the design, management and infrastructure sectors. Our client is currently seeking an ambitious Building Services engineer to work on signature high rise buildings, hospitals, airports and major international developments. Superb opportunity for self-development and progression.

### Associate Mechanical | London | EComp Salary + Bens | ref: 4056

Fantastic opportunity for an Associate Building Services engineer to join a renowned multi-disciplinary global consultancy. Ideally Chartered, candidates will have a proven track record in the delivery of major projects. Experience in aviation and government sectors is desirable.

### Senior Mechanical Engineer | London | to £50K + Bens | ref: 5124

Excellent opportunity to join one of the most admired multi-disciplinary consultancies. Working alongside signature Architects on some of the most prestigious global projects, they are currently seeking a determined Mechanical engineer. With unrivalled project exposure and career development this is a brilliant opportunity for an engineer to make a name in the building services industry.

### M+E Data Centre Engineer | London | EComp Salary + Bens | ref: 5021

One of the leading multi-disciplinary engineering consultancies is seeking a M+E Data Centre Engineer to design, manage and supervise data centre and critical facilities projects. You will be required to assist in the development of engineering concept / detailed designs and tenders through to completion.

### Senior Electrical Engineer | Avon | to £40K + Bens | ref: 4700

Exciting opportunity to join a world class multi-disciplinary engineering consultancy renowned for bespoke design solutions. You will work on a variety of projects including sports, aviation and commercial. Fantastic opportunity for an ambitious engineer to progress with a leading consultancy.

t: 02392 603030

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# Events & training

## NATIONAL EVENTS AND CONFERENCES

**CIBSE AGM and Presidential Address**  
8 May, London  
[www.cibse.org/agma](http://www.cibse.org/agma)

**SLI AGM**  
29 May, London  
[www.sli.org.uk](http://www.sli.org.uk)

**ILEVE AGM**  
5 June, London  
[www.cibse.org/ileve](http://www.cibse.org/ileve)

## CIBSE GROUPS, REGIONS AND SOCIETIES

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

**ANZ Region: ESD – RIP**  
6 May, Sydney  
The latest in a series of monthly seminars arranged by the New South Wales chapter of the ANZ Region.  
[www.cibse.org/anz](http://www.cibse.org/anz)

**Yorkshire Region: AGM & Swimming Pool Ventilation Seminar**  
6 May, West Yorkshire  
After our annual general meeting, Menerga's Michael Groves will present a technical seminar in relation to the design of swimming

pool hall ventilation systems, and carrying out energy surveys on swimming pools.  
[www.cibse.org/yorkshire](http://www.cibse.org/yorkshire)

**South Wales Region: Evaporative Cooling Seminar**  
12 May, Cardiff  
Alan Beresford, from EcoCooling, will present a technical seminar on evaporative cooling.  
[www.cibse.org/southwales](http://www.cibse.org/southwales)

**Home Counties North East Region: Presidential Address**  
13 May, Chelmsford  
Home Counties North East Region continues the annual tradition of being addressed by the incoming CIBSE president at their AGM. A tour of Essex Record Office will be followed by a short AGM, before Peter Kinsella speaks on his aims for the coming year as CIBSE president, and takes questions.  
[www.cibse.org/hcne](http://www.cibse.org/hcne)

**South Wales Region: May Ball 2014**  
17 May, Cardiff  
The Radisson Blu Cardiff provides an elegant setting, with exclusive lounge-bar area, where a glass of fizz can be enjoyed, pre-dinner. A three-course meal follows, then the evening's musical entertainment. After the success of last year's

event, there will be a casino in the adjacent salon, where you can indulge in blackjack, or try your hand at the roulette table.  
[www.cibse.org/southwales](http://www.cibse.org/southwales)

**ANZ Region: ARBS 2014**  
20-22 May, Melbourne  
This event is open to professionals and trade visitors involved, worldwide, in the design and construction of sustainable, energy efficient, commercial, residential and multipurpose buildings, and the design, manufacture, installation and maintenance of heating, ventilation, air conditioning (HVAC) and refrigeration products and services. ARBS particularly welcomes CIBSE visitors.  
[www.cibse.org/anz](http://www.cibse.org/anz)

**Home Counties North East Region: The non-domestic RHI**  
27 May, London  
The Renewable Heat Incentive (RHI) for non-domestic buildings is being relaunched in 2014. The Department of Energy & Climate Change will set out the updated requirements, and equipment manufacturer representatives will discuss the pros and cons of qualifying technologies. This is a joint event with the CIBSE

FM and CIBSE ASHRAE Groups.  
[www.cibse.org/hcne](http://www.cibse.org/hcne)

**Home Counties North West Region: Brewery visit and workshop – Integrating Young Engineers with the Regions**  
29 May, London  
This is a special workshop event in Sambrook's Brewery, in Battersea, expressly arranged with YEN London. We will discuss how your region can alloy experience, new ideas and new skills, and ensure succession in the region.  
[www.cibse.org/hcnw](http://www.cibse.org/hcnw)

**CPD TRAINING**  
For more information, visit [www.cibsetraining.co.uk](http://www.cibsetraining.co.uk) or call **020 8772 3660**

**CPD Part L update for LCEAs (CIBSE & IES)**  
8 May, London

**CPD – HVAC Systems and Building Services**  
12 May, Birmingham

**EPC Training**  
12-13 May, London

**CPD – EPC Conventions**  
13 May, Birmingham

**Cooling and refrigeration**  
13 May, London

**Electrical distribution systems and equipment**  
14 May, London

**Part L energy building regulations (non-domestic)**  
15 May, London

**Energy surveys**  
15 May, Manchester

**Design of heating and chilled water pipe systems**  
15 May, London

**Delivering operationally ready buildings**  
16 May, London

**Air con 2: the air conditioning process**  
16 May, London

**CPD – Lighting and energy efficiency**  
19 May, London

**Air conditioning inspection for buildings – Leeds**  
20 May, Leeds

**Gas safety regulations**  
20 May, London

**Standby diesel generator**  
21 May, London

**Variable flow water system design**  
21 May, London

**Building drainage explained**  
22 May, London

**LinkedIn for professionals workshop**  
3 June, London

**Running projects effectively**  
13 June, London

## CIBSE BUILDING PERFORMANCE AWARDS 2015 LAUNCH

The CIBSE Building Performance Awards 2015 will be launched on Wednesday 18 June, hosted by 2014 CIBSE Carbon Champion Marks & Spencer (M&S) at its head office in London.

Chair of the judges, CIBSE technical director, Hywel Davies, will introduce Munish Datta – head of facilities management and Plan A at M&S – who will present the retailer's winning entry. He will explain how it achieved a 31% improvement in overall energy efficiency per square foot, against 2006/07, and how M&S is aiming to hit its target of reducing energy use across the company's estate by 40% by 2015.

This is a great opportunity to discover how to enter a project, business, team, product or initiative into the 2015 awards, and get some top tips on what the judges are looking for. Book now at [www.cibse.org/bpa](http://www.cibse.org/bpa)



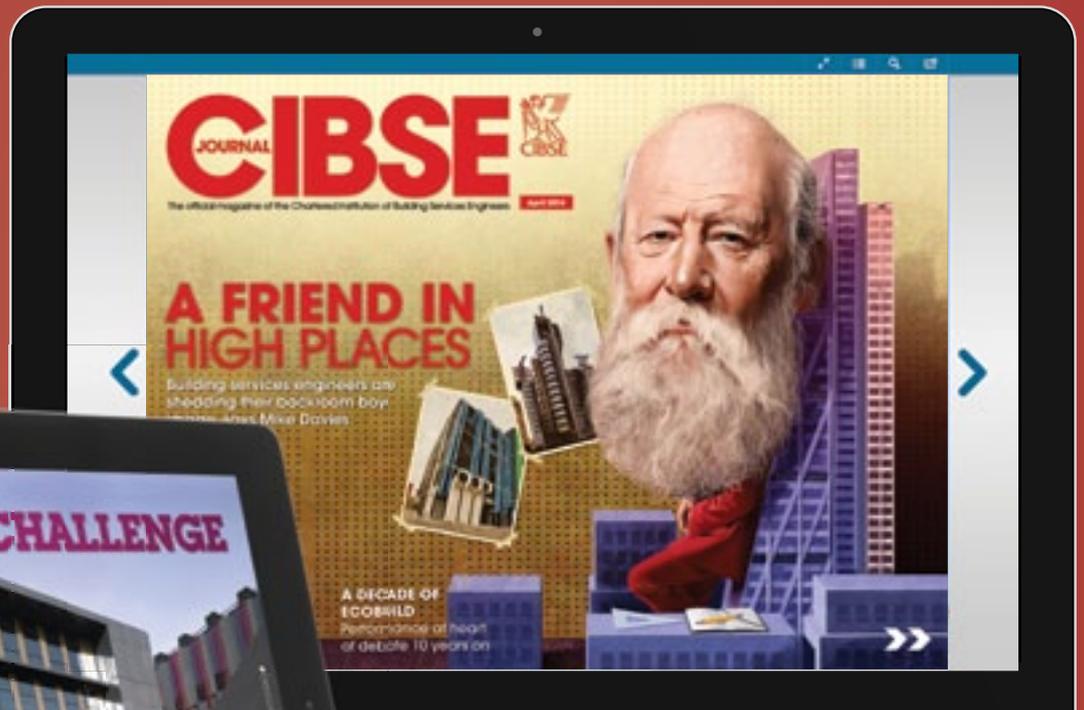
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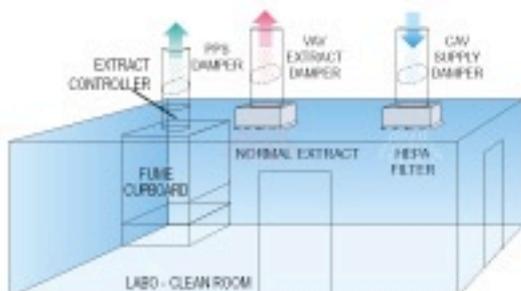


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