

# CIBSE

JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

January 2013

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**Happy New Year?**  
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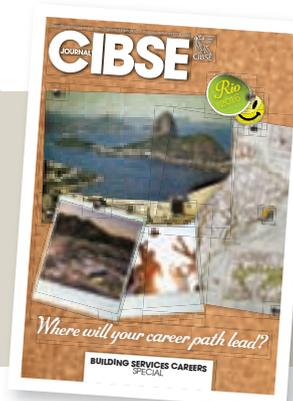
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# 'Appy New Year

**H**ow was your Christmas? Judging by the mild, wet winter it probably was not very white and bearing in mind the recent government U-turns on environmental policy it probably wasn't very green either.

The announcement by Eric Pickles that the next version of Part L would not contain consequential improvements (page 7) means the opportunity to improve the energy performance of up to 2 million homes has been squandered once again (Labour minister John Healey did exactly the same thing in 2009.)

The cost to the insulation and metering industry will be immense. The insulation industry is already reeling from foot-dragging on the Green Deal and Energy Company Obligation, which means both are behind schedule. They were due to replace grants from the Carbon Emissions Reduction Target (CERT), which ended on 31 December. The resultant drop in demand has hit firms hard, with the Insulation Industry Forum calculating that 816 jobs were lost around Christmas as a result.

Meanwhile the backtracking on Display Energy Certificates (DECs) has left even the mild mannered Paul Morrell 'massively frustrated'. DECs for public buildings between 500m<sup>2</sup> and 999m<sup>2</sup> will now only be required every 10 years, rather than annually.

Backtracking on Display Energy Certificates has left even the mild mannered Paul Morrell 'massively frustrated'

Government seems to regard Energy Performance Certificates as the prime tool to ensure minimum levels of energy efficiency, but EPCs measure predicted use, not actual, and research by the Better Buildings Partnership and Jones Lang LaSalle has revealed just how misleading they can be (page 20). It compared offices with an EPC rating of B and E, and found that, in terms of actual energy use, the lower rated building was 66% times more efficient.

Policymakers in the UK seem to be going in the opposite direction to authorities in Australia and the US, where mandatory energy labelling is becoming more prevalent.

On page 39 you will find our careers special, which contains a complete visual guide to the industry (feel free to hand it to anybody who asks what a building services engineer does), career tips, and the Hays/CIBSE 2012 salary guide.

And for those of you lucky (or well behaved) enough to receive a tablet device from Santa at Christmas, we've rounded up the best of the growing number of apps for the building services industry. If you can wrestle your iPad or Nexus from other family members' grabby hands, you might even have a chance of downloading them.

**Alex Smith, Editor**  
asmith@cibsejournal.com



## SON OF PFI WILL SHORTEN PROCUREMENT

The replacement for the discredited private finance initiative (PFI) will shorten the competitive tendering phase to no more than 18 months.

Private Finance 2 (PF2) should, therefore, reduce bidding costs and introduce flexibility into the bidding process.

The first PF2 projects include a £325m hospital in Birmingham and improvements at Ministry of Defence bases. The Chancellor also announced a £1.75bn privately backed fund for school projects under the Priority School Building Programme in his Autumn Statement.

## ZERO ENERGY BUILDINGS 'VITAL'

Zero energy buildings and cities remain a priority, despite the emergence of greater reserves of gas, a CIBSE ASHRAE Group webinar heard last month.

Preston-based consulting engineer Frank Mills said ASHRAE remained focused on the development of tools that would allow engineers to deliver net zero energy buildings (NZE) by 2030 – despite the US government pushing for energy independence by exploiting more of its fossil fuel reserves.

Mills said the industry had a duty to sell the concept of zero energy developments to clients. View the full presentation at [www.cibseashrae.org](http://www.cibseashrae.org)

# Osborne accused of reckless gas policy

## Decision to allow fracking is criticised by green groups

Environmentalists have attacked the Chancellor's decision to relax carbon emission targets and exploit new sources of gas.

In his recent Autumn Statement, George Osborne announced tax breaks for shale gas extraction using the controversial hydraulic fracturing (fracking) process and plans to build 30 new gas-fired power stations by 2030.

He said the UK could plug its energy gap with gas, if the carbon ceiling for the five years to the end of 2027 'is revised upwards and emissions reductions are more



PINGASSO / SHUTTERSTOCK

gradual'. He also announced the formation of a new regulator – the Office for Unconventional Gas.

Green Party MP Caroline Lucas said the policy was reckless and risked 'locking the UK into an expensive, polluting fossil-fuel future' while WWF-UK energy policy chief, Nick Molho, said our reliance on gas was 'highly risky'.

'Gas price rises have driven people's bills up in recent years, so committing the UK to more gas

seems to show a reckless disregard for both bill payers and the environmental impact of burning yet more fossil fuels,' he added.

However, the move was seen as inevitable by many observers. Ofgem chief executive Alistair Buchanan told the recent CIBSE Annual Lecture that gas would have to account for at least 70% of power generation by 2020 because of a shortage of alternatives.

David Frise, head of sustainability at the Building & Engineering Services Association (B&ES), said: 'Thanks to years of prevarication over renewables and the sluggish development of nuclear capacity, we have little choice if we want to keep our lights on.'

## Green Deal cashback starts early

The start of the Green Deal Cashback scheme has been brought forward to the second week of January. Originally due to begin on 28 January, the scheme, operated by the Department of Energy and Climate Change (DECC), offers cash rewards to early adopters of its flagship energy efficiency initiative.

The Heating and Hotwater Industry Council (HHIC) welcomed the move, saying it was done to encourage householders to replace their boilers earlier.

'An additional three weeks of subsidised boiler sales should stimulate demand for insulation and get the Green Deal off to the flying start that was intended,' said Neil Schofield, head of external and government affairs at the boiler manufacturer Worcester Bosch.

Householders can receive £310 cashback for upgrading a non-condensing oil heating boiler to a condensing version, and £270 for upgrading a non-condensing gas boiler to a condensing model.

Cashback is also available for installing loft insulation (£100), cavity wall insulation (£250) and heating controls (£70).

A £2.9m marketing campaign designed to 'build understanding and trust' of the Green Deal among UK homeowners is also under way. The campaign, which runs until April, is an exemption to the current spending freeze on government marketing initiatives. This followed research that revealed the vast majority of the UK public had never heard of the Green Deal.

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# Pickles drops consequential improvements for homes

## Decision sparks fury in industry

The government has confirmed that domestic 'consequential improvements' will play no part in Building Regulations. The decision had been widely predicted, but still prompted fierce criticism. Officials argued that the proposal for refurbishment work to trigger mandatory energy efficiency upgrades for the rest of the building could harm the home improvement market.

Communities Secretary Eric Pickles said: 'Having consulted carefully, the government has noted the potential danger that introducing consequential improvements would discourage people from undertaking



home improvements.'

Following a consultation on the proposal in early 2012, the Energy Saving Trust published research that showed over a third of households would be unwilling to carry out home improvement work if consequential improvements were also required. There was also concern that 'cowboy builders' might mislead homeowners about the scale of work required.

The *Daily Mail* led a campaign against the plan, falsely dubbing it a 'conservatory tax'.

However, the Association for the Conservation of Energy (ACE) accused the Minister of ignoring the findings of his own consultation that showed four out of five people supported the concept; that the government's own figures estimated consequential improvements would benefit the economy by more than £11bn; and without this measure more than two million fewer homes would take up the offer of Green Deal finance.

'This decision is bad for the economy, bad for jobs and bad for the environment,' said ACE. 'It is an undoubted triumph for the *Daily Mail*, whose mendacious campaign seems to have led to this foolish volte-face.'

## In brief

### ENERGY EFFICIENCY TO UNDERPIN NEW RHI

Industry has urged government to adopt minimum energy efficiency standards to underpin the second phase of the non-domestic Renewable Heat Incentive (RHI) when it is introduced later this year.

The £106m fund should also be aimed at rewarding the performance of complete systems rather than individual technologies, building services experts advise. They say the current scheme, which began in October 2011, is perverse because it gives the most efficient systems smaller payments.

Plans to extend RHI to air-to-air heat pumps, biomass direct-air heating, and biogas combustion over 200kW were the subject of a consultation last autumn.

Read CIBSE's response on page 30.

### CHILLED BEAMS ARE PENALISED

Passive cooling technologies are often not specified because of a poor understanding of their potential, according to the Chilled Beams and Ceilings Association (CBCA).

It claims that government-backed energy efficiency schemes only accredit individual products rather than complete systems, and so perversely penalise technologies that do not consume energy.

The association said it would be meeting with the Carbon Trust early in 2013 to look at the issue.

## EPCs 'not a reliable indicator' of energy efficiency

Energy Performance Certificates (EPCs) are an unreliable and often misleading indicator of building energy efficiency, according to new research.

Jones Lang LaSalle and the Better Buildings Partnership (BBP) have published a study that compares the actual energy consumption of two offices, one with a good and one with a poor EPC rating. Their conclusions prompted them to urge government to widen the use of Display Energy Certificates (DECs), which monitor actual energy consumption during operation. However, the Department for Energy and Climate Change (DECC) subsequently dropped plans to extend compulsory DECs to private sector buildings.

The report, *A Tale of Two Buildings – are EPCs a true*

*indicator of energy efficiency*, found that Ropemaker Place, which had a B-rated EPC, was actually 66% less energy efficient in use than 10 Exchange Square, which had been given an E rating. Researchers found this was not untypical when comparing these findings across 200 London office buildings.

'EPCs are nothing to do with real energy use,' commented CIBSE technical director Hywel Davies. 'They are a standardised computer simulation, which assumes standard hours of use, numbers of occupants and levels of unregulated energy use, all of which are hugely variable in practice.'

Read the opinions on pages 20 and 22 for more details.

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## CITY OF LIGHT GOING DARK

The famous shops on the Champs Elysees that helped Paris gain its title 'La Ville Lumiere' (City of Light) are among thousands of buildings in France that will have to turn off their lights – inside and out – between 1am and 7am to conserve energy, the French government has announced.

Shops, offices, and public buildings will be subject to the light restrictions in a country well-known for its early adoption of street light, although the famously rebellious population will not accept the new rules quietly.

'We are ready to make efforts, but the government is cutting a fine line between sobriety and austerity,' said Sofy Mulle, vice-president of France's Commerce Council. 'Surely, we can work out environmentally friendly solutions that have less impact on our society and our economy.'



JOAN PANAITIE / SHUTTERSTOCK

### SCOTLAND SEEKS TO CUT PROCUREMENT COSTS

A Scottish government review of its £2bn worth of public construction contracts could lead to greater collaboration across the supply chain and the end of unpopular late payment practices. It is charged with ensuring future procurement achieves better value for money.

### EC SUES UK FOR MILLIONS

The European Commission has started legal proceedings against the UK government for failing to implement measures contained in the Energy Performance of Buildings Directive (EPBD). The UK faces a fine of €9.6m, followed by daily penalties of hundreds of thousands of euros, for failing to set out – by 9 July 2012 – how it intends to implement the roll out of Display Energy Certificates, and its intentions for ensuring that homeowners provide Energy Performance Certificates when they place their homes on the market.

### STUDENTS LIGHT THE WAY

Brunel University has been shortlisted for the Guardian University Awards Employee Initiative category for its collaboration with the Lighting Education Trust. The partnership has seen students in the product design department get placements with lighting companies following their attendance at a summer school in May 2012.

# Firms confused about CE marking

## ● Working group to be set up

Manufacturers are concerned about the potential confusion created by the start of compulsory CE marking later this year.

Many products used in building services projects must carry a CE Mark from 1 July under the new European Construction Products Regulations, but companies are confused about what this means in practice. Some have questioned how the approval process will be applied to projects that are already in progress – and whether products that have already been specified will have to be recalled.

Building control and trading

standards will police the system, along with the Health and Safety Executive (HSE). There are also major implications for fire-rated equipment under the Regulatory Reform (Fire Safety) Order, which is enforced by fire officers.

Manufacturers and distributors can be prosecuted for placing non-CE marked products on the market, but are now seeking clarification from the European Commission about orders placed before the deadline, but completed after it.

'We have already received specifications and orders for many projects that will not be completed until long after 1 July – so what happens to those?' asked David Fitzpatrick, sales and marketing

director of Ruskin Air Management. 'Developing new products and completing the testing and documentation to meet CE mark standards can take months.'

Third party testing, certification, factory testing and audit trails must all be in place for a range of products, including flues, chimneys and fittings, and heat and smoke extraction fans.

CIBSE has established a working group to look at the implications of statutory CE marking for manufacturers, designers and installers. To find out more, email [technical@cibse.org](mailto:technical@cibse.org)

Read Hywel Davies' column on page 18.

## Chiller efficiencies could rise by 20%

Chiller efficiencies could be improved by more than 20% under a proposed addendum to the ASHRAE/IES energy standard 90.1, which is now open for public review. The changes to the requirements for air and water cooled chillers are in line with efficiency improvements that were implemented in 2010, when a Path B was added to the standard for part load, intensive water cooled chillers. The new addendum would expand this measure by adding requirements for air cooled chillers.

Also as part of this change, efforts were made to bring the efficiency requirements for water cooled

positive displacement and centrifugal chillers together. If approved, the new efficiency requirements would go into effect in early 2015.

ASHRAE says the average payback would be 6.3 years, and manufacturers have accepted that some redesign and cost reduction will be needed. The standard committee also noted that 'we are reaching maximum technological limits at a component level and, in the future, the industry will have to look at the full HVAC system for further improvements'.

Visit [www.ashrae.org/publicreviews](http://www.ashrae.org/publicreviews) Comments have to be received by 14 January 2013.

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## CIBSE graduate finalist in Young BME Engineer Award



Rafay Hasan collects his award

Rafay Hasan, CIBSE graduate member and senior engineer at Grontmij, was among the finalists at the 2012 Young BME Engineer Award.

The awards are run by the not-for-profit organisation AFBE-UK, with the express purpose of encouraging and recognising an outstanding young engineer of black or minority (BME) origin.

The award ceremony, which was hosted by journalist and broadcaster Henry Bonsu, took place at Royal Academy of Engineering in November. It was attended by key industry figures including Dr Nelson Ogunshakin, chief executive of the Association for Consultancy and Engineering; Chi Onwurah MP, Shadow Minister for Innovation and

Skills; and George Adams, CIBSE president-elect.

Rafay Hasan was nominated for his achievements in promoting building services engineering among youngsters. He completed his MSc in Building Services Engineering with Sustainable Energy from Brunel University in 2009, where he was also a student representative for

CIBSE. He is also a member of the newly formed CIBSE Diversity Panel.

Adams, also a member of the CIBSE Diversity Panel, said: 'It was so pleasing to see Rafay, one of our young building services engineers, shoulder to shoulder with the other engineering professions, and it is a well deserved achievement. His work to encourage young people in services engineering is valuable'.

Phil Anthony Moutousamy from Buro Happold won the Young BME Engineer award on the night, with Yewande Akinola from Arup being awarded the Exceptional Achiever Award. MITIE Technical Facilities Management won the Corporate Recognition Award.

AFBE-UK has worked towards building up a network of UK-based engineers who promote interest in the engineering profession, especially among young people from communities underrepresented in engineering in the UK.

For more information, visit [www.afbeawards.co.uk/award.php](http://www.afbeawards.co.uk/award.php)

## Building Simulation Group Student Prize awarded

Yair Schwartz from University College London has won the first Building Simulation Group Student Prize. He scooped the £1,000 award for his dissertation, titled *Variations in results of different building energy simulation tools and their impact on BREEAM and LEED ratings: A case study*.

The CIBSE Building Simulation Group Student Prize 2012 was awarded for the best research project at Master's degree level or equivalent, which includes a major element on the development or application of building simulation tools. The 2012 prize, open to students from UK and overseas universities, was the first to be awarded by the group. This year's prize focused on the 'validity of building performance simulation'.

## Apply for membership

The next closing date for applications for the Associate (ACIBSE) and Member (MCIBSE) grades is **4 February 2013**.

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For full details of the requirements and application process for ACIBSE and MCIBSE membership, go to [www.cibse.org/membership](http://www.cibse.org/membership) or email [membership@cibse.org](mailto:membership@cibse.org)

# Skills showcased at Teambuild 2012

Ten multidisciplinary teams from varied parts of the construction industry, representing 24 top construction companies, competed at Teambuild 2012 in November.

The event, which CIBSE sponsors, took place over a weekend in High Wycombe. It challenged teams to compete in a simulation of the design and construction process for the development of a real site. The competition aims to be a great training experience, developing skills in leadership and offering participants an opportunity to build networks between different companies.

This year, the teams were tasked to plan, design and deliver a world-leading mixed-use development at King's Cross, London. The real masterplan, from King's Cross Central Limited Partnership, was used as the basis for a series of challenging scenarios at all stages of the construction process. The competition helped identify the way teams must work together in the construction industry, and this year had a focus on building information modelling (BIM).

The winning team, awarded a cash prize of £1,500 by the Worshipful Company of Constructors, was Prism, a group from Kier, TP Bennett, Arup, AKTII and Hoare Lea. Prism impressed the judges with their consistent teamwork, shared methodology,

good humour and professionalism.

The winners of the Judges Prize, awarded for exemplary team working throughout the weekend, was RB3, a mixed team from Argent, Laing O'Rourke, Scotch Partners, A Studio and Ramboll, including members from CIBSE, ICE, RICS, and ARB.

The Procurement Strategy Prize, sponsored by the Worshipful Company of Chartered Architects, was awarded to Catalyst, a team from Wates and A\_Studio.

The final prize, awarded for the 'Most innovative use of materials', sponsored by Saint-Gobain, was won by Urban Innovation, a team from Buro Happold, Brunton Boobyer Partnership, and PJ Carey.

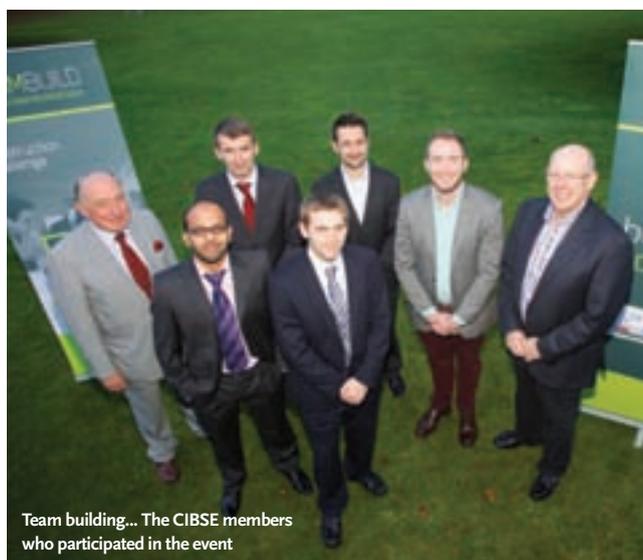
The overall standard of the

event was acknowledged by the judges as being extremely high.

Professor Brian Warwicker, a CIBSE Fellow and judge at the event, said: 'It was an honour to represent CIBSE as a judge at this competition. As well as the competitors honing their skills, the judges also learnt from, and were inspired by, the wealth of knowledge within the teams, which will benefit the construction industry both today and tomorrow.'

'This year there were several CIBSE engineers participating, and we hope for even more next year.'

If you are under 30 years of age and have not previously participated in this event, visit [www.teambuilduk.com](http://www.teambuilduk.com) for more information.



Team building... The CIBSE members who participated in the event

## SoPHE celebrates its ninth anniversary

The Society of Public Health Engineers (SoPHE) held its ninth anniversary dinner at the Kensington Royal Garden Hotel, London, on 8 November.

During the evening, the SoPHE Young Engineers Award 2012 was awarded to James Davies, William Musgrove and Philippa Garnett from Buro Happold. The competition challenged teams to provide a source of clean water to townships and households that have no access to a water supply infrastructure. As their prize, the winners will travel to Malawi's capital, Lilongwe, with the WaterAid Malawi Programme. There they will have the opportunity to research and discuss with WaterAid the potential for implementing their proposals into the current urban programmes.

At the event, John Smartt of Dublin Institute of Technology, was announced as a new Honorary Fellow of SoPHE.

The event was supported by Andrews Water Heaters, AO Smith, Blücher UK, DG Robson Mechanical Services, Geberit Sales, Girpi, Goodwater, Heatrae Sadia Heating, Honeywell Control Systems, Horne Engineering, Hydrotec UK, Lochinvar, Marley Plumbing & Drainage, Oventrop UK, Pipex, Polypipe, Rinnai UK, Roth UK, Saint-Gobain and Zip Heaters UK. Entertainment was provided by speaker Alfie Moore and magician Daniel Reed.

## Technical Symposium 2013 open for bookings

Booking is now open for the 2013 CIBSE Technical Symposium, sponsored by Rinnai.

The 2013 symposium, taking place in Liverpool on 11-12 April, will focus on practices that ensure buildings realise their energy and environmental promise.

The event, in association with Liverpool John Moores University, will include around 50 presentations over the two days, and submissions will all be peer reviewed.

Sessions will be delivered in the new Art and Design Academy at the university, with the evening buffet reception being held in the historic St George's Hall, famous for its unique ventilation system designed by Dr David Boswell Reid.

Presentations will cover more than a dozen areas, including renewables integration; forward-looking lighting and electrical systems; optimising building design; the

practical effect of climate change on design and operation; and developing water systems.

Delegate fees are being kept low with the help of sponsors. The two-day registration fee, which includes an evening reception on 11 April, starts at £60 for full-time CIBSE students, rising to £228 for non-members.

● For the draft programme, full list of delegate rates and to book, visit [www.cibse.org/symposium2013](http://www.cibse.org/symposium2013)

## TV series airs on Sky

The latest in a series of programmes produced by the Business Channel.tv, in association with CIBSE, was screened on 11 December. The latest programme looked at the questions: 'How do you retrofit your older building stock, to cut carbon and save energy, in a way that is financially and operationally efficient?' and 'How do you take into account government programmes such as the Green Deal and the Renewable Heat Incentive?'

It explored the business case for putting any kind of workspace onto a lower carbon trajectory and showed how new innovative technology can make a difference.

The programme, titled *The Low Carbon Refurb: The Retrofit Plan*, contained expert commentary from Advanced Air (UK), Elta Group, Medem UK, TracPipe by Omega Flex and the UK Green Building Council. Find it online at [www.thebusinesschannel.tv](http://www.thebusinesschannel.tv) There is also a link from [www.cibse.org](http://www.cibse.org)



## New members, fellows and associates

### FELLOWS

**Ashton, Anthony Stephen**  
Southampton, UK

### MEMBER

**Chan, Kwok Wa Johnny**,  
Kowloon, Hong Kong

**Chan, Su Man**, Hong  
Kong, Hong Kong

**Chan, Chun Man, Bill**,  
Kowloon, Hong Kong

**Chan, Siu Hang**, Tai Po,  
Hong Kong

**Chan, Fu Kit Shatin**,  
Hong Kong

**Cheng Wing Kwong**,  
New Territories,  
Hong Kong

**Cheung Ming Tai**,  
**Nicholas**, Kowloon,  
Hong Kong

**Choi Chi Hung**, Chai  
Wan, Hong Kong

**Chong, Man Wai**,  
Apleichau, Hong Kong

**Chow, Wing Yin Wendy**,  
Kowloon, Hong Kong

**Devine, Stephen John**,  
Doha, Qatar

**Farley, Mark Stephen**,  
Abu Dhabi, United Arab  
Emirates

**Fu Po-wa, Calvin**, New  
Territories, Hong Kong

**Ho Kin Kwok, Kelvin**,  
Kwun Tong, Kowloon,  
Hong Kong

**Ko, Hin Man**, Kowloon,  
Hong Kong

**Kwan, Ho-Fung, Nick**, Ma  
On Shan, Hong Kong

**Lai, Ping Kuen**, Kowloon,  
Hong Kong

**Lee, Wing Kuen**,  
Hung Hom, Hong Kong

**Leung, Chi Lung**, Tsing Yi,  
Hong Kong

**Lin, Chi Tak**, Tuen Mun,  
Hong Kong

**O KIN**, New Territories,  
Hong Kong

**O'Donnell, William**,  
Dublin 6, Republic of  
Ireland

**Pitchford, Robert Ian**,  
Newark, UK

**Rawnee Ho, Boon Chye**,  
Penang, Malaysia

**Stainsby, David Richard**,  
Lichfield, UK

**Szymczyk, Agnieszka**,  
Dubai, United Arab  
Emirates

**Tang, Chi Hang**, Tseung  
Kwan O, Hong Kong

**To, Chun Kit**, Shaoukeiwan,  
Hong Kong

**Tsang, Man Fung**, Tseung  
Kwan O, Hong Kong

**Tse, Tsz Yan**, Pok Fu Lam,  
Hong Kong

**Wong, Yiu Ting**, Kowloon,  
Hong Kong

**Yung, Sung Man**, North  
Point, Hong Kong

### LICENTIATE

**Grieves, Simon David**,  
Sutton Coldfield, UK

**James, Mark David**,  
Bristol, UK

**Mamode, Samir**, London,  
UK

### FELLOWS



#### Tony Ashton MSc CEng FIMEChE FCIBSE

Tony Ashton is head of MEP with KEO in Kuwait, and has worked throughout the UK, Middle East and Far East. He is master degree-qualified in project management and leadership, and has more than 38 years' experience in building services design and multi-discipline project management.



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# HAPPY NEW YEAR?

Thanks goodness for the Jubilee and the Olympics. Without those twin boosts to our collective sense of wellbeing, 2012 risked being a meteorological and economic wash-out. Still, 2013 brings new beginnings and our seven industry commentators have (some) high hopes for the New Year

“ If you survived 2012 unscathed, then it’s a decent performance because it was a difficult, hard time for us all!  
*Tiny Gittens* ”

*Tony Gittings,*  
managing director, Rinnai UK



Goodbye to 2012 and now it’s a memory – and that is probably the best way of looking back. It was a very tough year for everyone involved in the building services industry – consultancy, contracting or product supply.

If you survived 2012 unscathed, then it’s a decent performance because it was a difficult, hard time for us all!

But we are planning on making 2013 better with innovation and initiatives. We are sensibly optimistic about prospects – the drive will be energy efficiency and true added value for money.

Fresh ideas are always an answer to adversity and austerity.

*Stephen Matthews,*  
chief executive, CIBSE



2012 was a year contrasted, in London, by the construction of the Shard (for what purpose?) to the Olympics, the success of which was a huge shock to so many and had a hugely positive purpose – the buildings were pretty good too.

In the CIBSE calendar, the Annual Lecture given by Ofgem group chief executive Alistair Buchannan on the security of energy supply was a tour de force and shows what a knowledgeable expert on top of his game can do – it was electrifying (sorry!) and also challenging

for engineers, who are responsible for energy efficiency and balancing the supply and demand side.

My wish for 2013, from a UK perspective, is that the Energy Bill, Green Deal, Building Regulations and Electricity Demand Reduction project have some joined-up thinking in them.

While the industry does need to think how it is going to deliver buildings that work most of the time, it also needs to attract and equip sufficient people with appropriate skills and enthusiasm to deliver engineering excellence. The challenges are many but the rewards are significant, if we can get it right.

*Andy Ford,*  
director, Mott McDonald



The success of the London Olympics showed that construction can deliver given clear leadership, stable targets and political vision. 2013 needs more of this. We should be proud of the way our industry worked together to achieve excellence without drama for the Olympics and the celebration of engineering in the opening ceremony brought a lump to my throat. The story about the roles of respect and diversity in this Olympic success is still to be told but I hope will be in 2013.

Looking back at 2012 I will be glad to see the back of nonsensical political fiddling with our industry redefining ‘zero’ in building regulations. Defining ‘renewable heat’ displays a worrying lack of scientific knowledge in political circles.

*Jan Durbin,*  
partner, Hoare Lea



In 2013 I'm hoping for the return of the design team meeting, where designers design without the constant need to report progress back to

the client via the project manager, and a return to fee level stability where such design team meetings can be justified – as both produce better buildings. A return to optimism!

I'm glad to see the back of stupidly short deadlines – design programmes and bid periods have all been shortened to such levels where pressure to deliver seems to be almost daily – this isn't good for designers (and their home lives!), clients or building users.

*Patrick Bellew,*  
principal, Atelier Ten



2012 has been very challenging and has certainly had its lows, but it has had highs too. In particular, it will be hard to beat the thrill of seeing

the Gardens by the Bay open in Singapore to great acclaim with its zero carbon conditioning systems complete and operational.

2013 looks set to be much busier, both in the UK and overseas, but as an industry we should be concerned that the combination of cut-throat fees and an ever-increasing compliance and regulatory workload, as well as BIM, will result in the repeated deployment of stock solutions and a dearth of innovation.

*Christopher Cummings,*  
project director, Hillson Moran



Farewell 2012 old pal. It was a great year to be a Londoner with lots to be proud of, away from Westminster that is, where our 'greenest-

government-ever' not so much U-turned as corkscrewed their way through the year. I like a chance to sort that lot out in 2013. Zero carbon is just around the corner and we have such a terrific pedigree of design and engineering in the UK that I'm very positive about getting together and building brilliant things. I see a blurring of the lines between engineering, architecture and sustainability as passive design becomes more important than ducts and wires.

*Susie Diamond,*  
founding partner, Inklings



What I'd love to leave behind in 2012 is policy disconnectedness, and publication delays – I'm thinking particularly about the Green Deal and

Part L. We need certainty in our design targets – especially when margins are so tight – so moving goalposts are unhelpful.

For 2013 I am anticipating the new definition on overheating published by CIBSE, which will improve our ability to accurately predict uncomfortable levels of overheating. I'm sure overheating will be a hot topic, particularly in domestic projects. I am also excited by the new WiBSE network (Women in Building Services Engineering), which is rapidly gathering momentum.

# Your letters



STOCKMAPPER / SHUTTERSTOCK

## This month: More 'burning issues' on biomass, rare chimney manual found on Amazon and teachers on the receiving end

### Biomass grilled

Judging from the article in the December issue of the *CIBSE Journal* and further reading, the view is that biomass is an unsustainable, limiting and regressive short cut to reducing emissions. To consider the use of a biomass system is fraught with many pitfalls and some not inconsiderable risks to health and safety, ongoing effective planned preventative maintenance, correct system operation and the safe storage of fuel pellets.

Let's also not overlook the fact that the burning of wood in any form is a pollutant. Even under complete combustion, wood burning emits about the same CO<sub>2</sub> and NO<sub>2</sub> as oil; when incomplete it is a fairly unpleasant mix. Clients will start with all good intentions but, ultimately, will fail to ensure efficient control over time.

It is a falsehood by the market/industry to claim biomass systems as a 'green' alternative. It takes 20 years for a conifer to reach maturity, soaking up CO<sub>2</sub>, and a matter of hours to release it all back into the atmosphere. How is that sustainability? The emphasis must be on driving up the thermal performance of buildings, appropriate use of renewable technology and improved efficiencies from the plant that we specify and design systems around.

As an aside, the author implies that skills to size a flue are lost. Just to let

him know, some of us older gits with 'the knowledge' are still doing it the long-hand way.

*David Elloway, Bovey Tracey*

### Rare chimney find

On page 24 of the article, 'Burning issues' (*CIBSE Journal*, December 2012), the author says: 'very few people working now have ever sized chimneys.' Who then is designing the present generation of chimneys, I wonder?

Admittedly, the procedure can be lengthy and involve calculation of gas flow rates, buoyancy, pressure drop and exit velocity, which is probably why engineers have preferred to leave it to the remaining experts.

Some readers may remember the *Brightside Chimney Design Manual*, last published in 1979 by Technitrade Journals and now out of print. It presented a relatively easy solution through a series of nomograms, which took account of all the relevant variables. A few 'rare' copies still exist – one listed by Amazon is priced at \$500.  
*A A Field FCIBSE*

### Breaking the rules

I enjoyed your article 'Burning Issues' in the *December Journal* – especially the item 'common header design rules' on page 24.

It was a pity that the diagram above the rules broke rule 4 – that the header should be the neutral point

and the boiler pumps should be on the return to the boilers, not on the boiler flow, as shown in the diagram. To my mind the rules are correct and the diagram wrong.

*Rodney Perry (Fellow)*

*Editor: Thank you for the observation.*

*The intent of the diagram was to illustrate an 'as-installed' arrangement that had operational, metering and commissioning issues. The paragraphs identifying these issues were deleted, as the diagram should have been. An article on header design will appear in the new year.*

### Not every thing about biomass

I read with interest your biomass article in the December issue of the *Journal*.

Despite the front page title, stating 'Biomass: the facts, everything you need to know about design and specification', I was disappointed to see that no mention was made about whether biomass sources to heat buildings is appropriate, and if so, when this may be. Nor was there any mention of the ethical issues of biomass sourcing, or of the carbon intensity of the burning of biomass and recent research, which points to biomass leading to a 'carbon debt'.

*Sofie Pelismakers, Doctoral researcher  
DipArch MScArch MRes ARB RIBA  
UCL Energy Institute*

### Why we must plug the engineering gap

I welcomed the Engineering Knowledge supplement with last month's *CIBSE Journal*; it shows that the institution is looking to the future and recognises the potential problems ahead, where the grey-haired baby-boomers, like myself, will have no active part.

However, I still do not believe that CIBSE really realises the danger, in years to come, of too few building services engineers struggling to service the construction boom after the present recession disappears over the horizon.

How many of our members read *The Sunday Times* on 18 November,

So, what are our members doing about the education cliff-edge that, in my view, is fast approaching?

Engineering intake going off a cliff



DANCING FISH / SHUTTERSTOCK

and in particular the article, entitled 'Britain loses its knack for engineering'? It is a dismal article for engineers as it points out the decreasing percentage of university engineering students from the UK, and the increasing percentage of students from the Far East, particularly China.

On thinking over this statement, I realised that CIBSE may have been in a more parlous state had not so many applications for membership come from Hong Kong and the Far East over the last 20 years.

So, where are we going wrong in the UK? I have written to the *CIBSE Journal* in the past on the decreasing number of students taking physics and maths at school and, in addition, Dr Alan Smithers at the University of Buckingham has produced several reports on the problems associated with the decrease of physics-educated teachers in schools.

So, what are our members doing about the education cliff edge that, in my view, is fast approaching? How many have signed up as STEM ambassadors to promote science, technology, engineering and mathematics to school students?

I believe that the CIBSE hierarchy discussed this problem earlier this year, but note that this latest supplement makes no mention of the UK engineers gap that is fast approaching. The supplement does comment on how we should 'take care' of young engineers when they arrive in the industry, but if we do not actually gain sufficient entrants, then there will be few engineers to take care of.

The supplement shows that CIBSE is looking forward. However, I believe that it is missing one of the prime facets of our industry, namely the flow of candidates into the industry. If we do not do something now, we will be accused, correctly, of

taking our eye off the ball.  
*Ken McDougall*

**Teach the teachers**

The episode featuring the teacher's dismissal of engineering is a brilliant illustration of one of the things that is wrong with our society – no realisation of where the UK's net income comes from (see 'Lost for words' letter, *CIBSE Journal*, November 2012 issue). And slightly more subtle – no realisation that successful reality comes from the bottom up, via engineers, doctors, some city gents and other hands-on techies, and does not descend from above as 'upstream' or 'high level' conceptualisations and policies.

Nice to get that one off my chest, but perhaps the best response would have been: 'No, I don't think so, he will be too busy earning the money that pays for your salary, healthcare, street cleaning, food, clothing...'

Regards, and do congratulate Catherine Applegate for telling us about the teacher's comment that obviously blew her mind.

*John Moss, consultant, Arup  
Advanced Technology and Research*

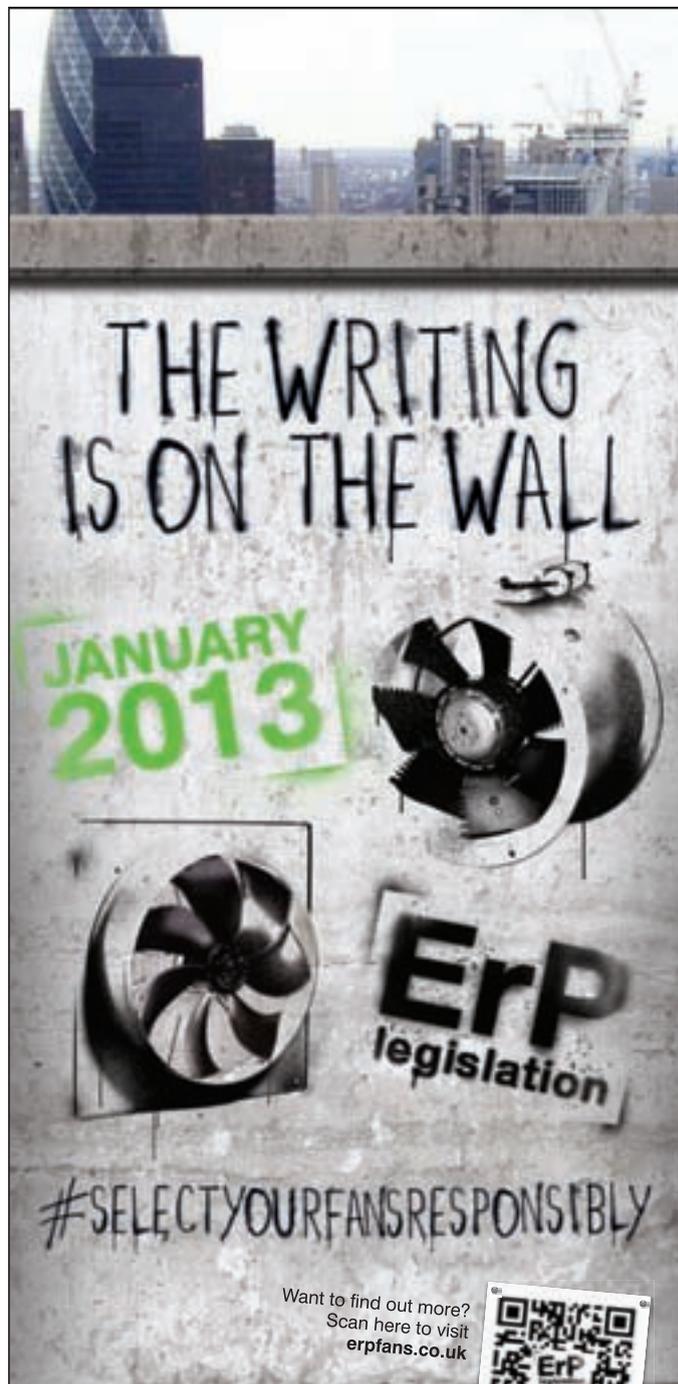
**If you can't do engineering...**

As requested, herewith my suggested response to the teacher's comment: 'Well, I guess if he doesn't prove clever enough to become a chartered engineer he could always get a job teaching.'

*Stuart Bridgman BScEng MCIBSE*

*CIBSE Journal* welcomes article proposals from any reader, wherever you are – whether it be letters, longer opinion pieces, news stories, people or events listings, humorous items, or ideas for possible articles.

**Please send all letters and any other items for possible publication in the *CIBSE Journal* 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. Please indicate how you wish your letter to be attributed, and whether you wish to have your contact details included.**



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# ON YOUR MARKS



Under the existing Construction Products Directive, CE marking is voluntary in the UK. But from 1 July 2013, any construction product must be CE marked, which will have significant implications for manufacturers and specifiers, says **Hywel Davies**



LUIZ ROCHA / SHUTTERSTOCK

Introduction of the Construction Products Regulations (CPR) next July is the biggest change in more than a decade for construction products sales across Europe. Under the Construction Products Directive (CPD), CE marking was not a legal requirement in the UK, although much of Europe required it. Twenty years, and many wrangles later, it will be a legal requirement.

As a regulation, the CPR applies directly in UK law without being transposed or implemented by Parliament. So it comes into force across the whole EU on 1 July 2013, after which any construction product placed on the market in the EU must be CE marked. This has significant implications for

product manufacturers, importers, distributors, specifiers, certification and test bodies, and regulators.

The CPR aims to overcome technical barriers to trade in construction products in the European Economic Area. It has four main elements:

- A system of harmonised technical specifications (European Standards and European Technical Approvals)
- An agreed system of conformity assessment and declaration for each product family with harmonised methods of product testing and assessment
- A framework of notified bodies
- Statutory CE marking.

CE marking indicates that a product is consistent with a Declaration of Performance (DoP), made by the manufacturer, and



The CPR aims to overcome technical barriers to trade in construction products

allows the product to be placed legally on the market in any member state. Although the product may be placed on the market, it may not be suitable for all end uses in all member states, since each member state has its own building regulations.

After 1 July 2013, construction products placed on the market in the UK and covered by a harmonised standard (hEN) or an ETA must be accompanied by a DoP and be CE marked. The DoP will be based on the provisions of the current hEN (or ETA) applicable.

Where a notified body is required to assist with the conformity assessment of the product, its advice should be sought on the provision of DoPs. In due course all hENs published under the CPR will be

revised, but this process will take several years.

Construction products placed on the market and CE marked in accordance with the CPD prior to 1 July 2013 are deemed to comply with the CPR. A manufacturer may draw up a DoP based on a Certificate or Declaration of Conformity that was issued before 1 July 2013, and CE mark against that.

Some products covered by hENs may have been placed on the UK market before 1 July 2013 without a CE marking, because of the way the CPD was interpreted in the UK. Products already on the shelves or supplied to end users will not need to be withdrawn, but the same items manufactured and supplied after 1 July must be CE marked. For those already CE marking under the CPD, the transition should be straightforward.

In theory manufacturers who did not previously CE mark products should have the test results and conformity assessment data, as they should still comply with the harmonised standard. In

practice it may prove a little more complex, and they would be well advised to review their arrangements for compliance with the CPR as soon as possible.

● CIBSE is forming a task group to look at the implications of the CPR and CE marking for manufacturers in the services sector. For more information contact [technical@cibse.org](mailto:technical@cibse.org).

### References Essential reading

A guidance note has been published by the Construction Products Association (CPA), assisted by the British Board of Agrément, British Standards Institution and FBE Management Limited and in consultation with the Trading Standards Institute. Visit the CPA website at [http://www.constructionproducts.org.uk/?elID=dam\\_frontend\\_push&docID=1441&filename=CPR\\_V7.pdf](http://www.constructionproducts.org.uk/?elID=dam_frontend_push&docID=1441&filename=CPR_V7.pdf). The author is grateful for the assistance of CPA deputy director John Tebbit, in preparing this article.

### Footnote

This article is intended as a guide. The regulation is directly applicable in UK law and neither this article nor its author purport to offer any definitive legal interpretations.

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



## MANUFACTURER'S VIEWPOINT

The Pinpoint project will direct users to the best sustainability tools, guidance and case studies. **Martin Fahey** of Mitsubishi Electric says it will sort the wheat from the chaff

Mitsubishi Electric is on a mission to stimulate debate about how we can all play a part in reducing the impact of our built environment, in terms of energy use and carbon emissions.

We are doing this because, as a manufacturer, we have an important role to play in reducing the impact of our own operations, and it is only through collaboration that we will achieve anywhere near the ambitious targets that have been set.

We are also choosing to do this through the pages of this journal because of the important role of CIBSE members.

We have been an active member of the UK Green Building Council for a while because we believe this is another way of sharing knowledge and experience.

The recent announcement by the UK-Green Building Council (UK-GRB) of the new Pinpoint project ([www.ukgbc.org/content/pinpoint](http://www.ukgbc.org/content/pinpoint)) is an excellent example of how a collaborative approach can help address the issues of how we create new buildings and refurbish existing ones so that they are more efficient, have lower carbon footprints and incorporate renewable power.

Pinpoint is a new online platform that allows users to search, filter and post reviews about sustainability tools, courses, benchmarks and case studies.

The project has been spurred on by the proliferation of sustainability information available, and Pinpoint aims to help users get to the right information within a few clicks.

The timing of the launch seems ideal, as there are some good parallels between Department of Energy and Climate Change's recently published energy efficiency strategy<sup>1</sup> and, of course, we see direct links with our own Green

Gateway approach, especially the energy hierarchy that we embrace as part of that approach.

That is why we have joined with other leading companies such as Marks and Spencer, Wates Group and EPR Architects to sponsor the project, so that the industry ends up with a sustainability search tool to help built environment professionals navigate to the best resources and metrics available.

Pinpoint has been developed with the help of an industry task group that scoped what information was currently available and decided how best to present it in an

easy-to-use format.

Building on the work of this task group, which was sponsored by BAM and Morgan Sindall, an advisory group is helping the project take shape, with the intention of launching in Spring 2013 – in time for Ecobuild.

With the majority of existing buildings likely to be in use for decades, establishing a way of accessing all that is best and most sustainable should help everyone understand and address issues.

*Martin Fahey is sustainable solutions manager at Mitsubishi Electric. Join the debate by visiting the Green Gateway LinkedIn group, or following Martin's Twitter account (@green\_gateway), which offers followers a chance to receive up-to-the-minute news and views from those within and outside the industry, including key opinion leaders.*

<sup>1</sup>DECC Energy Efficiency strategy [www.decc.gov.uk](http://www.decc.gov.uk)



## HARMONISED TECHNICAL SPECIFICATIONS

Harmonised technical specifications under the CPR are published by the European Standardisation body CEN/ CENELEC or European Technical Approvals.

The specification defines EEA-wide methods of assessing and declaring all performance characteristics required by regulation in any member state that affects the ability of the product to meet the seven basic requirements for construction works, which are:

1. Mechanical resistance and stability
2. Safety in case of fire
3. Hygiene, health and environment
4. Safety and accessibility in use
5. Protection against noise
6. Energy economy and heat retention
7. Sustainable use of natural resources.

European product standards may also address unregulated characteristics that are included for commercial reasons, such as aesthetic characteristics. The harmonised characteristics covered by CE marking under the CPR are listed in an Informative Annex (Annex ZA), in all hENs. This details the regulated requirements, clauses in the standard in which they are addressed and any separate supporting documents such as test standards. Section ZA.1 of the Annex is a checklist of all the requirements for CE marking for the product, and how they can be met.

Parts of the standard not referenced in ZA.1 are termed 'voluntary' or 'non-harmonised'. If a hEN cannot be produced or foreseen within a reasonable deadline, or for a product that deviates from the scope of an hEN, an ETA may be issued on the basis of a European Assessment Document. The ETA will include a section similar to Annex ZA.1 in a hEN.

# ARE EPCS A TRUE INDICATOR OF ENERGY EFFICIENCY?



The commercial property sector will not be motivated to improve building performance until it is forced to measure actual energy consumption, says **Chris Botten**

It is well documented that approximately 45% of the UK's carbon emissions come from the built environment, with commercial buildings being responsible for approximately 20%. However, this sector, as a whole, has historically been profligate in its attitude to energy use.

We are continually reminded that a significant proportion of the commercial building stock we see today will still be standing in 2050 – energy reduction targets will not be met by improving standards of new buildings.

This has been recognised by government with the recently launched Energy Efficiency Strategy, which outlines the UK's potential to save the 'equivalent to 22 power stations' by 2020.

Commercial property clearly has an important role to play in contributing towards this. In recent years, government has introduced a growing number of policy and legislative drivers focused on encouraging carbon and energy reductions throughout the industry, including the CRC Energy Efficiency Scheme, Mandatory Carbon Reporting and the Green Deal.

A key policy driver is the use of Energy Performance Certificates (EPCs).

The government has decided to use EPCs as its main rating tool for the energy performance of buildings. They are required for the sale and letting of all commercial buildings and, importantly, there are plans to introduce minimum performance standards based on EPC ratings. The legislation, to be introduced by 2018, will result in any building that does not achieve a minimum standard of energy efficiency being 'unlettable' and 'unsaleable'. At present, the suggestion is that this minimum standard will be an EPC 'E' rating.

But are EPCs an appropriate indicator of a building's energy performance? Every year the Better Buildings Partnership measures the energy consumption of its member's



Ropemaker Place (left) has an EPC rating of B compared to an E for 10 Exchange Square (right) but in terms of actual energy consumption 10 Exchange Square was 66% more efficient

## Measuring and reporting actual energy consumption is essential

London property portfolios. Taking two central London offices as an example – Ropemaker Place, with an EPC rating of 'B', and 10 Exchange Square, rated 'E' – it should be expected that Ropemaker Place is the more efficient.

However, the reality is that 10 Exchange Square is 66% more efficient in terms of actual energy consumption. As surprising as this is, the scenario is far from unique. Our analysis, supported by Jones Lang LaSalle, based on the actual energy use of more than 200 properties, shows that there is little or no correlation between EPC ratings and actual energy performance.

The BBP/JLL research is not intended to discredit EPCs, which have a role to play. They can help to set goals for improved design and refurbishment of buildings and, similarly, for investment in improvement measures, which can lead to a more energy-efficient building.

The main concern is how they are being used as a cornerstone of policy and how the industry interprets their meaning. A measurement mechanism that focuses on actual energy consumption is likely to be far more useful in helping the industry reduce its carbon emissions. This is already a requirement for many public sector buildings through the use of Display

Energy Certificates (DECs). This basic requirement of understanding how our building stock is performing is a necessary first step to significantly reducing our consumption, yet is currently ignored by government policy.

Internationally, positive examples can be seen, for example the use of the National Australian Built Environment (NABERS) rating system and the recent mandatory disclosure of energy use for buildings in New York. It can be argued that, in the UK, the private commercial property sector should already be reporting and measuring energy consumption because it makes sense, given the savings that are available.

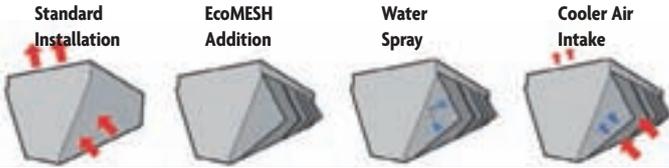
However, the sector is a complex beast and reticent to change unless forced to by regulation. If the government is serious about reducing carbon emissions from commercial buildings, it needs to wake up to the fact that measuring and reporting actual energy consumption is essential. Only then, with a good understanding of how the industry is performing, will it be in a position to introduce effective policy that stands a chance of achieving its ambitious – but necessary – targets.

CHRIS BOTTEN is the programme manager at the Better Buildings Partnership

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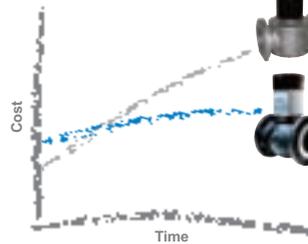


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# A CLOUDED VIEW



The government would be wrong to ditch dynamic simulation modelling as a compliance method in Part L, says **Chris Yates**. In a world increasingly turning to DSM, UK consultants could be quickly left in the shade

Hywel Davies rang alarm bells in December's *CIBSE Journal* (Part L – Should we be worried?). Many of us are affected by changes in energy performance regulation. For example, the changes in 2006 propelled my niche speciality in building physics into the mainstream. However, Hywel's message makes it apparent that looming changes might be nowhere near as beneficial – at least to me.

As well as the usual victim (consequential improvements), other cuts could be made. A proposal that has eluded the spotlight is one to remove Level 5 (dynamic thermal simulation or DSM) as a compliance option. Under this arrangement, all UK compliance would be performed in SBEM.

DSM tools potentially offer greater accuracy but require more careful input. With DSM, solar gain is treated more accurately, as well as external shading and thermal mass. Other effects can be modelled such as inter-zone airflow and dynamic HVAC. The Energy Performance Certificate (EPC) conventions list building features where a Level 5 analysis is required and SBEM cannot be used (for example, atriums).

The reason for removing DSM from the framework is that as future designs approach zero carbon, the percentage 'error' between results from different software will be greater. It follows that the only fair way of performance rating is with one tool – even if it is inaccurate in certain situations.

Cost is also a factor. At present, DSM software must be accredited through rigorous vendor testing and then reviewed independently. The independent review has, up until recently, been a cost to the Department for Communities and Local Government (DCLG). Under new proposals, DCLG are likely to opt for a 'cost recovery' scheme where the software vendor pays. This 'cost recovery' might also extend to revenue



IXPERT / SHUTTERSTOCK

It's become difficult to enter the UK market if you are an outsider

generation with fees levied to help fund SBEM development (assuming DSM continues to feature).

### Who would stand to lose if Level 5 was dropped?

Training, loss of BIM integration and a reduction in perceived value would hit consultants. In a world where simulation is becoming the norm, Britain could even be sending out the wrong signal and reducing its experts' opportunities of delivering to an international market.

There is no way to adequately describe the operation of innovative equipment or controls in SBEM's monthly-average method. On the other hand, DSM software developers have the most ability to model anything innovative – they are where the greatest pool of development talent lies. Daikin, PCM modelling and Tarmac offer a few examples where software companies have collaborated with equipment manufacturers to model innovative technology. So, it would be bad news for innovation if DSM was off the menu.

Software companies have invested much in the National Calculation Methodology (NCM), which underpins non-domestic Part L and EPCs. If you're

a developer, there's no other calculation methodology that's as onerous – so much so that it's become difficult to enter the UK market if you are an outsider.

The Swedish vendor Equa Simulation has implemented the NCM in its IDA ICE software, but accreditation has been delayed because DCLG's independent review scheme is on hold. At almost the same time, it implemented its ASHRAE 90.1 tools (the equivalent LEED analysis). According to its CEO, Per Sahlin, 'coding for compliance with ASHRAE has been a dream in comparison to the NCM!'

A combination of public and private sector delivery is key to success. Collaboration is required. There is a future for SBEM, but let's remind ourselves of what the 'S' has always stood for, ie. simple. The current system is serving needs adequately, but it needs a few tweaks. It doesn't need reinvention and certainly not cuts. CIBSE and others will continue to push to get behind those 'closed doors', but it will take more than this to get heard.

**CHRIS YATES** is an independent building physics consultant working with BDP

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# THE **RISE** AND

The wrapping's in the bin and your shiny new iPad is ready and waiting to be used. But how can it make



SHUTTERSTOCK / KROMKRATHOG

# RISE OF APPS

make your business life easier? It just so 'appens that Tim Dwyer has a few application-based answers...

The forecast was that Christmas 2012 would be a festival of tablets – not, of course, carved from stone proclaiming the second coming of our saviour, but more likely sleek, portable handheld electronic devices loaded with 'apps', such as Angry Birds, and carrying the promise of an (even more) effective lifestyle. The clamour for the ultimate 'electronic organiser' evokes memories of the mad dash for a Filofax as the essential business accessory in the mid 1980s – a boom that lasted just a few years.

## Kick-starting technology

The technology driving today's tablets was arguably kick-started by the advent of the iPhone, and it is just six years since Steve Jobs of Apple wowed his audience at the launch of the iPhone in January 2007. It was not the first electronic handheld device to excite the techies, but it took hold of the media and, most importantly, the mass market.

Expectations were set for 'space age' handheld technology that would not only replicate the Star Trek communicator (and yes, there is an app!), but also provide access to the knowledge of the *Hitchhiker's Guide to the Galaxy*, complete with the translation skills of the babel fish. And with the

meteoric launch of the iPhone came the popularisation of the term 'app'.

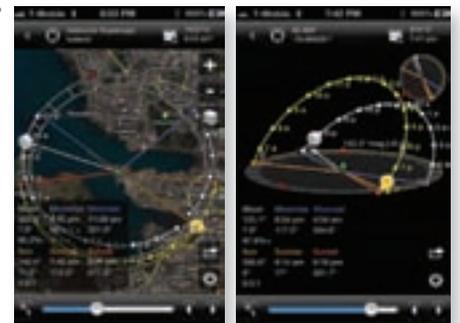
An abbreviation of 'application', an app is not the same as the software application that runs on the desktop of a PC – it is a specially written program that can (ideally) leverage the best performance from the device that it has been designed for.

An app would typically be written for a mobile device, such as an iPhone and iPad, Android device, Blackberry or the newly launched Microsoft Surface, and may be more clearly referred to as a 'mobile app'.

However, the term is also increasingly used for web-based applications (online apps) that hold the main parts of the software systems in the 'cloud', allowing access from almost any web-connected device using a browser (such as Chrome, Firefox or Internet Explorer), irrespective of whether the user has a smartphone, tablet, desktop PC or even a smart television.

The world of apps is at an interesting point in this formative period. Tablets that are joining the commuters' smartphone and umbrella as the essential accessory, and becoming de-rigueur at meetings, have powers that would previously have been envied in a laptop computer.

Indeed, in the three years since the launch of the iPad, which invigorated the tablet market, devices the size of a paperback book (and far thinner) produce graphical performance – and progressively more



The Sun Surveyor app allows instant sun plots to be created



With Sun Seeker, the tablet camera is pointed at a location and the sunpath diagram appears

6 The very connectivity offered by the contemporary tablet is blurring the world between apps that can run independently on a device, and those that rely on the umbilical link to the web

➤ number crunching ability – which would have been seen as extraordinary on a desktop computer just a few years ago. The expectation of performance from an app is similarly high.

The very connectivity offered by the contemporary tablet is blurring the world between apps that can run independently on a device, and those that rely on the umbilical link to the web-based servers that provide a conduit to the massive computer power and data storage in the myriad machines serving the 'cloud'.

The difference may not be obvious to the urban user, continuously connected to the web through wi-fi or phone services – but on leaving the metropolis (or entering the basement plantroom), the link is severed and the formerly lightening-fast, critical web-powered app becomes as useful as a battery-less toy early on Christmas morning.

Then there are the online apps that live totally in the cloud, such as the increasingly sophisticated Google Apps and Microsoft Web Apps, which need a live web connection to be useable.

### Apps with attitude!

And so, with the excitement of unpacking the iPad/Android tablet but a distant memory and the designer packaging consigned to the recycling bin, it is now time to seek out whether there is real justification for the seasonal splurge on the new technology and explore whether the mobile apps can maintain that seasonal sparkle.

As with any other business activity, the world of building services engineering is dominated by text-based documents, spreadsheets and presentations, as well as the more discipline-specific calculations and drawings.

There are, clearly, very capable and sophisticated apps that provide flagship office software for the iPad, such as the iWork suite (£42). However, the day-to-day reality is that most of the engineering business world revolves around documents created in Microsoft Office.

The iWork suite will open and save compatible files, but there are a number of packages, both for Android and the iPad, that provide excellent and direct-file compatibility and are far cheaper.

For example, the Quickoffice Pro HD (Android/iPad £7.48/£6.99) can be used to create, edit and comment on documents, presentations and spreadsheets, and includes flexible file transfer methods, particularly important for the iPad with its lack of a USB port for sharing files.

The Android version includes PDF marking up – especially useful when commenting on draft documents or sharing comments among a team on drawings and project files. For the iPad, such PDF annotation requires an app such as the incredibly sophisticated GoodReader.



LEFT and CENTRE: Danfoss fitters app

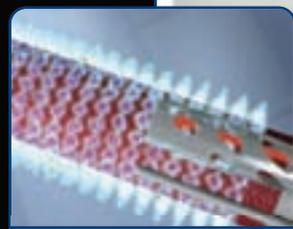
TED app

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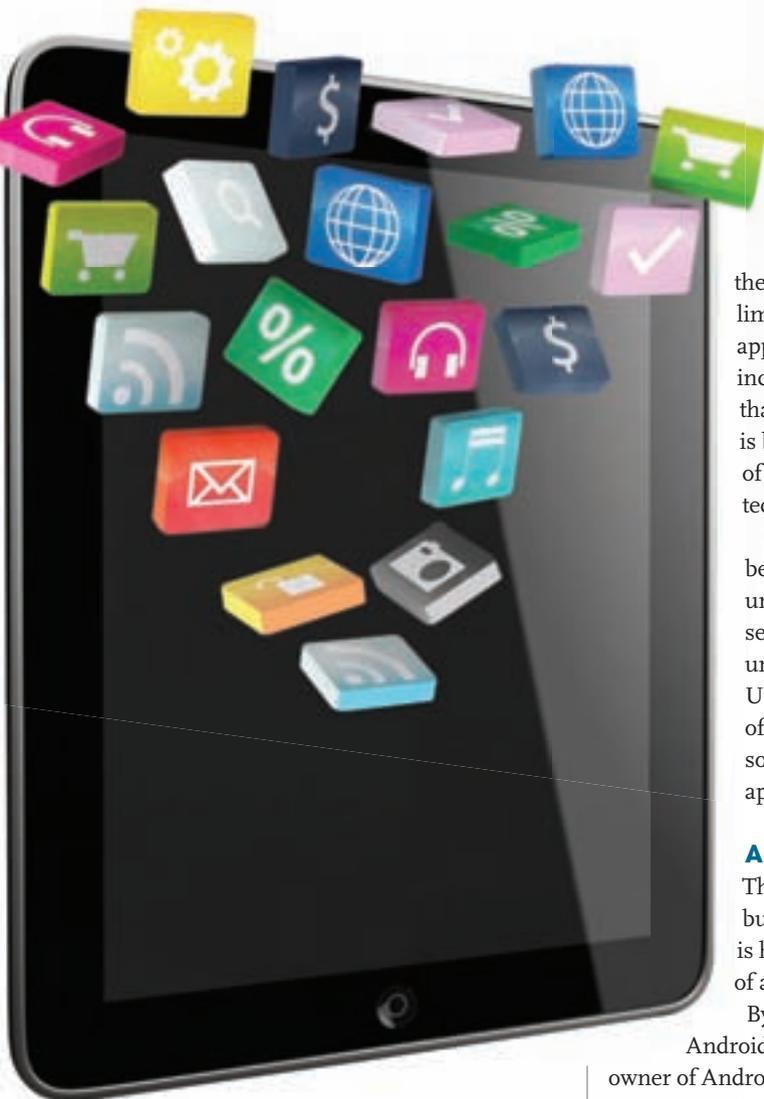
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Autocad WS app, which allows access, editing and sharing of Autocad drawing files. Although some users have found the file-handling capability limited, one wonders if the appreciation of such an incredible utility (on devices that can cost less than £100) is being clouded by the surfeit of apps and their associated technology.

The sharing of information between users is increasingly undertaken by email and web services. For iPad users – unlike Android – there is no USB port, nor the simplicity of ‘sneaker-net’ sharing. And so the opportunity of using apps to share files is huge.

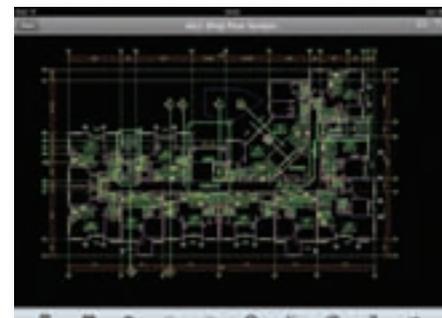
#### Android vs Apple

The world associated with the building services profession is huge, so literally thousands of apps have been developed.

By far, the most are for

Android devices – Google (the owner of Android) maintain little control on the apps that appear at their Google Play store and can be downloaded from many other sites.

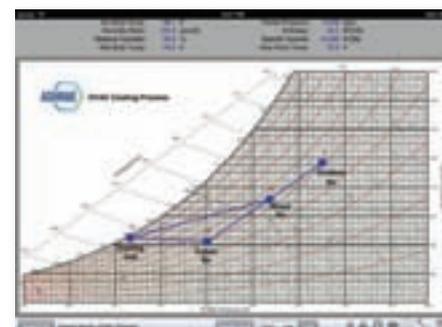
Apple and Microsoft, on the other hand, maintain a strict control on the apps that are available. This does not mean that the apps will be any better per-se, but it does reduce the amount of ‘noise’ in the marketplace.



The Autocad WS app



Honeywell's PT chart



ASHRAE psychrometry chart

Left: Silverglance software



SHUTTERSTOCK / CLIPAREA / CUSTOM MEDIA

One of the areas in which a tablet can boost its position in the virtual toolkit is the ability to apply geographic information, from an inbuilt compass and GPS, to provide enhanced, localised data. For example, the Sun Surveyor and Sun Seeker apps allow instant sun plots to be created for a site producing overlays onto web-sourced mapping data.

It is with the advent of ‘augmented reality’ that the potential power of tablets can be seen in these apps where the tablet camera is pointed at a location and the sunpath diagram is superimposed live over the live image.

#### Apps and DEC

Free apps such as Layar provide some visually stunning links to data sets. Simply by pointing the internet-connected tablet at a building, Lessen plugin superimposes on the screen image the Display Energy Certificate (DEC) rating of buildings for England and Wales.

As images – and particularly drawings – are a key part of a designer’s work, access to drawing files for review and amendment while out and about is provided by the

Free apps such as Layar provide some visually stunning links to data sets



**OPENING WINDOWS FOR APPS**

The newly released Microsoft Surface tablet has the potential to inject a whole new swathe of apps into the heating, ventilation, air conditioning and refrigeration marketplace. It is likely to gain a foothold in the business market because of its integration with the Microsoft Office applications. The Pro version does not start shipping until next month, but when it does the ability to run Windows 8 software is likely to raise the bar substantially for what is expected from apps.

Among the many Android gems, there is also an enormous, diverting array of vanity publishing apps – those simply proclaiming the existence of a firm or individual without enhancing the information experience.

There are many free and low cost apps that provide an experience not dissimilar to that of programmable calculators. These cover all the basic areas to supply data for duct and pipe sizing, psychrometrics, fluid flow, lighting, acoustics and many areas of operation and fault finding. This is undoubtedly useful information and quicker to access than searching out printed tables or catalogues.

Many companies have launched apps both to provide information and to support product lines. These provide a low cost way of accessing information, but tend to be limited in scope.

Presumably, since there is a relatively small market for integrated design apps (with development costs typically quoted at a minimum of £10,000 to £20,000 for apps rich in content) the price of specific industry apps tends to be £15 and upwards.

Finally, if you've got time to kill between meetings try downloading TED's official

app in which you'll find instant inspiration from over 1,100 talks from some of the world's most fascinating people.

As both the computing and screen technologies continue to race forward, the power consumption of the devices tumbles, batteries and power systems evolve, and the global connectivity to the internet, desktop PC and the myriad IP (internet protocol) linked appliances expand, the pervasive growth of apps as a means of supporting business activity looks set to continue.

There is now a critical mass of devices being used – this year will undoubtedly see some major advances in software of specific interest to the CIBSE member.

CIBSE Journal will follow developments and provide a regular update on the apps that may be set to change the mobile working practices of the industry. **CJ**

Thanks to Mike Barker, Chris Germann, Stewart Gilmour, Keith Glasch, Ken Goodson, George Leon, Ed Palmer, Joey Rouse and Kenneth Shifflett for suggestions of apps.

Prices change rapidly – those stated were correct at 1 December 2012



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# DEMAND FOR RENEWABLE HEAT

The Renewable Heat Incentive is far more likely to succeed if the government avoids complex tariff-style payments and takes a long-term view on training, accreditation and product development, says CIBSE in its response to DECC's proposals for the non-domestic RHI

**T**he Renewable Heat Incentive (RHI) is likely to fail if the government adopts the same tariff system used for solar PVs, according to CIBSE's response to the government's consultation on proposals for non-domestic RHI.

CIBSE says the proposed tariff system is complicated and contains uncertainties about the amount of support on offer. The Institution acknowledges that the 'opening tariffs need to be very attractive to kickstart the scheme', but notes that subsequent tariff reductions, once the market takes off, may 'cause confusion and possible market collapse'.

It notes there was a big fall in installations of solar PV in 2012 when feed-in tariffs were cut from 43.3p to 21p per kWh of solar electricity.

## Hands up for cashbacks

The institution says that the proposals fail to provide an incentive for manufacturers to invest in product development, and make it very difficult for the supply chain to predict the uptake in RHI. As a result suppliers, designers and installers are unlikely to see sufficient business to warrant investment in training, installation and maintenance, says CIBSE.

It says the government needs to take a holistic approach and make training and accreditation key planks of its programme.

The institution also recommends a design improvement programme that would help ensure advances in the next generation of renewable products and suggests the government work with technology innovation partners such as TSB to achieve this.

The measures would have the benefit of reducing the perceived risk of taking up the RHI in the eyes of consumers, says CIBSE.

In its response, submitted last month, CIBSE recommends incentivising the market with a cashback scheme rather than

tariffs. This would offer ongoing annual payments for those who agree to metering, regular maintenance and the submitting of performance data. CIBSE says customers would know how much money they would receive, and it would give suppliers the certainty they need to invest in renewables.

CIBSE says that the RHI must first be given for proven renewable technologies. It advises the government to look closely at biomass and the issues around safe and efficient design and installation of both the biomass boiler and the chimney (see Burning issues, *CIBSE Journal*, December 2012). CIBSE guidance on biomass boilers will be published in the new year.'

It warns the Department of Energy and Climate Change (DECC) that describing biomass boilers as being part of a 'boiler replacement scheme' would be misleading as fossil fuel boilers operate at higher

temperatures than renewable heat sources and so are smaller, lighter and easier to match to existing heating systems. The need for larger radiators and a fuel store, as well as fuel availability should also be considered.

CIBSE backs the DECC proposal to make improvements to homes' energy efficiency before installation of renewable heat sources. Without so called 'green ticks' CIBSE says 'the system will be larger than it needed to be, more expensive to run, and will waste energy'.

## Switching back

Customers switching back to conventional heat will be likely if technology underperforms, warns CIBSE, adding that while accrediting the supply chain should protect consumers, there are relatively few knowledgeable designers and installers for heat pumps<sup>2</sup>.

To stop consumers from switching back to gas, CIBSE says a loyalty bonus could be offered at 10, 15, and 20 years, which would contribute to maintenance costs. Consumers would show receipts from DECC-approved maintenance service providers to receive the bonus. CIBSE says the relationship could mimic that of the car buyer and garage dealer.

C. JONES / SHUTTERSTOCK



More expensive sources of renewable heat, such as solar thermal, should attract no higher grant than other systems, advises CIBSE, suggesting target installed costs could be set that meet value-for-money criteria.

CIBSE is cautious about the provision of RHI for social housing landlords until capital costs have reduced and operating costs are better understood. However, it says that social housing landlords may be able to offer better value for money from centralized installations.

Monitoring should be favoured above deeming – a method of calculation that relies on a tick box approach, rather than analysis of real data – to calculate RHI payments, says CIBSE, as there is currently a lack of data to determine what is good performance. If a calculation method had to be used, the institution recommends SAP, once a version is developed for RHI. And it says the government has to offer incentives to customers to install metering and monitoring, and ensure any data is made available to the supply chain to enable development and improvement of systems.

The government should undertake pilots to identify benefits and problems, the findings of which could be fed into product development,

system design and improvements in service provision, says CIBSE. Meanwhile, any pilot should closely monitor the performance of renewables, and help evaluate the experience for the customer.

#### Non-domestic RHI

DECC asked for a response to proposals for an extension to the non-domestic scheme, particularly air to air pumps.

CIBSE says that there should be no RHI for reversible air-to-air heat pumps, as the market is already strong. It also believes that monitoring rather than deeming should be used to determine payment. It fears deeming will create a precedent for other forms of renewable heat, which will mean less data available for formulating future policy and less certainty over whether payments are appropriate. Ideally payments should be based on actual performance of the system.

The use of waste heat should also be considered, while recent developments in below-ground thermal storage are achieving significant carbon savings, says CIBSE, and can be used in conjunction with refrigeration systems generating waste heat. 

Opening tariffs need to be very attractive to kickstart the scheme, but then entrenchment to a more balanced tariff once the market has taken off causes confusion and market collapse

#### References

- 1 CIBSE Application Manual for biomass heating systems [www.cibse.org](http://www.cibse.org)
- 2 Energy Saving Trust Heat pump field trial initial findings found that performance is highly dependent upon appropriate installation and integration with the building's existing heating system, and appropriate control by customers.

The full response to the RHI consultation is available on the CIBSE website along with responses to other recent consultations [www.cibse.org/consultationresponses](http://www.cibse.org/consultationresponses)



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(Heating & Ventilation Review Judges)

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# THROWING DOWN THE GAUNTLET

With only a month to go until the 2013 Building Performance Awards, **Andy Pearson** talks to Mike Burton at CIBSE's reigning Building Services Engineer of the Year, Aecom, to see what impressed the panel of expert judges

**M**ike Burton is clearly proud of Aecom's submission for the Building Services Engineer of the Year at the 2012 CIBSE Building Performance Awards. He's printed copies of the company's awards submission and placed them strategically around Aecom's swanky new offices in London's Holborn. 'When we pulled together everything we're doing here it makes for a very powerful document,' he says. Clearly the CIBSE judges thought the same: Aecom triumphed in the category.

Burton has good reason to be pleased with the win. As director of building engineering,

he is responsible for the London building engineering team, which includes its building services engineers. Sitting in one of the company's corporate meeting rooms, dressed soberly in a dark suit and white shirt, he outlines how the company he joined 20 years ago has transformed itself into a global building services consultancy, and one of the world's leading engineering consultancies.

After graduating in 1989 with a degree in architectural engineering from the University of Leeds and Pennsylvania State University in the USA, Burton joined Oscar Faber, as it was then called. Following completion of the engineering consultant's graduate training programme, his career flourished, and he became a director of Oscar Faber in July 2006. He has remained with the company in all its guises ever since; first as it merged with Maunsell to become Faber Maunsell;





then in 2001 after the firm was acquired by global mega-consultant Aecom to become Faber Maunsell Aecom; finally, in 2009, it was rebranded simply as Aecom.

Through the consultancy's various incarnations Burton's specialism has been sustainable design. Burton says he's been fortunate in his career to have worked as a design engineer with some of the best architects in the UK. 'I've worked with Fosters, Hopkins and Grimshaw on the design of thought-leadership buildings,' he recalls. Burton's portfolio reflects the consultant's innovative approach to engineering. It includes: the first displacement ventilation system in the UK at Britannic Insurance, Birmingham; the UK's first chilled beam installation at Molnlycke's HQ in Dunstable; the first mixed mode at Electronic Arts HQ in Chertsey; and Defra's Alnwick offices, which is the first zero carbon building and the first scheme to be awarded BREEAM Outstanding for its in-use performance. 'Working with the leading architects, you appreciate how you can influence a design to produce a better building,' he says.

A key reason for the consultant's success, according to Burton, is that it employs engineers who are prepared to look beyond the

conventional. 'In terms of the type of staff we employ; we look for those that will challenge the norm,' he says.

Having provided significant resources for training, the company is safeguarding its investment (see box: School leavers' first steps on page 38) through the capture and dissemination of this knowledge and learning. On a general level, Aecom has set up technical practice networks (TPNs).

These are discipline-based global knowledge sharing networks, which include discussion forums, libraries of information, details of events, exemplar project information and webinar-based technical briefings. 'In the mechanical group, for example, an engineer will be able to ask if anybody has had experience of using a particular type of chiller and, if they have, what issues should they be aware of in its specification,' says Burton. Currently, he says, the UK is inputting a lot of sustainability and low energy information into these TPNs to help designers in the USA who are starting to work on low-energy schemes.

Another knowledge transfer tool is Adapt, or – to give it its full name – Aecom's Design and productivity tool. This is available to all engineering staff. It's a directory of good design information for things such as: what to

---

Working with the leading architects, you appreciate how you can influence a design to produce a better building  
*Mike Burton*



Above: Broadcasting House, London

## CIBSE BUILDING PERFORMANCE AWARDS 2013

RECOGNISING EXCELLENCE IN MAKING BUILDINGS WORK

The CIBSE Building Performance Awards recognise, reward and celebrate the best performance, innovation and practice in design, commissioning, construction, installation and operation of sustainable buildings, and the manufacturers whose technologies enable energy efficiency.

Join the best of the industry talent and be there on the night to see who will scoop the awards. The glittering event, taking place on 5 February at London's Grosvenor House Hotel, will see the industry come together in a night celebrating the achievements across the building services chain. Don't miss your chance to be there. To book a table, visit [www.cibseawards.org](http://www.cibseawards.org) or call 020 7324 2771.

consider when choosing an air conditioning system; the key factors associated with that type of system; and key projects where the system has been used. It also includes web-based design tools, such as the Renewable Energy Toolkit, which helps designers establish the most appropriate type of renewables for a project.

There is also software to enable standard solutions for plantrooms and risers to be produced quickly. The senior engineer in each discipline is responsible for ensuring Adapt is kept up to date for their specialism. 'Aecom has invested considerable resources in the Adapt tool to enable engineers globally to use a common design platform to increase productivity, accuracy and quality,' says Burton.

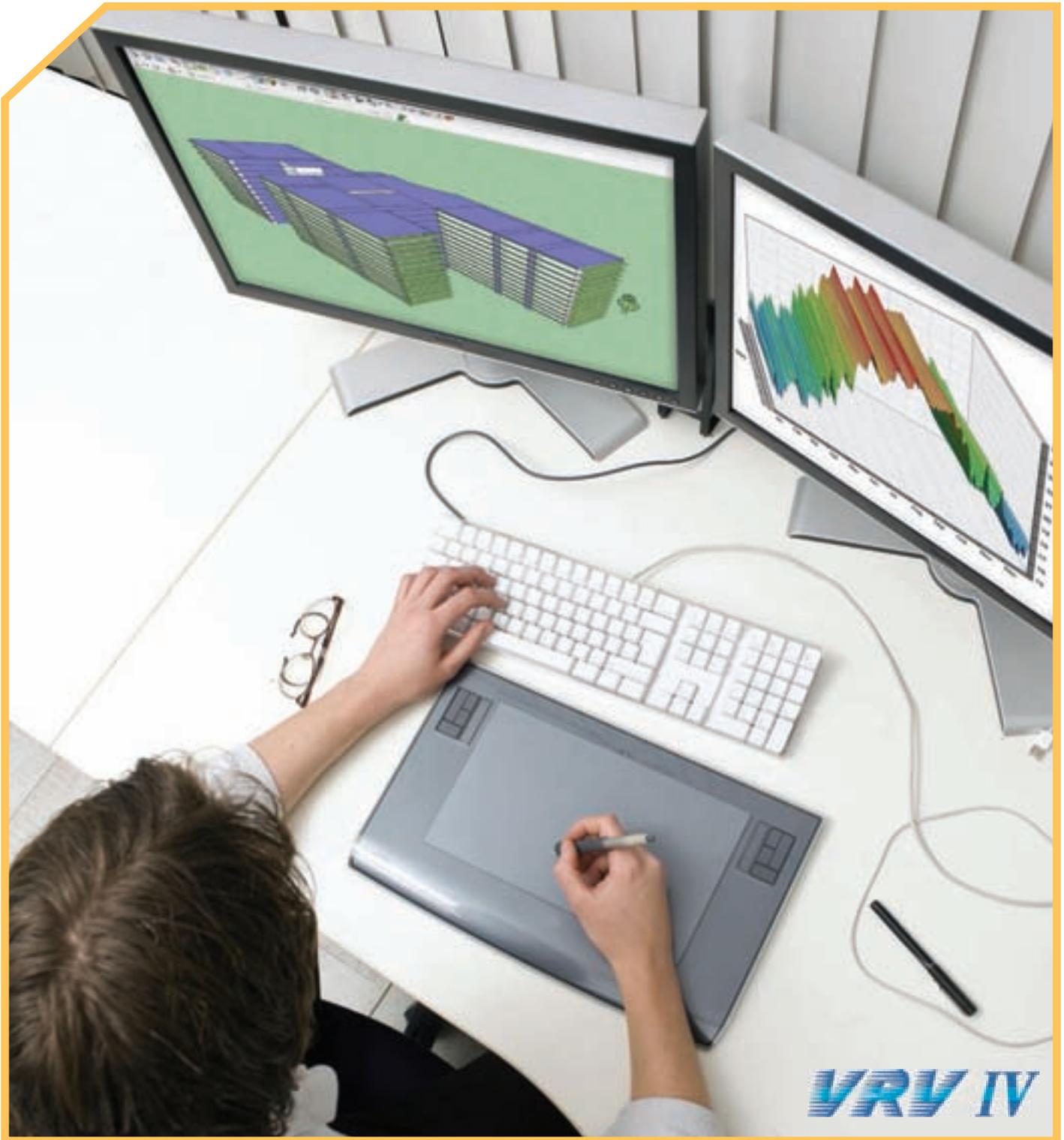
Aecom is also investing in staff training to grow the business in new and emerging markets by up-skilling staff so that they can focus on new areas, such as waste-to-energy and renewables. 'The size of the company allows us to put the funds in place to focus on these sectors,' Burton explains.

Another way the company has evolved from the Oscar Faber that Burton joined 20 years ago is Aecom's growing number of specialists. 'At Oscar Faber we were general engineers that worked on different types of building; now there are lots of specialist engineers for you to call upon to help with the design of a building,' he says. These specialists include bomb-blast

experts, security, fire engineers or even IT. 'For a global firm with 45,000 employees, it makes economic sense to employ experts in different disciplines,' he adds.

The Halley VI research base in Antarctica for the British Antarctic Survey is one scheme where Aecom's global knowledge base and engineering specialisms came into its own. The competition for project was announced on OJEU. Aecom put together a team with Hugh Broughton Architects. Before developing a solution, the design team used the company intranet to find out if anybody at Aecom had experience of working in extreme climates. The responses included one from Aecom's Canadian arm. They had worked on a similar project for the USA in the Arctic. 'If we hadn't had their expertise there is no way we'd have been shortlisted for this project,' explains Burton.

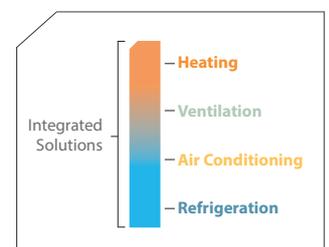
While the drive for profit is as fundamental to the business now as it was 20 years ago, commercially a key change has been to focus the business on the different market sectors. Aecom now has groups of experts focused on education, commercial, high-end residential, hotels and healthcare sectors. 'It is different to the generic approach of Oscar Faber, now that we not only have specialists, but specialists focused on a specific sector,' he says. Significantly, these sectors are not confined to the UK but exist globally, which allows the



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The VRV plug-in for IESVE 2012 helps create engineered VRV solutions for buildings of any complexity and size, delivering accurate simulations and efficiency calculations for VRV systems. A new update compatible with the Virtual Environment feature pack 2 is available in January, which offers even faster and more accurate simulations plus a simplified user interface. The update features the new VRV IV Heat Pump system with Variable Refrigerant Temperature technology, which substantially increases seasonal efficiencies. So use the best resources for your next climate control solution - and discover how to set new standards in comfort and efficiency.

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company to focus on the countries where each sector is most active.

'Being part of Aecom has allowed us to have offices all around the world so that when there is a downturn, such as there has been in the UK, it has allowed us to transfer staff to Asia, Australia and New Zealand for example, where currently there is a significant amount of work,' Burton says. It is an approach that has enabled Aecom to retain engineers when consultancies without a significant global presence are shedding staff. He admits that the downside to this is that staff have to be more flexible and mobile than in the consultant's Oscar Faber days.

Alongside its design work, Aecom also has a steady income stream from research work for government. 'The work we're continuing to do on changes to Part L is great for staff to be involved in, but it also helps the design teams shape the buildings of the future,' explains Burton.

This is proving commercially advantageous on developments like the refurbishment of London's Shell Centre, which is not due to complete until 2016. 'There are potential changes to the regulations for 2016, so it is important that we know what is likely to be coming along in order to design buildings to

comply with them now,' he says.

In addition to producing guidance documentation for government on regulations to reduce carbon emissions, the company has also set out to reduce its own carbon footprint. Aecom is currently benchmarking its emissions; at the same time it has instigated a programme to help reduce these year-on-year. The programme includes better metering and data collection in its office. It is also providing teleconferencing facilities to reduce air travel, and has invested in two video conference rooms for its London HQ.

Also in London, Aecom is working with its landlord, Derwent London, and other tenants in an environmental forum set up to help reduce carbon emissions associated with the office. Under the initiative Aecom has: monitored energy use in the building and analysed the results; carried out energy surveys of tenants floors to identify potential energy savings; and analysed energy use profiles for landlord areas to help identify savings. As a result, Derwent London is implementing energy-efficiency measures such as enhanced sub-metering and the installation of low energy lighting, which will help minimise energy bills and its carbon footprint.

Looking ahead, what changes does Burton >

6 Having provided significant resources for training, the company is safeguarding its investment through the capture and dissemination of this knowledge and learning

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Halley VI

**6** We need to stay focused on emerging markets because that is where the business will grow  
*Mike Burton*

think the next 20 years will bring? ‘We need to stay focused on emerging markets because that is where the business will grow,’ he says.

It will also be important for the company to successfully integrate with the new businesses it is continuing to acquire. ‘We’ve just merged with Davis Langdon, so it is important we integrate properly, both to benefit from their expertise in cost management, and to use those skills to become the best all-round engineers and project managers,’ he says.

The biggest change, however, will be more fundamental. With the increased adoption and growing sophistication of BIM, the design process will become more automated.

As a result, Burton anticipates Aecom’s role evolving from design engineer to design advisor. ‘Our role will become more of a consultancy or advisory role in looking after projects,’ he says. An indication, perhaps, of how much the award-winning consultant has changed and how it will continue to change in the future. **CJ**



### School leavers’ first steps

Aecom’s search for precocious and talented engineers is helped by its proactive recruitment programme and, in particular, its Step initiative. This innovative programme is designed to attract talented school leavers to the sector by enabling them ‘to earn while learning’.

The programme is targeted at two groups: post-GCSE students and post A-level students. The post-GCSE students work four days a week at Aecom and spend the fifth

day training for an NVQ or HNC, which could lead to a university degree. Post A-level students will primarily be those attending university and will gain valuable work experience at Aecom during their gap year.

Step is one part of a comprehensive training commitment. Commendably, the company’s investment in training has increased in recent years so that Aecom now spends 6% of its turnover on staff development.

After joining the company,

young engineers can take advantage of the Guide programme.

This initiative has been introduced to help engineers obtain recognition from their relevant professional institution, such as CIBSE, through a programme of work-based learning to help them develop professionally. ‘If you joined as an electrical engineer, then we’ve put in place a career path and training programme for that specific discipline,’ Burton explains.

# CIBSE JOURNAL



*Where will your career path lead?*

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SPECIAL**

**Sam Wood**

GCU Graduate

Project Manager,  
Turner & Townsend.

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# Welcome

**C**ould building engineering become the degree of choice for the next generation of undergraduates? The success of the Olympics has drawn attention not only to the gold medallists, but also to the engineering talent that made the spectacle possible. Between cheering on the supreme efforts of Team GB at the Velodrome, spectators were discussing how engineers had created the optimum riding conditions for Chris Hoy and co, with the minimum amount of mechanical heating and cooling.

The Olympics was a perfect advertisement for a career in engineering, and because of the Games young people are becoming more aware of the opportunities and rewards of a career in building services.

Senior mechanical engineer Sophia Negus is one of them. She worked on the London Olympics masterplan for AECOM, and is now helping deliver the Rio masterplan and five venues for the 2016 Games. As well as working on the Velodrome, Negus is lead building services engineer on the tennis centre, despite being only 30 (page 42).

One of Negus's most exciting and rewarding challenges is the move towards low carbon building, which ranges from the specification of low-embodied energy products to the creation of lasting legacies for the venues after the Games.

The skills and knowledge of building service engineers will be increasingly valued as the UK strives for zero carbon. Core services such as heating, ventilation, water, and lighting all have an impact on the earth's resources, and those professionals best able to minimise their use will be highly sought after.

Our visual guide to a career in building services (page 46) shows the many different roles available, and explains the educational path to full qualification. We also talk to those recruiting within the industry to find out how you can

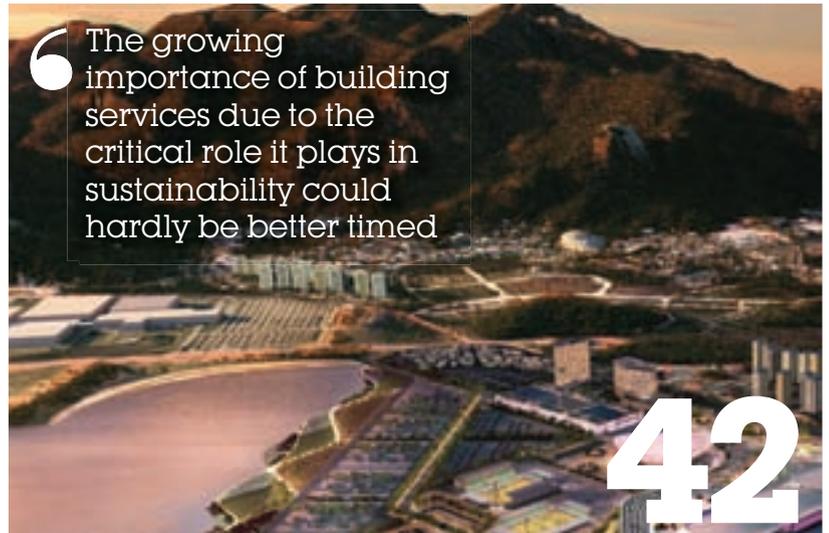
maximise your chances of landing a plum role (page 53).

Finally, you'll probably want to know what you could be earning in the industry. The Hays/CIBSE salary survey reveals all (page 49).



**Alex Smith,**  
Editor

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“The growing importance of building services due to the critical role it plays in sustainability could hardly be better timed



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## CIBSE membership free to students

CIBSE is committed to supporting the engineers of tomorrow, to help students in their studies and as they step into industry. So, CIBSE now offers free membership to students in full-time education. As members, students will benefit from:

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- Support through education and training
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# Next stop RIO

**Roxane McMeeken** gets a first-hand perspective on what it's like to work on the Rio 2016 Olympic Games from senior mechanical engineer, Sophia Negus



It's great to learn how people do things in other countries, particularly the engineering solutions they adopt due to local conditions, such as fuel prices

If you loved the London Olympics buzz last year, you might be keen to know that a career in building services could keep you involved in that excitement full-time. Building services engineers are needed for constructing sports venues the world over. As a result, some follow Olympic Games building projects around the globe.

Sophia Negus, 30, spends every day at work in the UK right now on preparations for the Rio 2016 Olympics in Brazil. She is a senior mechanical engineer in the building services engineering arm of Aecom, a planet-spanning, multi-disciplinary built, natural and social environment consultancy.

Negus says: 'It's really exciting to be working on such a high-profile project in a place as interesting as Brazil.' The job comes with challenges, she says, but the rewards are huge.

Aecom was involved in the London Games, including drawing up the masterplan – the map of what buildings go where and how they are

connected – for the London Games. The firm continues to work on the 25-year-plus scheme to revamp the east London area around the Olympic Park. Based on this expertise, Aecom won the international competition to deliver the masterplan and five venues for Rio's 300-acre Olympic Park.

### Exciting challenges

Part of Aecom's role in Rio is designing the Tennis Centre, including mechanical, electrical and public health building services. This covers everything, from the lights to the air conditioning, to the integration of specialist equipment such as real-time scoring systems and information relay.

Negus is involved in the Velodrome, although her main focus is the Tennis Centre, on which she is the lead building services engineer. Negus says: 'I am lucky to have been involved from an early stage, that's really rewarding. And I'm delighted to work in detail on a specific venue.'



Building services engineers' world view

SHUTTERSTOCK

It is a demanding role though. She says: 'I started working on Rio at the start of 2012 and given the size and scale of the venue, it's been pretty fast-track from day one.'

The Tennis Centre features three main stadiums: the 10,000-seat centre court, which will be decreased to 6,500 seats after the Games; plus two temporary venues of 5,000 and 3,000 seats respectively. There are a further seven match courts and six external practice courts during games mode.

At the moment, Negus is thrashing out the final concept design, a stage known as design stage C. 'We have strict time, budget and planning constraints,' says Negus. 'We absolutely have to deliver in time for 2016. Unlike other projects, where things might be more flexible, this deadline is immovable. We also have to constantly keep the budget in mind – funding levels are set at the onset and an overspend could require additional funding.'

Negus must juggle all this with sustainability. 'We also have to meet increasingly stringent energy targets.'

According to Negus, the ability to cooperate

with other disciplines is essential: 'As we develop the design it's often an iterative process, working closely with the architects and other engineers. So you have to maintain the flow of information so everyone is aware of the changes being made to the design.'

Some of this communication is long distance. Although Negus will visit Brazil in due course, she is based in Aecom's St Albans office, while some of her colleagues are in Rio. But Negus does not see this as a drawback: 'It's great to learn how people do things in other countries, particularly the engineering solutions they adopt due to local conditions, such as fuel prices.'

Negus has learned, for example, that, in Brazil, solar thermal power is routinely used to boost hot water provision. 'So we are using it but it's different in Brazil compared to the UK because you have a much higher yield due to the intensity of the sun.'

### Making a difference

One of the exciting things about being a building services engineer is that they are uniquely positioned to make the built environment more sustainable. Negus says: 'Building services are often hidden, but as we strive towards carbon neutral buildings and as fuel prices rise, building services engineers have the ability to make a positive impact on lifetime fuel use of a building and its carbon emissions.'

The construction industry is looking increasingly beyond the energy that buildings consume while they are occupied. The focus is expanding to the energy used to make, transport, install and eventually uninstall building products. This 'cradle to grave' assessment means building services engineers are again

taking on an ever more critical role, says Negus.

By specifying the right products at the start of the project, building services engineers can improve the lifetime performance of the built environment, she says. 'They also set the scene for future building adaptability to suit changing market conditions and end-user requirements.'

In Rio, this holistic approach encompasses the legacy use of venues. Although seven of the venues will be temporary, nine will remain after the Games. Negus says: 'Legacy is an integral part of Aecom's design planning process. Stadia, when designed well, should last for decades and be suitably adaptable for future use so that they can continue to benefit the local area,' says Negus. Around 70% of the infrastructure built for Rio 2016 is expected to be used after the event, with planned regeneration to include housing and commercial development.

The potential to travel is one of the things Negus loves about working in buildings services. 'There's huge potential to travel, especially with Aecom because we have so many global projects. I have worked on projects in Montenegro, Poland and Ukraine, but nothing as exotic as Brazil.'

Negus is passionate about travel and first visited Brazil during a gap year after graduating from Imperial College London with first class honours in mechanical engineering (MEng) in 2005. Why did she choose building services? 'I wanted to do something that was not quite pure science or maths, while involving both, and I like design and understanding how things work. Building services combines all these things.'

In the future, Negus is looking forward to 'new projects in new countries'. She adds: 'It's always good to work on buildings of different types and I'd love another big project to get stuck into.' 

# Hoare Lea is an award winning firm of Building Services Consulting Engineers and the largest of its kind in the UK.

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Our approach has kept us market leading 'engineers of choice' for many years and as we pass the firm from generation to generation of Partner, it's important that we maintain our position.



**Calum Davies Smith**  
Trainee Engineer



I started at Hoare Lea after finishing my A-Levels in August 2012. I am currently working towards a HNC in Building Services Engineering and hope to

go to University in the future.

I chose Hoare Lea as I knew that it was a well-established firm that invests in training. I could become an Electrical Engineer, Mechanical Engineer, or become part of a specialist group. I have improved my knowledge and been able to work in all areas of building services.

**Brian Meegan**  
Electrical Placement student



During my summer placement at Hoare Lea, I have gained a wealth of experience, and have been able to get hands-on experience using the latest software

programmes – which Hoare Lea heavily invest in to keep us ahead of the game.

Each day brings a new challenge and the opportunity to work on a range of different projects. What makes working here even better is the extremely friendly and professional people who make working here so much fun.

**Kate Glensman**  
Graduate Mechanical Engineer



Whilst at university, I did a number of summer placements. I noticed that in multi-disciplinary consultancies, building services is often underrepresented.

This was the main reason I applied to Hoare Lea. Its focus is on building services, which means we have the resources and experience to come up with innovative designs. With Hoare Lea's international presence, I am looking forward to the opportunity to work on projects further afield whilst working towards my Chartership.

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# How to grow your career

For budding engineers, there are myriad routes into the building services industry. Our visual guide to the huge number of exciting roles and opportunities shows how you can build a flourishing career in this dynamic and forward-looking industry. **By Roxane McMeeken**

*Dorte Rich Jorgensen*  
sustainability manager, Atkins

Led the delivery of the London 2012 Olympics' sustainability objectives for a number of elements, including structures, bridges and parkland. Passionate about cutting carbon.

**D**id you know that buildings consume 42% of all electricity worldwide? That's not even including the masses of energy used to make them and their myriad components.

So, if you care about the environment, joining the construction industry will put you on the front line of the battle to save the planet. Building services engineers are uniquely positioned to lower the carbon footprint of the built environment. But that's just one reason people choose a career as a building services engineer.

Building services engineers design, advise on, install and maintain everything in a building that makes it work, from lighting and plumbing to lifts and air conditioning. This means that, arguably, when it comes to making buildings greener, no one has a more critical role.

Angela Ringguth, head of careers promotion at CIBSE, says: 'There is a growing realisation that we must use less energy and more renewable energy, and that means increasing demand for people who can deliver this.'

While the construction industry has been focused on how to make buildings use less energy once they're up and running, the focus of the battle to emit less carbon is now shifting. This is another trend that's giving building services engineers a starring role.

The industry is increasingly looking at the energy-intensive processes used to make

## *Bringing buildings to life*

**Building services are everything that makes a building habitable**

- Managing the environmental performance of buildings throughout their lifecycles, known as the 'cradle to grave' approach
- Collaborating with world-leading clients, architects, interior designers, structural engineers and more
- Opportunities to work all over the planet
- A role at the heart of construction projects, and becoming even more integral because of the growing importance of energy efficiency
- On the frontline of the ongoing battle against global climate change
- Exciting projects, such as Olympic stadiums, skyscrapers, science laboratories, music venues, schools in developing countries, headquarters of multi-national companies, hospitals, art galleries and museums.
- Working with cutting edge and rapidly changing technology, including Building Information Modelling
- Membership of a highly respected and agenda-setting professional body: CIBSE

## *The heart of construction*

**All the areas that building services cover**

- Energy supply – gas, electricity and renewable sources
- Heating and ventilating
- Water, drainage and plumbing
- Lighting – natural and artificial
- Escalators and lifts
- Harnessing renewable energy, such as solar power
- Communications, telephones and IT networks
- Security and alarm systems
- Fire detection and protection
- Air conditioning and refrigeration
- Facade engineering
- Public health engineering
- Control systems

## *Nourishing growth*

Once in the industry, the levels of professional qualification you can pursue with CIBSE are: chartered engineer (CEng), incorporated engineer (IEng) or engineering technician (Eng Tech). Achieving these makes you an expert in your field and brings you letters after your name to prove it – these are recognised worldwide.

## Rafay Hasan

senior engineer, Gronmij



Designs mechanical services for office buildings, hotels and high-end residential.

He says: 'Being a building services engineer means you can make a difference by designing sustainable buildings to minimise environmental impact. I enjoy the opportunity to travel and work alongside world renowned designers and architects on iconic buildings.'

## Branching out

Some of the different jobs you can do in building services

- Air conditioning engineer
- Business manager or proprietor
- Building physics engineer
- Carbon emissions specialist
- Computer aided design technician
- Commissioning engineer
- Consulting engineer
- Contract or project engineer
- Design engineer
- Domestic heating engineer
- Domestic plumber
- Ductwork installer
- Educator and trainer
- Electrotechnical panel builder
- Electrical repair and rewinder
- Energy inspector/adviser
- Estimator
- Facilities manager
- Fitter/welder
- Gas fitter
- Heating and ventilating engineer
- Highway electrical systems installer
- Industrial and commercial plumber
- Installation electrician
- Instrumentation installer/engineer
- Lighting expert
- Maintenance electrician
- Public health engineer
- Quantity surveyor
- Refrigeration engineer
- Satellite systems engineer
- Service and maintenance engineer
- Sheet metal weathering specialist
- Site supervisor
- Environmental engineer
- Project engineer

## Doug Oughton

FREng FCIBSE  
consultant at Aecom

Helped to shape the global building services engineering business at AECOM, and is a past CIBSE president. He is also a past member of UNESCO Science Committee Engineering Council and the UK sustainable construction research organisation, the Building Research Establishment. He has worked on Buckingham Palace Lloyds of London, the Royal Academy of Music and Windsor Castle.

## Kaval Patel

associate director,  
Buro Happold



Kaval leads a team within the Buro Happold London Building Fabrics Group nurturing the

next generation of young engineers. He is also director and leader of projects both here in the UK and around the world.

## Putting down roots

Some of the 'roots' into building services and membership of CIBSE

- Degrees including civil engineering, electrical engineering, energy, environmental engineering, design and technology, engineering, maths, mechanical engineering, physics and product design
- Inspire Scholarship Scheme supports full-time undergraduates studying construction degrees
- National Certificate and Higher National Certificate qualifications in building services engineering
- Arkwright Scholarship sponsored by CIBSE to support studying in school years 12 and 13
- NVQ Diploma (England), SQVF (Scotland), or Apprenticeships
- Remember, for a career in building services, you must keep up maths and science after GCSE!

*Jamsin Tweddell*

senior engineer,  
Max Fordham



Spearheading the company's work on building performance and soft landings, which

ensure buildings stay sustainable after the construction phase. Tweddell says: 'Everyone is designing low energy buildings now, but because of the way the buildings are used they don't end up being so sustainable. So staying with the building after construction to understand how it works when in use is an exciting and crucial new area for building services.'

*Patrick Bellew*

principal, Atelier Ten, an environmental design and building services engineering firm

Co-founded Atelier Ten in 1990. Named a Royal Designer for Industry by the Royal Society of Arts (RSA) in 2010. A founding member of the UK Green Building Council, with more than 30 years' experience in the design of high performance buildings.

*Sasha Krstanovic*

director of arts and culture sector lead for AECOM building engineering, Europe



Has worked in China, Iceland, India, Russia and the United Arab Emirates. Responsible for occupant

comfort and the associated amount of energy buildings consume. Krstanovic says: 'I am a project director, which means winning work, conceptualising the design and ensuring the successful delivery of the project. I work with amazing people all over the world.'

construction products and the long distances they sometimes travel. For example, a 'British' boiler could have started life as Australian iron ore and ended up being assembled in a German factory. Industry leaders are also looking at the environmental impact of decommissioning and disposing of construction products and materials.

Looking at the whole construction process in this way is known as 'cradle to grave'. It is at the cutting edge of modern sustainability thinking worldwide and there's no one better equipped to do it than a building services engineer.

Indeed, the opportunities to work overseas is another reason for choosing a career in building services. You could work on London's Shard, the Rio Olympics or Qatar's World Cup. Ringguth says: 'Building services engineers are involved in major buildings and developments on every continent of the globe. This is particularly because CIBSE-qualified engineers have a status that is internationally recognised.'

Building services engineers are certainly in demand. Ringguth says: 'We hear a lot about graduate unemployment at the moment, but this is definitely not the case in our sector. Demand for skilled professionals greatly outstrips supply and the wage premium for people with engineering degrees has grown over the last 20 years. This is good news for young people coming into our industry.' 

*David Fisk CB*

former chief scientific adviser to government, current CIBSE president and director of Laing O'Rourke Centre for Systems Engineering and Innovation at Imperial College London

Received his CB for services to the Department of Environment in 1996.

*Doug King*

Royal Academy of Engineering Visiting Professor of Building Physics at the University of Bath

Founded sustainability specialists King Shaw Associates Consulting Engineers in 2002. Known in the industry for pointing out the pitfalls of less useful sustainable additions to buildings – what he calls 'eco-bling'.

*Professor Max Fordham*

Founded building services engineering partnership Max Fordham in 1966

Awarded the Prince Philip Designers Prize in 2008 by the RSA, an enlightenment organisation, which deemed him a 'pioneer of environmental design for buildings'. Believes strongly in looking at buildings holistically, with a creative but practical approach. Visiting professor at Bath University to travel and work alongside world renowned designers and architects on iconic buildings.'

*Lee Tabis*

trainee design engineer, NG Bailey



CIBSE's 2012 graduate of the year. Tabis is an electrical design engineer who works on

various projects of all sizes throughout the UK, and mentors apprentices. He says: 'My job is a fine balance between science and practicality, and every project has its own lessons to learn. There's something new to learn everyday.'

# The end of the ice age?

Building services salaries may have been in the deep freeze during the recent downturn, but data from the CIBSE/Hays Salary Survey suggests a thaw could be on the way, with 71% of firms optimistic about prospects in 2013, and 57% planning to recruit more staff. **Roxane McMeeken** says this is good news for graduates entering the industry

“The emphasis right now is on trying to win work, so those involved in bidding and particularly the economic viability of bids are more crucial than ever

**Mike McNally, Hays**

The pay freeze for building services engineers has yet to thaw. This year’s survey of salaries and benefits, conducted exclusively for *CIBSE Journal* by Hays Building Services, a leading recruitment expert, shows that over the past year there has been scant change in levels of pay in the sector.

The research, which included interviews with employers and employees, revealed that a consequence of this stagnation appears to be widespread itchy feet; of the employees questioned, more than four in ten plan to look for a new job in the next 12 months.

However, the sector’s bosses appear to be blissfully unaware of the looming shake-up, with just 9% of employers expecting problems with staff retention next year. In an industry that is already struggling to attract and retain the most talented people, these findings are a wake-up call for the sector.

This is especially when you consider that 71% of firms surveyed were optimistic about prospects in the next business year, and 57% said they were planning to recruit. This optimism suggests 2013 could be the year

**Associate engineer (£)**

	Typical	Min	Max
Central London	60,000	52,000	65,000
South East	55,000	50,000	60,000
South West	42,000	37,000	45,000
Wales	40,000	35,000	42,000
West Midlands	46,000	40,000	55,000
East Midlands	44,000	40,000	48,000
East Anglia	39,500	33,500	44,000
North West	41,000	39,000	46,000
North East & Yorkshire	40,000	38,000	45,000
Scotland	44,000	44,000	50,000
Northern Ireland	36,000	34,000	40,000
<b>National Average</b>	<b>44,000</b>	<b>40,000</b>	<b>49,000</b>

SHUTTERSTOCK/ELENAARTS

What will keep people on board is the thrill of the job. This means that the growing importance and expanding breadth of the building services profession, due to the critical role it plays in sustainability, could hardly be better timed

**Rob Harris, Elementa**

salaries start to rise. Indeed, more than half of the employers surveyed said they were planning pay increases.

**The big freeze**

However in 2012, 75% of the employees questioned said that they had not received a wage rise in the last 12 months. Mike McNally, director at Hays, says: 'The static nature of salaries reflects the UK economy in general and it's been well documented that construction and property has suffered disproportionately in the recession.'

Indeed, the latest data from the Office for National Statistics, published in October, showed that over the three months from June to August this year construction output was 11.9 per cent lower than the same period in 2011. New work decreased by 15.6 per cent and the volume of new infrastructure work decreased in particular - by a dismal 23.9 per cent.

McNally says: 'Demand for services has been flat, therefore demand for skills has been flat, with little movement between jobs, and that has a knock-on effect on salaries.' Hence, Hays found that many national average salaries for roles have not moved – or hardly moved – in the past twelve months. For example, the average wage for a chartered associate-level consulting engineer, is now £44,300 compared to £44,000 last year. The average UK mechanical engineer salary, meanwhile is now £33,700, up minimally from £33,000 a year ago.

Although pay was generally static, some roles are in demand and have seen pay rises as a result. McNally says cost roles are sought-after above all others: 'The emphasis right now is on trying to win work, so those involved in bidding and particularly the economic viability of bids are more crucial than ever.' However, the sector's depressed condition means that although there have

been sporadic rises for cost roles, the national averages for senior estimators and estimators have remained broadly the same, at £39,800 and £32,500 respectively.

Equally there were some falls in salaries in geographical regions for particular roles where vacancies remain rare and numbers of candidates high. An intermediate-level design engineer in the South East, for example, could command a typical salary of £30,000 in 2011 but this dropped to £28,000 in 2012.

In this climate, redundancies have continued. Hays found that more than two thirds of employers (69%) had implemented redundancies, whether voluntary or involuntary, as a part of cost cutting measures over the past 12 months.

Further pay cuts have been implemented too. Of the employees questioned, 31% said that in the past year they had taken a reduction in salary.

**Brain drain**

The survey shows starkly how these conditions are hitting morale. Some 72% of employees said they believed salaries in the sector were low and, perhaps partially as a consequence – and alarmingly for employers – a significant 43% said that they planned to leave their job within the next twelve months.

Simon Stoker, senior HR officer at Arup, says this may also be because the sector, depressed as it is, is seeing a little more activity than in 2010. 'Whereas, two years ago, fewer people wanted to switch job because they were concerned about job security, as some markets have started to improve people may well start to look around.'

The research did not reveal whether employees planned simply to switch jobs within the sector, or to leave the industry altogether. For some, it could be the latter. Becci Taylor, associate and building services engineer at Arup, says: 'People do leave the

**Principal design engineer (£)**

	Typical	Min	Max
Central London	50,000	43,000	55,000
South East	42,000	38,000	50,000
South West	35,000	31,000	39,000
Wales	33,000	30,000	40,000
West Midlands	42,000	38,000	45,000
East Midlands	40,000	38,000	43,000
East Anglia	43,000	37,000	44,000
North West	39,000	36,000	42,000
North East & Yorkshire	38,000	36,000	42,000
Scotland	36,000	36,000	43,000
Northern Ireland	32,000	28,000	33,000
<b>National average</b>	<b>39,000</b>	<b>36,000</b>	<b>43,000</b>

**Intermediate design engineer (£)**

	Typical	Min	Max
Central London	34,000	30,000	38,000
South East	28,000	24,000	32,000
South West	25,000	22,000	30,000
Wales	24,000	22,000	27,000
West Midlands	28,000	25,000	35,000
East Midlands	27,000	24,000	29,000
East Anglia	26,000	23,500	30,800
North West	27,500	23,500	29,500
North East & Yorkshire	26,000	22,000	28,000
Scotland	27,000	26,000	31,000
Northern Ireland	24,000	22,000	26,000
<b>National average</b>	<b>27,000</b>	<b>24,000</b>	<b>31,000</b>

**Junior engineer (£)**

	Typical	Min	Max
Central London	25,000	22,000	30,000
South East	20,000	18,000	24,000
South West	18,000	17,000	23,000
Wales	18,000	16,000	20,000
West Midlands	20,000	18,000	23,000
East Midlands	21,000	19,000	22,000
East Anglia	21,000	18,000	22,000
North West	18,000	17,000	22,000
North East & Yorkshire	18,000	17,000	22,000
Scotland	19,000	18,000	22,000
Northern Ireland	18,000	16,000	20,000
<b>National average</b>	<b>20,000</b>	<b>18,000</b>	<b>23,000</b>



industry if they are motivated more by money than anything else – you can earn a lot more elsewhere and everyone knows that.'

HR heads also say that a growing number of staff are interested in leaving to become contractors. Stoker says: 'There are salary differences between salaried and contract staff rates, so if people are motivated by money they may want to move to contracting.'

There appear to be more opportunities for contractors, too; Hays found that 74% of employers in the past 12 months had hired temporary staff, whereas only 52% of them had made any permanent appointments.

Whatever employees' motives, employers have a fight on their hands to retain the best brains. While some may be easy to replace, others will not - particularly those in whom you have invested time and money for training, and who know how your

organisation operates.

Rob Harris, business development director at Elementa, says senior people are particularly difficult to recruit because of an ongoing shortage. He says: 'It takes six months to a year to find a high level principle engineer and then another six months to see if they are up to standard. It can be very frustrating as it makes it difficult to plan ahead.'

Ironically, as we have seen, few employers appear to be aware of the looming fight, with less than one in 10 employers anticipating the potential exit of close to half their staff. Neither are many expecting to raise salaries, with 65% not planning pay rises in the next 12 months.

**Laws of attraction**

For employers, there is still time to put in place strategies to retain and attract talent

– and, unfortunately for staff, it need not involve raising pay. But first, McNally says the battle for the best brains must start in schools. 'The sector needs to make itself known – and attractive – to school children. That means visiting schools to talk about the career and what it involves.'

It is essential to keep creating opportunities for graduates and apprentices too, despite the downturn. Taylor says this is a must in any case: 'These new entrants are the future of the business, so we must invest in them – not just at Arup but industry-wide. If we lose them to another industry now we will struggle to attract them later.'

Companies may find that their international operations provide both the need for entry-level recruits and the means to attract them. Mike Burton, director of building engineering at Aecom UK, says: 'We are able to attract people with the overseas opportunities we

**Senior estimator (£)**

	Typical	Min	Max
Central London	52,000	48,000	55,000
South East	43,000	40,000	50,000
South West	36,000	32,000	40,000
Wales	34,000	29,000	38,000
West Midlands	39,000	35,000	45,000
East Midlands	40,000	36,000	42,000
East Anglia	46,000	41,000	46,000
North West	37,500	33,500	40,000
North East & Yorkshire	37,000	33,000	40,000
Scotland	38,000	34,000	45,000
Northern Ireland	35,000	32,000	42,000
<b>National average</b>	<b>40,000</b>	<b>36,000</b>	<b>44,000</b>

**Estimator (£)**

	Typical	Min	Max
Central London	42000	40,000	45,000
South East	35000	32,000	40,000
South West	29,000	26,000	31,000
Wales	28,000	25,000	30,000
West Midlands	32,000	28,000	34,000
East Midlands	32,000	29,000	35,000
East Anglia	35,000	31,000	37,000
North West	33,000	27,500	35,000
North East & Yorkshire	33,000	25,000	35,000
Scotland	30,000	28,000	35,000
Northern Ireland	30,000	29,000	35,000
<b>National average</b>	<b>33,000</b>	<b>29,000</b>	<b>36,000</b>

**Senior mechanical/electrical contracts manager (£)**

	Typical	Min	Max
Central London	48,000	43,000	52,000
South East	45,000	40,000	50,000
South West	39,000	35,000	42,000
Wales	35,000	32,000	40,000
West Midlands	38,000	36,000	45,000
East Midlands	37,000	34,000	41,000
East Anglia	45,000	38,000	48,000
North West	37,000	34,000	42,000
North East & Yorkshire	37,000	34,000	43,500
Scotland	38,000	33,000	43,000
Northern Ireland	32,000	33,000	38,000
<b>National Average</b>	<b>39,000</b>	<b>36,000</b>	<b>44,000</b>

**Mechanical/electrical contracts engineer (£)**

	Typical 12	Min 12	Max 12
Central London	40,000	38,000	44,000
South East	38,000	32,000	40,000
South West	34,500	31,000	36,000
Wales	32,000	29,000	34,000
West Midlands	32,000	29,000	40,000
East Midlands	31,000	28,000	33,000
East Anglia	35,000	32,000	38,000
North West	33,000	30,000	36,000
North East & Yorkshire	32,500	30,000	36,000
Scotland	33,000	28,000	37,000
Northern Ireland	30,000	26,000	34,000
<b>National average</b>	<b>34,000</b>	<b>30,000</b>	<b>37,000</b>

**Operations director (£)**

	Typical	Min	Max
Central London	70000	65000	77000
South East	65000	62000	67000
South West	47000	43000	51000
Wales	45000	40000	50000
West Midlands	47000	43000	53000
East Midlands	51000	46000	55000
East Anglia	55000	49000	59000
North West	50000	45000	55000
North East & Yorkshire	50000	42000	54000
Scotland	45000	40000	50000
Northern Ireland	42000	36000	45000
<b>National average</b>	<b>52,000</b>	<b>46,000</b>	<b>56,000</b>

**Operations manager (£)**

	Typical	Min	Max
Central London	60,000	55,000	65,000
South East	60,000	55,000	63,000
South West	40,000	35,000	45,000
Wales	40,000	33,000	42,000
West Midlands	44,000	35,000	44,000
East Midlands	45,000	40,000	48,000
East Anglia	45,000	42,000	48,000
North West	40,000	37,000	45,000
North East & Yorkshire	40,000	37,000	45,000
Scotland	37,000	35,000	43,000
Northern Ireland	34,000	32,000	38,000
<b>National average</b>	<b>44,000</b>	<b>40,000</b>	<b>48,000</b>

can offer. We currently have building services graduates working in Auckland, Sydney and California.

The way companies work can also help. Burton says: 'Part of why we attract people is the working environment. We work in design studios with flexible spaces, informal meeting areas, cafes and comfy chairs. We also allow people to communicate how they want, whether that's through twitter or email etc – we recognise that younger people are often less keen to pick up the phone.'

It may also be worth firms revisiting their branding. Alasdair Reid, senior partner at Max Fordham, says: 'Graduates have always liked the fact that we have the theme of sustainability running through everything we do, because they want to use their engineering skills to improve wider society. So we rebranded our website 18 months ago to emphasise that, and we have seen an upsurge in applicants for jobs.'

In lieu of higher salaries, firms can offer employees a stake in the business. At Max Fordham, for example, the partnership structure can be attractive. Of the firm's 160 staff, 90 are partners. Reid says: 'We are a democratic partnership and that empowers the people that work here. A sense of ownership and responsibility is ingrained in them from the word go.'

At Arup, a profit-share scheme fosters a similar sense of belonging. This is likely to be popular: Hays asked employees what benefits they considered most important when considering a new job, and the most popular choice – picked first by 20% – was performance related bonuses. This was followed by pension (18%) and flexible working or a flexible benefits package (17%).

However, career development opportunity is perhaps the most important factor in attracting and keeping employees. Stoker says: 'Our strategy is to support professional development and provide a variety of career

paths and varied projects for individuals. It's about people fulfilling their potential and being stretched. This breeds loyalty.'

Harris agrees: 'Money is important but it only has a short-term impact on people's motivation.' What will keep people on board is the thrill of the job, he says. This means that the growing importance and expanding breadth of the building services profession – due to the critical role it plays in sustainability – could hardly be better timed.

McNally says that with so many ways to lure recruits, the industry should not be fixated on its inability to increase salaries. 'Don't worry if you can't increase salaries at the moment – remember that this is an industry-wide issue and even outside it most sectors are seeing pay freezes.' Instead, he says: 'The trick is to use more inventive ways of attracting and keeping talent.'

Graduates have always liked the fact that we have the theme of sustainability running through everything we do, because they want to use their engineering skills to improve wider society

**Alasdair Reid,  
Max Fordham**

## Key survey findings: Employers vs employees

### Employers

- 57% of the employers surveyed said they would recruit in the next 12 months.
- 77% of those recruiting will seek a mix of permanent and temporary staff.
- 71% said they were optimistic about the prospects for their business in the coming year.
- 38% thought the main reason the sector struggles to attract recruits is lack of jobs

and 29% cited lack of understanding of the roles.

- 62% said recovery from recession would have the greatest impact on building services over the next five years.

### Employees

- 49% of the employees questioned said they felt fairly or very secure in their current role, with 41% saying they had felt no change in their level of job security over the past twelve months.

- 47% would recommend their current employer to a friend.
- 84% said they had a good or average work-life balance.
- 46% think the industry struggles to attract recruits because packages are not seen as competitive, and 41% cited the industry's image not being exciting.
- 61% said recovery from recession would have the greatest impact on building services over the next five years.

# Making a good job of it

**Roxane McMeeken** asks people in the know how to break into the building services industry



It's easy to see when a CV is quite generic and we immediately discount these

**Steven Bentley**



We receive job application letters where the candidate has forgotten to change the name of the addressee

**Charmaine McKeown**

**W**hen applying for multiple jobs, candidates can make some alarming gaffes. Charmaine McKeown, head of human resources at engineering firm Max Fordham, has seen a few: 'We receive job application letters where the candidate has forgotten to change the name of the addressee.'

This would be a fairly easy mistake to avoid and suggests that it is certainly worth giving your next covering letter a final check before pressing send. Here we look at what else you must do to land a job in building services, whether you're going for your first role or are in the early years of your career.

### Getting an interview

You can find out about vacancies by scanning employers' and recruitment agents' websites, but it's also worth networking – the real

and virtual kind. Mike McNally, sales and development director at Hays Construction, a leading recruitment expert, says: 'Try to go to events, whether it's a local CIBSE Young Engineers Network (YEN) workshop or your company's own internal groups. This will bring you a network of people who have studied in the same area as you and will tell you about job opportunities.'

McNally recommends complementing this with social media networking, such as CIBSE's LinkedIn group or YEN's Facebook group, or join Hays' specialist building services network groups on LinkedIn.

When you're ready to send your CV to an employer, tailor it to the job. Steven Bentley, director at engineering consultancy Ramboll, says: 'It's easy to see when a CV is quite generic and we immediately discount these.'

McNally says: 'Study the job specification and pull out two or three points on your CV that match them – you can even highlight the most relevant areas.'

Tailoring might mean taking experience that seems not to be directly relevant and presenting it so it's interesting for the employer. Bentley says: 'We get a lot of graduates who've done manufacturing-based degrees and they'll talk at length about designing aircraft. That's not really what we do, so it suggests they're not interested in the built environment.' However, if you present your aircraft design experience as evidence of a general passion for the fundamentals of engineering, Bentley says he will take notice.

Include a paragraph at the top of your CV summing yourself up. McNally says: 'Think of



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▶ this as your sales pitch. It should briefly describe your experience, your ambitions and how you would add value for the employer.'

Try not to leave time gaps on your CV. 'Make sure any gaps on your CV are explained, otherwise people draw their own conclusions,' says McNally.

Do include a covering letter, which again should always be bespoke. McKeown says: 'We expect a cover letter – not just an email saying "Please find my CV attached". It should show that you know the industry and our company's culture and values, and why you are the best person for the role. We want people whose aspirations chime with ours.'

Carol White, UK head of resourcing at engineer WSP, adds: 'Mention the things you can't put on your CV, like career ambitions and why you love engineering. We look for letters showing real passion and a great work ethic.'

### Meeting the employer

When you get an interview, preparation is crucial. It might sound obvious, but know your own CV inside out – including which version you sent to the employer. If you are sending different versions to various companies, keep records.

Study the job specification too. 'Make sure you know how the job spec and your CV link,' says McNally.

You must also research the company you are interviewing with. Find out what their commercial activities entail, whether they have been involved in any recent mergers and their latest financial results. For stock market-listed companies, check how the share price is faring.

McNally recommends a search on LinkedIn of the person interviewing you. 'If you find out

what they do and what their objectives are, you can respond to that in the interview.'

Interviews in building services may be 'competency-based'. This is where the employer needs people with certain qualities and asks candidates to prove how they meet these needs by describing an example of a past experience. So prepare to talk about your key study, work and volunteering experiences and what they show about your abilities.

A number of employers in the sector, including WSP, recruit graduates via assessment centres. As intimidating as this may sound, White says WSP tries to make the day-long experience non-threatening. 'We give talks during the first half of the day to give people the chance to ask questions, get to know us and relax.'

In the afternoon the candidates are assessed while working in groups of between eight and 10 to solve a problem. White says: 'There are no surprises and candidates should feel that these sessions are similar to exercises they did at university.'

It's not such a big deal if you can't solve the problem: 'We are assessing behaviour more than technical ability. Our work is specialised so people we hire will learn on the job.'

However, you must speak. 'If we don't hear you, we can't assess you, so we do need you to contribute,' says White. But don't overdo it: 'Don't overrule everything that everyone else in your group says. Be careful that your contribution is balanced.'

Lastly, remember that during any presentations or breaks, you're still being assessed. 'We'll see if you are on your mobile during a presentation,' says White. 



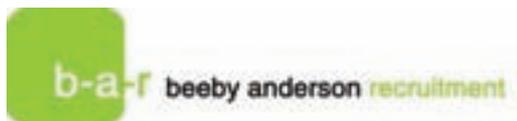
Study job specifications and pull out two or three points on your CV that match them

Mike McNally



We look for letters showing real passion and a great work ethic

Carol White



## Beeby Anderson Recruitment

**Address:** The Wenlock, 50 – 52 Wharf Road, London, N1 7EU

**Website:** www.b-a-r.com

**Telephone:** 0203 176 2666

**Contact:** Peter Anderson, director

**Email:** peter@b-a-r.com

Beeby Anderson Recruitment operate solely within building services and concentrates 100% of its time developing an unrivalled knowledge of the temporary and permanent building services job market across the UK and internationally. For its candidates, it provides a complete comprehensive approach to managing their job search, while for its clients it targets the best people, and attracts them into your business.



## Talent Motion

**Address:** 27 Austin Friars, London, EC2N 2QP

**Website:** www.talentmotion.com

**Telephone:** 0207 614 3431

**Contact:** Dominic Evans/Will Pearce

**Email:** hello@talentmotion.com

Talent Motion is an executive search consultancy that specialises in building services engineering. With an emphasis on relocating senior professionals internationally, our highly experienced team focuses on key strategic hirings, where talent cannot be sourced locally. Our business is built on a strong foundation of values and a passionate desire to assist our clients in achieving their personal and business objectives, through the acquisition of talent.



## Eden Brown

**Address:** Head office – 222 Bishopsgate, London EC2M 4QD

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**Telephone:** 020 7422 7300

**Contact:** Peter Berry

**Email:** p.berry@edenbrown.com

Eden Brown provides bespoke recruitment solutions for all levels of building services engineering, placing high quality candidates in temp, contract and perm roles across the UK and internationally. Our experienced recruitment specialists work with numerous clients of all sizes covering consultancies, service providers, contractors and property management companies.



## BSV Recruitment Limited

**Address:** Lynton House, Station Approach, Woking, Surrey, GU22 7PY

**Website:** www.bsvrecruitment.co.uk

**Telephone:** +44(0) 1483 768600

**Contact:** Darren Warmington – building services

**Email:** Darren.warmington@bsvrecruitment.co.uk

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## Skilled Careers Search & Selection

**Address:** Zetland House, 109-123 Clifton Street, London EC2A 4LD

**Website:** www.skilledcareers.co.uk

**Telephone:** 0207 033 8866

**Contact:** Simon Beresford – M&E team leader

**Email:** simon@skilledcareers.co.uk;

lmccormack@skilledcareers.co.uk

Our associates collectively have more than 100 years of experience in the search and recruitment industry. Our M&E team of six are specialists in providing building services jobs for contract, temporary and permanent positions. We offer a wide range of jobs in building services, such as mechanical design, electrical design, CAD, public health and sustainability consultants. So, whether you're a graduate or director, we can assist you. As a business, we recruit specialists from architecture through to facilities management, so please feel free to browse our website for current opportunities in the market.



## Human Capital Solutions

**Address:** 27 Austin Friars, London, EC2N 2QP

**Website:** www.humancapitalsolutions.co.uk

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## Cardiff University

**Address:** Cardiff School of Engineering, Queens Buildings, The Parade, Cardiff, CF24 3AA

**Website:** [www.cardiff.ac.uk/engin](http://www.cardiff.ac.uk/engin)

**Telephone:** 0292 087 4975

**Contact:** Julie Cleaver, admissions office

**Email:** [engineering-pg@cardiff.ac.uk](mailto:engineering-pg@cardiff.ac.uk)

**Courses offered:** MSc Structural Engineering, MSc Civil Engineering, MSc Geoenvironmental Engineering, MSc Hydroenvironment Engineering, MSc Sustainable Energy and Environment, MSc Professional Engineering (Distance Learning), MSc Advanced Mechanical Engineering, MSc Electrical Energy Systems, MSc Wireless and Microwave Engineering.

## London South Bank University

### London South Bank University

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**Email:** [course.enquiry@lsbu.ac.uk](mailto:course.enquiry@lsbu.ac.uk)

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**Contact:** Tom Kissack

**Email:** [Thomas.Kissack@brunel.ac.uk](mailto:Thomas.Kissack@brunel.ac.uk)

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**Website:** [www.bartlett.ucl.ac.uk/graduate/programmes/postgraduate/mscdiploma-facility-environment-management\(London\)](http://www.bartlett.ucl.ac.uk/graduate/programmes/postgraduate/mscdiploma-facility-environment-management(London)) and [www.bartlett.ucl.ac.uk/graduate/programmes/postgraduate/mscdiploma-facility-environment-management-singapore\(Singapore\)](http://www.bartlett.ucl.ac.uk/graduate/programmes/postgraduate/mscdiploma-facility-environment-management-singapore(Singapore))

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**Telephone:** 0161 295 4545

**Contact:** College enquiries team

**Email:** [cst-enquiries@salford.ac.uk](mailto:cst-enquiries@salford.ac.uk)

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**Website:** <http://study.ulster.ac.uk>

**Telephone:** 028 9036 6521

**Contact:** Faculty office

**Email:** [adbe@ulster.ac.uk](mailto:adbe@ulster.ac.uk)

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Research has shown that metering and monitoring HVAC systems can lead to substantial savings in energy use at little capital cost. Now a new project is inviting hundreds of organisations to participate for free in a major pan-European study to demonstrate the benefits of automatic monitoring when used to complement statutory HVAC inspections. **Alex Smith** reports

# EARLY WARNING SYSTEM

It's a no-brainer. To achieve the energy savings you usually just need a regular update of the systems' performance to prevent them drifting out of control  
*Ian Knight*

**A** Cardiff University administrative building has slashed the energy used by HVAC systems through the use of metering and monitoring. By analysing the performance of its HVAC system, the energy managers at McKenzie House were able to identify HVAC energy saving measures that amounted to a 25% saving in the building's total annual electricity bill.

McKenzie house was part of an EU-funded project called HARMONAC, which monitored and assessed the performance of 42 HVAC systems across Europe to assess their performance and identify energy conservation opportunities (ECOs).

Now the research team is inviting building owners and managers to participate in a new EU-funded project called iSERVcmb that could help see reductions in HVAC energy bills by up to 60%. iSERVcmb, in which CIBSE is a full partner, aims to collect sub-metering data from 1,600 HVAC systems in the EU.

It will analyse and compare this information to enable the benchmarking of individual

HVAC systems within buildings. From these benchmarks building managers can identify the measures required to save energy in the specific HVAC system configurations that are servicing the activities in their buildings.

iSERVcmb will show whether automatic monitoring would offer a better alternative to the inspection of air conditioning systems across the EU, or whether it could be used to complement current statutory inspections. Regular inspection of air conditioning systems with rated output of more than 12KW was required under the Energy Performance of Buildings Directive, but following the findings from HARMONAC automatic monitoring and feedback systems can now be used to reduce the frequency of testing under the recast EPBD.

HVAC systems account for 11% of all electricity consumption in Europe according to the EC's Joint Research Centre. For the EU to meet its target of reducing energy use by 20% by 2020, it must do something to ensure these systems are energy efficient.

There is little information in the public 



Common issues identified by continuous monitoring include leaks in compressors, over-sizing and blocked filters  
*Ian Knight*

domain on the measured energy consumption of HVAC systems, says Dr Ian Knight, iSERV project coordinator and reader at Cardiff University. ‘The old adage “you can’t manage what you can’t measure” is very apt for HVAC systems,’ says Knight. ‘There is an absence of publicly available information derived from large-scale datasets on the detail of energy consumption of HVAC systems in buildings.’

HARMONAC revealed that inspections did not always identify under-performing systems. Through monitoring the project was able to identify and analyse 141 different energy conservation opportunities (ECOs), but it concluded that many of them would be missed by inspection. The sub-hourly data from the 42 sites revealed that inspections only identified 37% of the measures that

could have been taken to improve efficiency in those systems.

‘Inspections record a point in time – you see little of the control issues and you can’t see whether the system is consuming more energy than it should or is not running properly,’ says Knight. HVAC systems also tend to be serviced shortly before inspections, says Knight, meaning that systems that would benefit from the inspectors’ knowledge – often those that are not regularly serviced or monitored – are often missing the opportunity to improve their operating and maintenance practices.

Common issues identified by continuous monitoring includes leaks in compressors, over-sizing and blocked filters. It also finds solvable control issues, which are not expensive or difficult to remedy, such as



## MCKENZIE HOUSE

Metering and monitoring enabled McKenzie House at Cardiff University to make substantial energy savings with little capital expenditure.

The data revealed that the HVAC systems were being run for far longer than necessary. The controls were changed so that they were only operating when areas were occupied.

Further energy savings were made when the comfort range was extended from 20-26°C to 21-23°C, and AHUs were turned off before people were due to leave the office.

In total the electricity savings achieved in this building from the HVAC system amount to around £55,000 per annum and are part of a total 33% (£74,000) annual electricity saving that has been achieved since 2005.

systems running in unoccupied areas and bad sequencing where, for example, three chillers might be running simultaneously when only one is required.

iSERVcmb addresses all the technical components in the EPBD such as boilers, pumps, fans and chillers. By collecting data from hundreds of HVAC systems, iSERVcmb will be able to provide benchmarks at the components level when serving specified end-user activity, hours of use and areas such as a conference room, kitchen, or server room. These benchmarks will allow energy managers to assess whether the energy being consumed by their HVAC system is reasonable for the activity it serves. Benchmarks will be continually updated during the project.

The researchers will use the project findings to create professional guidance on in-use energy

consumption of HVAC systems. This will, in turn, provide guidance for European member states legislating for automatic monitoring. 'We are attempting to show from live systems the benefits that can be achieved, as well as the practical in-use limits on reducing energy use when servicing specific end-user activities,' says Knight. 'iSERVcmb provides evidence-based data to inform the regulations that will be used to try and achieve near zero carbon buildings from 2019.'

### How it works

For end users adding HVAC information to iSERVcmb there are two main sections to address. The first section requires them to describe the physical assets of the HVAC system, the spaces and activities served, the meters used to record the energy consumed,



Sub-metering shows an AHU working outside office hours

Inspections only identified 37% of the measures that could have been taken to improve efficiency in those systems

and any sensors to be logged. iSERVcmb has developed a standalone Excel spreadsheet for this purpose. Participants use this spreadsheet to upload details of their HVAC systems onto the iSERVcmb database.

Once details are logged on the iSERVcmb database, the energy consumption of the HVAC components can be recorded and analysed by sending sub-hourly data from an automatic meter reading system to the iSERVcmb cloud-based servers. iSERVcmb prefers that participants record the consumption of as many components as possible but at a minimum they should at least record the chiller. The spreadsheets produced by the participating companies have already proven to be invaluable references, not only for understanding the HVAC system in a building, but also as business continuity documents, which allow information on where HVAC components, sensors and meters

are located to be quickly found – this is vital expensive-to-obtain information that is often lost when employees move on.

Time intervals between data collection should preferably be less than an hour (ideally 15 minutes says iSERVcmb), and should ideally be in the form of meter readings not just consumption over a time period – though pulse meter readings can be used. Data should be sent to iSERVcmb at least once a month via email. Direct data entry is possible via secure login facilities to the iSERVcmb database.

Reports are generated as soon as monitoring data has been uploaded. Participants will receive feedback on a number of indicators, including annual consumption against bespoke benchmarks for the mix of HVAC components and end use activities served.

Where possible and applicable, potential ECOs will also be identified, which could lead to energy savings of up to 60%, says iSERVcmb.

A case study is also generated on each system, which, along with the data, remains anonymous unless otherwise requested. Some have been happy to make their data public, says Knight. 'One well-known firm said they didn't care about anonymity. If their system's not performing well they want to do something about it.'

The use of the iSERVcmb is free until funding ends in 2014, after which participating organisations can pay a monthly subscription if they want to continue to monitor and oversee their HVAC systems in this manner.

Data collected in iSERVcmb could potentially also be used in BIM. The fields used within iSERVcmb are intended to be compliant with Construction Operations Building Information Exchange (COBie) standards by the end of the project and therefore be integrated into BIM models.

Knight says there is an opportunity for organisations to make large savings with little capital cost. 'The return on investment is often less than three months. It's a no-brainer. To achieve the energy savings you usually just need a regular update of systems' performance to prevent them drifting out of control.'

CIBSE's technical director Hywel Davies says the project is vital. 'Given the concerns about the mismatch between what the buildings are meant to use and really use, this is a really important and timely piece of research.'

'It's particularly timely when you consider the concerns about UK energy supply and the greater acknowledgement by government that reducing demand is a simple, cost-effective way of keeping the lights on.' CJ



## Benefits to participants

The research runs until May 2014 and iSERVcmb is calling for owners or operators of HVAC systems to participate in the scheme. It has 300 systems in its database, but wants to reach 1,400 by the end of the project. It is also inviting HVAC system or component manufacturers, facility managers, and legislators or policymakers to join the scheme. Data collected remains secure and anonymous unless otherwise requested. Participation in iSERVcmb is free.

**iSERVcmb says there are numerous benefits for participating building managers and owners:**

- Information on unexpected changes in energy consumption
- Bespoke energy consumption benchmarks for individual HVAC systems derived from the activities served
- 'Real' data from real systems makes the information easy to understand by all stakeholders, and provides confidence that the

performance benchmarks are achievable.

**Benefits of allowing this approach for EU member states:**

- Improvement of the efficiency of the energy inspection process
- Reducing compliance burdens on well-run HVAC systems
- Achievement of lasting, cost-effective improvements in HVAC system energy efficiency
- Rapid identification of good and best practice in HVAC energy use without favouring any technology or approach.

**Benefits for participating equipment manufacturers:**

- Independent verification of HVAC component energy performance in practice
- Marketing opportunities
- Opportunity to add value to HVAC products.

## Colchester Borough Homes Worsnop House Refurbishment Contract



Applications are invited from suitably qualified and experienced building, mechanical and electrical sub-contractors who wish to be included on the tender panel for the above sub-contract work.

The contract will be managed by Colchester Borough Homes, on behalf of Colchester Borough Council.

The works include a variety of refurbishment and improvement works to the existing Worsnop House including electrical works, new heating, bathrooms, kitchens, roofing works, new glazed atrium, new access lift, construction of a new plant room and alterations to the internal layout of the building.

Further details and a pre-qualifying questionnaire are available from:

**The Projects Team**  
Colchester Borough Homes  
Property Services  
123 Gosebeck Road  
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# SIMULATION GETS REAL

Software companies are increasingly partnering with manufacturers to simulate the energy performance of new technology, but how accurate are they? To validate their model, EDSL and Mitsubishi Electric measured the actual energy consumption of a Chelmsford office and compared it to a dynamic thermal simulation over the same period



The 3D model of the Chelmsford office building

6 Mitsubishi Electric worked with EDSL to input performance data from most of its air conditioning and heating products into Tas

When Mitsubishi Electric decided to make the performance data of its HVAC systems available in EDSL's Thermal Analysis Simulation Software (Tas), it wanted to know just how accurate the simulations would be compared to real energy use and cost.

It undertook a study with EDSL that aimed to provide qualitative validation of a Tas building and plant simulation for an office fitted with a Mitsubishi CITY MULTI R2 Recovery system.

Tas is a dynamic simulation model that allows designers to predict on-going energy consumption, CO<sub>2</sub> emissions, operating costs and occupant comfort.

Mitsubishi Electric worked with EDSL

to input performance data from most of its air conditioning and heating products into Tas, enabling designers to see the impact Mitsubishi systems and configurations had on simulated energy use.

The HVAC supplier wanted to see how good the Tas model was at predicting actual energy use for an existing building containing its equipment. It measured the energy consumption for a two-storey office building for more than a year, and the data was compared against the simulation results to see how close predicted energy performance was to verified use.

The model was then updated to use the equivalent Mitsubishi Electric equipment from the current (2011) catalogue and the results were compared to the installed equipment simulation, to see what improvements in energy performance might be achieved by using the latest energy efficient plant.

Mitsubishi Electric then compared the updated equipment against the fancoil, chiller and heat pump notional system for Part L 2010.

## Simulating office containing Mitsubishi HVAC

In 2004 Mitsubishi Electric conducted the energy consumption monitoring for a purpose-built office in Chelmsford. The two-storey office is served by 5 City Multi R2 outdoor units PURY-P250YMF-C and a total of 25 indoor units.

The ground floor has two systems, including the yellow and dark green ones illustrated in the plans opposite. The three remaining systems – red, light green and blue – are on the first floor. The first-floor plan shows their positions. It was thought that the East West aspect of the building and large amount of glazing would suit a heat recovery system. This system was

designed to utilise heat recovery where heat energy, absorbed by units in cooling, is redirected to units in heating, and vice versa, through the BC controller.

**Inputting data**

The geometry for the model was input using the floor plans. Photographs of the building were used to provide information on constructions, elevation details and building orientation.

Internal conditions were assigned to the spaces based on the designated use for the space, and were derived from the National Calculation Method (NCM) internal conditions. This gave the zones internal gains from occupants, equipment and lighting. The internal conditions also specified a fresh air requirement, which was met in the systems model. A value for infiltration was also included.

A small aperture opening is added to the window frames to allow for additional infiltration. An aperture is also added to internal doors to allow air to move between zones as if the doors were being opened and closed during the day.

The only weather data that is available from the study gives the peak dry bulb temperature each day. This is not sufficient for use in the simulation, so the Swindon Test Reference Year has been selected as a reasonable fit for the Chelmsford location.

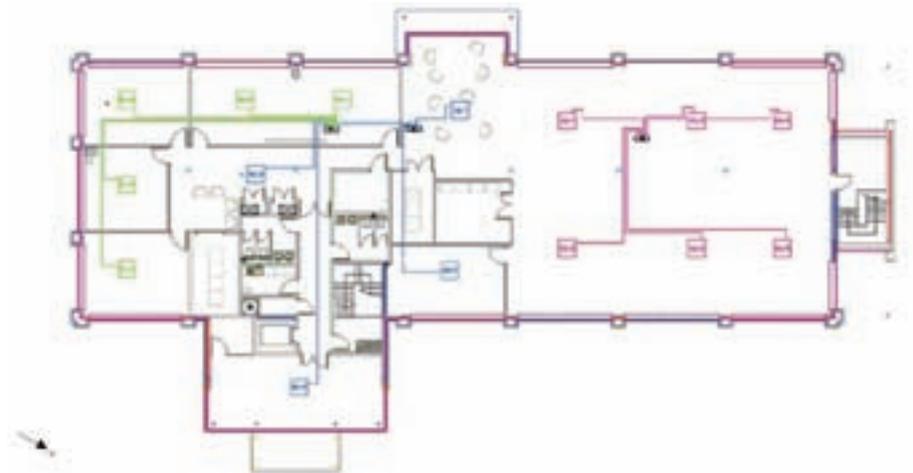
There are two main air-side systems. One supplies the ground floor with fresh air and the other, the first floor. The fresh air rate is 568 l/s for each system and the sensible heat recovery on the fresh air is 80%.

**Simulation results**

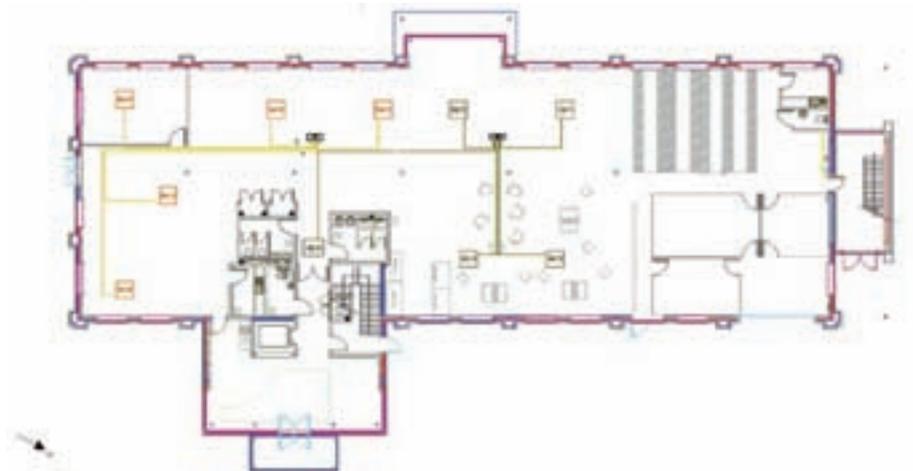
The building simulation results give the zone loads for the spaces in the building. There are hours in the year when only heating or cooling are required. There are also hours in the year when both heating and cooling are required. This is illustrated below for zone loads on the First Floor. For example, heating and cooling are required on day 50, hour 12 (see page 66). These are the zone loads before adding fresh air.

**Weekly consumption results**

The weekly consumption results allow the comparison of measured and simulated data. The consumption figures in the graphs on page 66 are for the 5 City Multi systems and their indoor units. There is a clear correlation between the two sets of results. The consumption in both cases for the three systems on the first floor is



First floor plan



Ground floor plan

roughly equal to the consumption of the two systems on the ground floor. The peak weekly consumption in winter is around 1,400 kWh and peak weekly consumption in summer around 1,000 kWh.

**Weekly cost results (assuming an historic (2004) time of use tariff of £0.07 per kWh)**

The consumption figures are taken and multiplied by a tariff of £0.07 per kWh to put them in context of the original report. Peak weekly cost in the winter is around £100 and about £70 in the summer.

**Heat recovery**

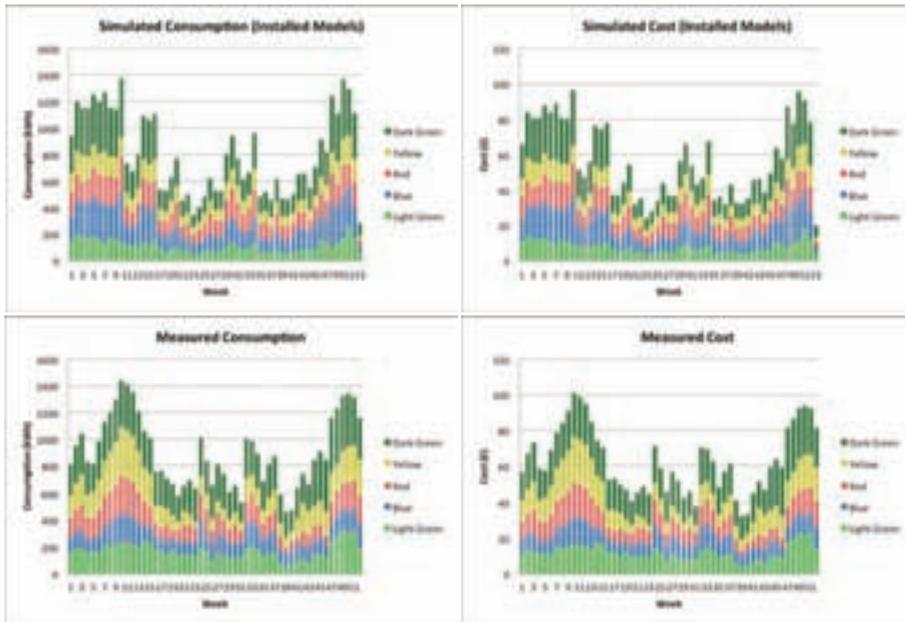
The number of hours where there has been demand on the systems for both heating and cooling is given in the table on page

System name	Hours
Dark green	334
Yellow	407
Red	43
Blue	959
Light green	956

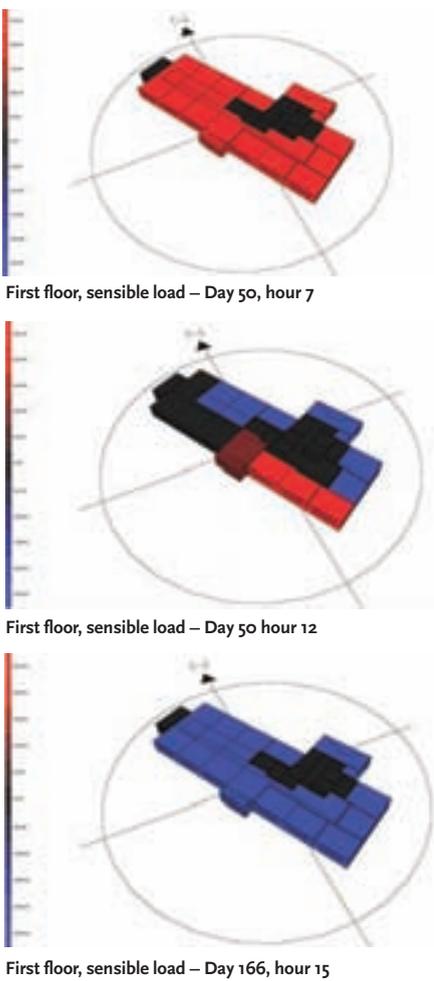
Hours where there is demand for heating and cooling

	Annual consumption (kWh)	Annual cost (£)	Improvement (%)
Simulation (installed equipment)	42,494	2,982	N/A
Measured	46,821	3,277	N/A
Simulation (2011 equipment)	27,810	1,947	34.6%

Cost and consumption comparison between simulations and actual use



The actual measured performance and costs of the systems closely follow the simulation



65. From the table we can see that the blue system needed to supply both heating and cooling for 959 hours, whereas the red system only had 43 hours. This information could be used to optimise heat recovery in the design.

**Conclusion**

The simulated model shows good qualitative agreement with the measured data. The model contains reasonable assumptions based on engineering judgement and utilises industry tools, such as the Swindon TRY weather file and NCM Activities database, to fill in the blanks for areas where monitoring had not been undertaken. The new manufacturer data import facility for EDSL Tas is used to provide realistic results for City Multi, Mr Slim and CAHV Mitsubishi Electric models. The building and plant simulation capture the part load characteristics and give consumption results that are close to what you would expect to find in practice.

**Updating equipment to units from Mitsubishi 2011 catalogue**

Taking the model that has been developed for the qualitative validation, it is possible to update the air conditioning units to the latest Mitsubishi Electric equipment.

The total annual consumption and cost for the measured, validation model with installed equipment, and the 2011 equipment model, are detailed in the table on page 65. The simulation shows that the new models are 34.6% more efficient than currently installed models for this building.

**Simulating updated equipment against Part L notional building**

The entire building model is updated to match the 2010 notional building requirements, including the geometry. The model is taken through the UK Building Regulations 2010 Studio, and all the inputs for the actual building are set to equal the notional defaults. In this way, building loads will be identical, allowing a direct comparison between the notional system and variable refrigerant flow (VRF) system effectiveness. In Part L a VRF system is compared against a fancoil system with chiller for cooling and an electric heat pump for heating. The VRF system is set to equal the efficiency for the notional system. The notional chiller has a COP of 4.5 and a distribution efficiency of 80%. The notional electric heat pump has a COP of 2.7 and a distribution efficiency of 90%. This gives an overall chiller efficiency of 3.6 and an overall electric heat pump efficiency of 2.43.

The Part L calculation is simulated and the Building Regulation UK Part L (BRUKL) document shows that the actual and notional building exactly match with a target emissions rate (TER) and building emissions rate (BER) of 17.1 kg CO<sub>2</sub>/m<sup>2</sup>/annum. The EPC rating is B(34).

A new systems model is created and linked to the actual building simulation results file from that Part L simulation. This systems file contains the detailed VRF system with the imported Mitsubishi Electric equipment. This model is simulated for the entire year and the seasonal efficiency for heating and cooling is calculated (before left).

The Part L calculation is repeated, with the new efficiency values entered for the VRF system. The BRUKL document now shows that the actual building has a BER of 16.1kgCO<sub>2</sub>/m<sup>2</sup>.annum and the Notional building TER remains at 17.1kgCO<sub>2</sub>/m<sup>2</sup>/annum. The EPC rating is now B(31) an improvement of 3 points. CJ

	Heat SSEF	Cool SSEER
Notional	2.43	3.6
City Multi R2 System	3.74	4.28

Seasonal energy efficiency ratios

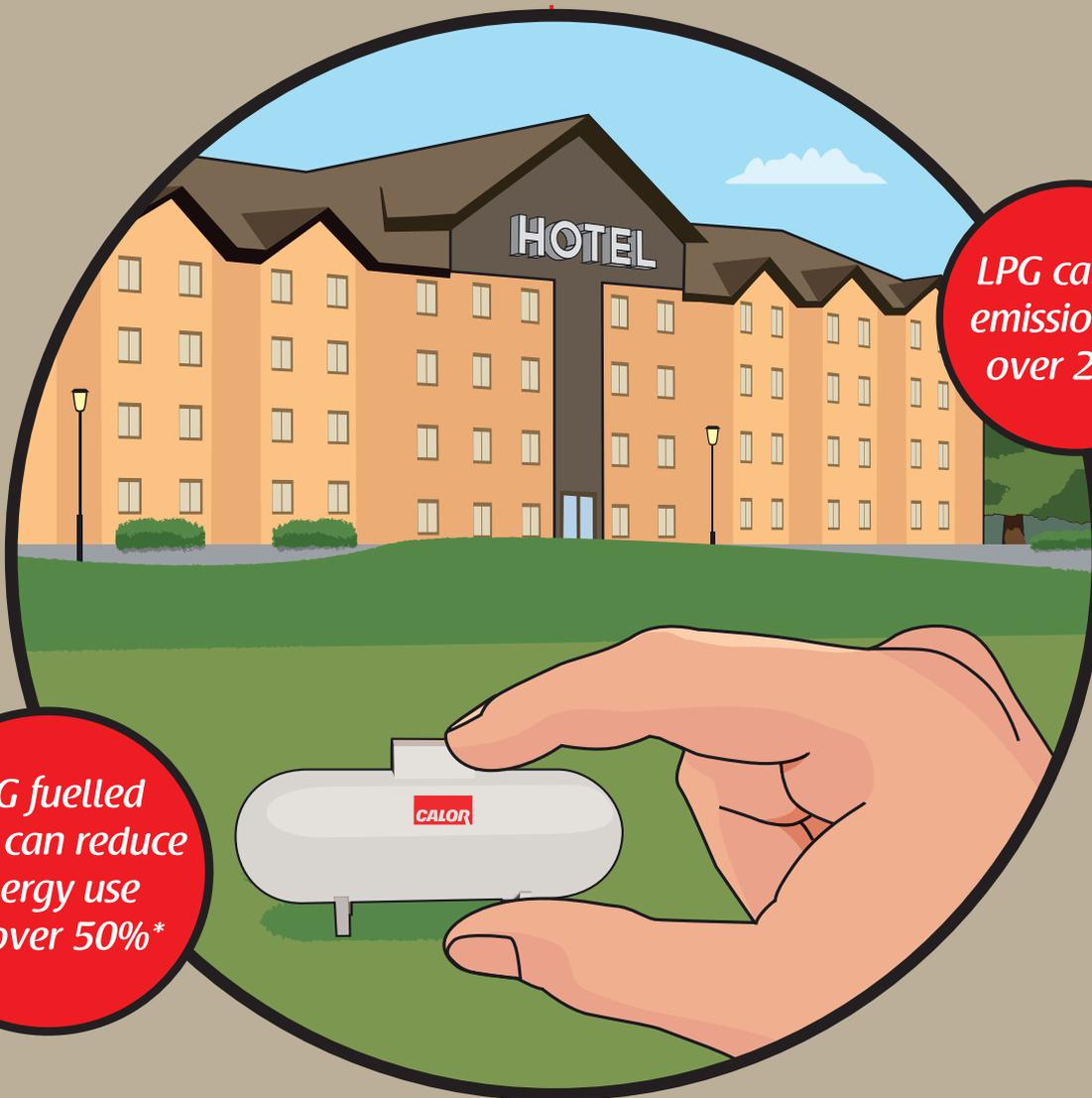
**References**

Mitsubishi Electric – The measured energy consumption of 5 City Multi R2, 2 Pipe Heat Recovery systems at Springfield Lyons Approach, Chelmsford over a one year period.

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# DAIKIN TAKES IES ROUTE TO SIMULATION

Following on from the previous case study, manufacturer Daikin explains how it has been working with EDSL's rival, Integrated Environmental Solutions, to create a sophisticated modelling tool for its VRV equipment. **Carina Bailey** reports

“If this was used and was then shown to be wildly inaccurate... the whole issue of credibility is foremost in our minds

**D**aikin has spent two and a half years working with Integrated Environmental Solutions (IES) to produce a 'plug-in' for IES' Virtual Environment 2012 simulation software to model how Daikin's heat pump and heat recovery VRV (variable refrigerant volume) systems could work in any type of building anywhere in the world.

VRV is a technology that recovers the heat from a building's cooling units and uses it for space heating in another part of that building, or to heat that building's water.

Daikin has collected extensive data about how its VRV equipment works – both during factory testing and from real-life usage – and programmed it into IES' Virtual Environment simulation software. This means that a design consultant can simulate how this technology would work in any project they are working on, creating a much more accurate analysis of the technology's energy performance than has ever been possible before, claims Richard Green, engineering specialist in the engineering department at Daikin. They can also modify aspects of their system design to ensure optimal building performance.

The software will then enable design consultants to create more accurate energy performance certificates than has been

possible before. This is because they will be based on more accurate energy consumption analysis for Daikin's heating and cooling systems, and will show more accurately how a building – using Daikin's products – will comply with Part L of the Building Regulations.

Green claims that this simulation software can achieve a coefficient of performance (CoP) of up to 10 for its VRV equipment – when the expected industry average is just three or four. According to Green, it regularly achieves a CoP of 5.41 for heating and 7.28 for cooling. This would make VRV far more efficient in operation than predicted by the general National Calculation Method.

Green says: 'The simulation goes through and looks at the conditions over every 10-minute period throughout the year. Some simulations are so large that you have to run it all night. It's very, very complex.'

He adds: 'The heat recovery potential has always been there, but it is only now, using IES, that we can actually demonstrate it and simulate it accurately, so we can show exactly what it can do.'

'You can actually select whole systems, define whether you want them as wall-mounted, ducted or cassette, heat pump or heat recovery systems. You can then get that heat into water to create hot water and simulate that process through this software. You can then select whereabouts in the world this product is being used.'

The software add-on was launched in May 2012 and, by the summer, there had been three times more interest from design consultants than Daikin had anticipated, with more than 100 people requesting training to use the programme.

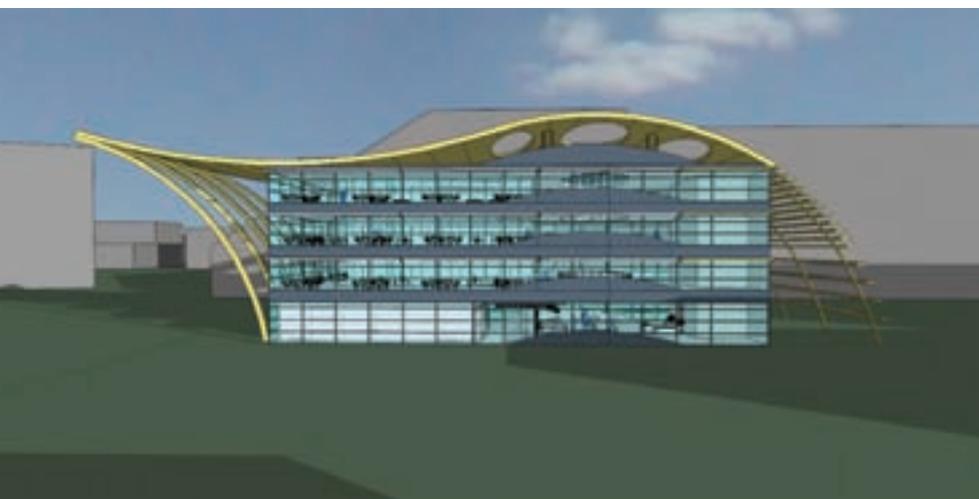
Despite achieving such good CoPs, Daikin was still nervous about launching it to the marketplace. 'If this was used and was then shown to be wildly inaccurate... the whole issue of credibility is foremost in our minds,' says Green.

'We're the first one to stick our head above the parapet. We've had to do a lot of work behind the scenes to ensure the data is as accurate as we can possibly make it.'

'We are very conscious of the fact we may be judged by it. But somebody had to do it.'

And there is a commercial danger for the company; if the system is not used correctly, it could give low CoPs, for example, and damage Daikin's reputation, which is why Daikin insists some training is given.

IES plans to publish case studies where simulation was part of the design process later this year. **CJ**



Simulation software is now becoming more enhanced as manufacturers and software providers join forces



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# Professional development



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## Simple thermal analysis for buildings

This module explores the parameters required to assess the relative thermal performance of the building fabric

There are several dynamic simulation packages in common use by CIBSE members to assess the heating and cooling loads in buildings. These enable the sophisticated application of computer algorithms to provide an interpretation of how a building will perform but, as with any complex tool, require a relatively high level of resource (information and time) to provide satisfactory results. However, the relative thermal performance of a particular building will depend on a few well-defined parameters. This CPD will explain these parameters (concentrating on opaque structures), and will set the scene for a follow-up article that will apply a simple, freely available tool to explore the need for active building heating and cooling.

In May 2011, the *CIBSE Journal* CPD article considered variations in thermal transmittance – U value ( $\text{W} \cdot \text{m}^{-2} \cdot \text{K}^{-1}$ ) – and, subsequently, in June 2011 considered the effect of non-homogeneity on U values. The U value is determined by summing up the thermal resistances of a structure, with each resistance calculated by thickness,  $d$  (m), divided by thermal conductivity,  $\lambda$  ( $\text{W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$ ). However, no matter how well the U value is characterised, it will only provide an interpretation of the steady state heat flow through a structure using the basic

relationship  $Q = U \times A \times \Delta\theta$ , where  $Q$  is heat flow (W),  $A$  ( $\text{m}^2$ ) is area of wall/roof through which the heat is flowing and  $\Delta\theta$  is the temperature difference (K) between the two sides of the structure.

In the real world, there is rarely, if ever, a time in a building's life where there is true steady state. For even in winter, where outdoor conditions may be thought to be close to steady state, the building will be exposed to variations in the building occupancy, the radiant solar gains will continue cycling throughout the day and, critically, the building fabric will act to absorb and release heat both from the inside and outside. A reasonably accessible method for approximating the cycling flows of heat and assessing the resulting need for heating or cooling was developed by BRE, and adopted by CIBSE as the 'admittance method', more than 40 years ago<sup>1</sup>. The output of the admittance method is comparable with more sophisticated dynamic computer methods but is inherently limited, as it uses a simplified treatment of loads. For example, when assessing cooling loads, it treats the outdoor daily temperature profile as being constant over a repeating number of consecutive days and, for heating loads, it assumes a constant outside air temperature and no solar gain.

Also, the basic implementation of the method maintains a constant infiltration/ventilation rate (outdoor air passing directly into the room).

However, despite its deficiencies, the benefits of the simplification from applying the admittance method still holds good even today, where a tablet computer (or a smartphone) can undertake sophisticated numerical analysis and calculate building loads. The thermal admittance method is particularly useful for those designers who are less experienced in building modelling, so that they can gain an understanding of the sensitivity of proposed designs to variations in the basic thermal properties of the construction.

### Thermal properties that affect building performance

The primary parameters that affect thermal performance of an opaque material are its density,  $\rho$  ( $\text{kg} \cdot \text{m}^{-3}$ ); specific heat capacity,  $C_p$ , ( $\text{J} \cdot \text{kg}^{-1} \cdot \text{K}^{-1}$ ); and thermal conductivity,  $\lambda$  ( $\text{W} \cdot \text{m}^{-1} \cdot \text{K}^{-1}$ ).

The three terms may be combined as thermal diffusivity,  $\alpha = \lambda / (\rho \cdot C_p)$   $\text{m}^2 \cdot \text{s}^{-1}$ , which is an indicator of how rapidly heat is conducted in a material. The depth that the daily changes in temperature reach within the material will depend on thermal

Material	Thermal conductivity $\lambda$ (W·m <sup>-1</sup> ·K <sup>-1</sup> )	Density $\rho$ (kg·m <sup>-3</sup> )	Specific heat $C_p$ (J·kg <sup>-1</sup> ·K <sup>-1</sup> )	Diffusivity $\alpha$ , (m <sup>2</sup> ·s <sup>-1</sup> )	Effusivity $\beta$ , (J·m <sup>2</sup> ·K <sup>0.5</sup> ·s <sup>-0.5</sup> )
Brick (outer)	0.77	1,750	1,000	4.40E-07	1,161
Brick (inner)	0.56	1,750	1,000	3.20E-07	990
Concrete block (heavy)	1.75	2,300	1,000	7.61E-07	2,006
Concrete block (light)	0.20	600	1,000	3.33E-07	346
Mineral wool (quilt)	0.042	12	1,030	3.40E-06	23
Plaster (dense)	0.57	1,300	1,000	4.38E-07	861
Plaster (light)	0.18	600	1,000	3.00E-07	329
Plasterboard	0.21	700	1,000	3.00E-07	383
Steel	50	7,800	450	1.42E-05	13,248
Wood	0.13	500	1,000	2.60E-07	255

Figure 1: Example thermal properties of materials

diffusivity. So, considering the data in Figure 1, the thermal diffusivity of common materials ranges from about  $1.4 \times 10^5$  for steel down to towards  $8 \times 10^7$  for concrete materials. Materials with higher thermal diffusivity values can be more effective for cyclic heat storage at greater depth than materials with lower values.

The **thermal effusivity**,  $\beta = (\lambda \cdot \rho \cdot C_p)^{0.5} \text{ J} \cdot \text{m}^{-2} \cdot \text{K}^{0.5} \cdot \text{s}^{-0.5}$ , is used to represent the capacity of a material to absorb and release heat. This relationship is also known as the ‘thermal inertia’. It can be particularly useful when examining multi-layered structures with thin layers. Materials with high thermal effusivity will more readily dissipate heat from their surface, and so will be suitable for storage as well as having a high storage capacity. However, at a surface of a wall or roof there are additionally the convective and radiative coefficients that will more directly dominate the amount of heat transfer. The amount of heat flow will be determined by the surface roughness, shape and emissivity (for radiation) and the speed and turbulence of the air passing across the surface (for convection).

The thermal admittance procedure<sup>2</sup> is based around a regular (and theoretical) 24-hour cycle of heating and cooling loads. The fundamental variables in the method may be calculated using an application of the standard non-steady state heat flow equation<sup>3</sup> that considers how much heat is stored in, and how much heat passes from, a small element of thickness  $x$  (m) of the structure in a time period  $t$  (s), in order to determine the change in its temperature,  $\theta$  (K). So this can be shown,

in classical differential format as:

$$\frac{\delta\theta}{\delta t} = \alpha \frac{\delta^2\theta}{\delta x^2} \quad \text{and this is rearranged in CIBSE Guide A3 to be} \quad \frac{\delta^2\theta}{\delta x^2} = \frac{\rho c}{\lambda} \frac{\delta\theta}{\delta t}$$

To solve this, matrices are applied (see Guide A3 for full details and a worked example). The resulting solution takes the internal and external surface resistances, and applies matrix coefficients to represent each of the layers (m, n.... etc.)

$$\begin{bmatrix} 1 & R_{si} \\ 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} m_1 & m_2 \\ m_3 & m_4 \end{bmatrix} \cdot \begin{bmatrix} n_1 & n_2 \\ n_3 & n_4 \end{bmatrix} \cdot \begin{bmatrix} 1 & -R_{se} \\ 0 & 1 \end{bmatrix}$$

that using matrix multiplication can be reduced to

and the four coefficients,  $M_1$  to  $M_4$ , are then directly used to provide the key, non-steady state factors used in the admittance method.

This calculation may be readily undertaken for single layer structures; however, to tackle more than one layer requires lengthy matrix manipulation and is better suited to computer methods (it employs imaginary number notation and can be quite straightforwardly laid out in a spreadsheet, as in the example at <http://goo.gl/rxOoF>).

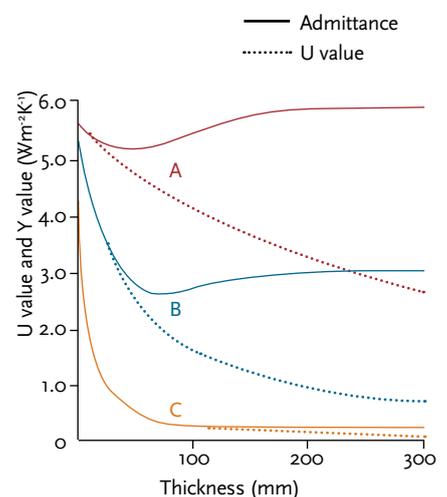
The principal values used in admittance method, as derived from the four matrix coefficients, are:

**Thermal admittance**,  $Y$  (W·m<sup>-2</sup>·K<sup>-1</sup>), provides the name for the method itself and is also a key parameter in determining the response of the internal surface of the building fabric to heat. It is a measure of

the ease by which energy will pass through the internal surface of the element to, or from, the room per degree of temperature difference between the surface at a particular time and the ‘room’ average temperature (*environmental temperature* is used to represent the room’s temperature). This is simplified, based on a 24-hour sinusoidal cycling of heat flow into the surface and, in electrical terms, the U value is analogous to the reciprocal of the total resistance (conductance), and Y additionally includes the susceptance that accounts for the storage effects of the structure. It is closely associated with the **admittance time lead**,  $\omega$  (hours), that provides the time delay between the peak heat flow passing through the surface into the room and the time of the peak room temperature.

As can be seen in Figure 2, the value of thermal admittance is predominantly affected by the part of the wall closest to the room – as the wall increases in thickness, the value of admittance practically approaches a constant value. For very thin walls and those with low thermal conductivity, the U value and Y value are the same. This would be the assumption made for elements such as windows and doors.

(Note that the thermal admittance, Y, is completely unrelated to the ‘y-value’ as used as a performance metric for thermal



Material	Density $\rho$ (kg·m <sup>-3</sup> )	Thermal conductivity $\lambda$ (W·m <sup>-1</sup> ·K <sup>-1</sup> )
A	2,400	1.52
B	1,000	0.24
C – insulation	25	0.35

All specific heat capacities are 1,000 J kg<sup>-1</sup>·K<sup>-1</sup>

Figure 2: Comparison of U value and admittance for example single skin walls<sup>4</sup>

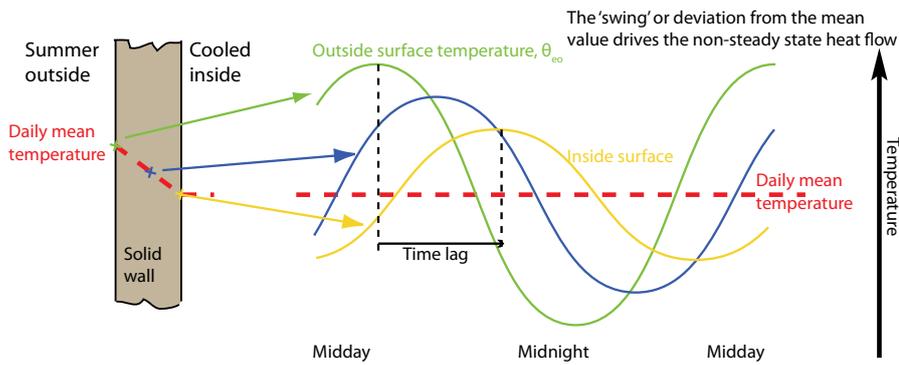


Figure 3: Daily temperature profile at points through a concrete wall

bridging).

**Decrement factor,  $f$ ,** is a ratio that accounts for the thermal dampening that reduces the magnitude of the swing in temperature imposed on one face of the fabric as the temperature wave passes through the structure – the effect of which is shown in Figure 3. And the **time lag,  $\phi$**  (hours), is how long it takes for the heat passing into one side of a structure to get to the other side (and, of course, the magnitude will have been reduced, due to the decrement factor). So, for example, the careful selection of materials can ensure that high solar irradiance striking the outside of a wall is not felt inside the space until after the building's use has ended for the day.

The final pair of factors are **Surface factor,  $F$ ,** that is the ratio of the swing in heat flow from the internal surface of the element to the swing in heat flow received at the

internal surface of the element (such as the gain from localised sunshine through a window), and an associated **time factor,  $\psi$  (h)**, that defines the time delay.

Calculated admittance data for some example constructions are given in Figure 4. For example, comparing the external walls (A, B and C) clearly shows the impact of the structures to improve the heat loss (by reducing the U value) can make significant alterations to the admittance and decrement factor that may adversely affect the resulting room cooling loads. The selection of internal walls (for example, D, E and F) can make a major difference to the average room admittance.

If seeking out a particular thermal admittance value that is not specifically listed in the CIBSE tables, it should be possible to find a similar structure as an approximate proxy, considering

that the admittance is normally defined by the characteristics of the inner 100 mm of the surface (or, better still, the value can be determined using a spreadsheet).

Published values of thermal admittance are calculated on a basis of sinusoidal variation of heat input and temperature. In practice, these conditions rarely occur. Theoretically, it would be possible to calculate thermal admittance of periodic conductance for any pattern of heat gain, but to retain the simplicity of a thermal admittance method, standard thermal admittance values are generally used.

The follow-on CPD article will apply the thermal admittance method to undertake some concept 'what-ifs' to help reduce the heating and cooling loads.

© Tim Dwyer, 2012.

● Thanks to Dr Tony Newton and Tom DeSaulles for contributing information for this CPD.

#### Further reading

See the relevant appendices *CIBSE Guide B3* and *CIBSE Guide A5* – they are a mine of information.

#### References:

- 1 Loudon, A.G., *Summertime temperatures in buildings without air conditioning*, JIHVE, 1970.
- 2 *CIBSE Guide A3*, Appendix 3.A6, CIBSE, 2006.
- 3 Rogers and Mayhew, *Engineering Thermodynamics, Work and Heat Transfer*, Prentice Hall, 1992.
- 4 Millbank, N.O. and Harrington-Lynn, J., *Thermal*

Ref	Construction	Transmittance		Admittance		Decrement-factor		Surface-factor	
		U (Wm <sup>-2</sup> K <sup>-1</sup> )	$\Upsilon$ (Wm <sup>-2</sup> K <sup>-1</sup> )	$\omega$ (h)	$f$	$\phi$ (h)	F	$\psi$ (h)	
A	105 mm brick, 50 mm airspace, 100 mm dense concrete block, 13 mm dense plaster	1.77	5.37	1.2	0.34	8.1	0.4	2.2	
B	105 mm brick, 50 mm airspace, 105 mm brick, 13 mm dense plaster	1.44	4.38	1.5	0.35	8.8	0.53	1.7	
C	105 mm brick, 50 mm airspace, 100 mm light concrete block, 13 mm dense plaster	1.06	2.72	2.6	0.53	7.4	0.76	1.1	
D	Internal wall – 12.5 mm plasterboard, timber studding, 12.5 mm plasterboard	1.7	0.61	5.7	1	0.5	1	0.3	
E	Internal wall – 13 mm lightweight plaster, 100 mm lightweight concrete block, 13 mm lightweight plaster	1.11	2.27	3.8	0.81	3.6	0.88	1.1	
F	Internal wall – 13 mm lightweight plaster 105 mm brick, 13 mm lightweight plaster	1.69	3.76	2.2	0.52	5.4	0.65	1.6	

Figure 4: Thermal properties of example constructions taken from the CIBSE Guide A3 (the external constructions are not suitable for modern buildings – used for illustration only)

# Module 48

January 2013

**1. When was the admittance method adopted by CIBSE?**

- A 10 years ago
- B 20 years ago
- C 30 years ago
- D 40 years ago
- E 50 years ago

**2. What are the units of thermal diffusivity?**

- A  $J \cdot kg^{-1} \cdot K^{-1}$
- B  $kg \cdot m^{-3}$
- C  $m^2 \cdot s^{-1}$
- D  $W \cdot m^{-1} \cdot K^{-1}$
- E  $W \cdot m^{-2} \cdot K^{-1}$

**3. Which of the following materials has the lowest thermal effusivity?**

- A Brick (outer)
- B Concrete block (light)
- C Mineral wool (quilt)
- D Plaster (light)
- E Wood

**4. What is the approximate time delay for a peak in outdoor temperature to produce a peak temperature in the middle of the structure, as shown in Figure 3?**

- A 0.25 hours
- B 3 hours
- C 6 hours
- D 9 hours
- E 12 hours

**5. What electrical analogy is most appropriately applied to account for structural storage effects in thermal admittance?**

- A Current
- B Impedance
- C Resistance
- D Susceptance
- E Voltage

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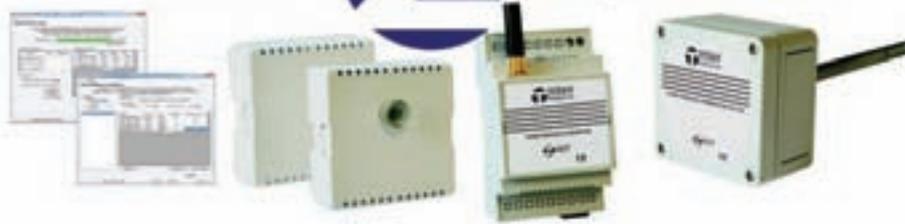
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## TPZ-NET



### Titan Products launch TPZ-Net Zigbee wireless range

The TPZ-Net is a new range of wireless environmental products from Titan Products. Incorporating Zigbee wireless technology, the range creates extremely stable, self-healing mesh networking capabilities. The TPZ-Net range is designed to monitor temperature wirelessly, CO<sub>2</sub>, humidity, light and occupancy levels and transfer this information back to the Titan Products coordinator, where the information can be transferred onto a BACnet network or to other Titan product controllers or I/O (input/output) devices.

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### East Midlands centre harnesses bio-fuel technology

Atlantic Boilers has installed dual-fuel boilers at the new Corby Enterprise Centre in Northamptonshire. The £8.3m centre is home to 15 workshops, 38 offices and a café. The flagship centre is built next to the Corby Business Academy at Priors Hall Park, the major urban extension to the north east of Corby. The centre aims to provide an environment to support and develop new and emerging businesses with space from 200 sq ft to 1,500 sq ft.

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### Underfloor heating system sets new green standard

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### Elta Fans selected for motorway services refurbishment

When Cherwell Valley Services reopened following a fire, the centre included four Elta Fans Heritage SCHAT roof units. The original amenity centre, located at junction 10 on the M40 motorway, was completely destroyed when the fire caused the original roof to collapse inwards. In the renovation of the site, Elta Fans was specified.

It recognised the importance of effectively handling grease-laden air from the kitchens in protecting the site from the threat of any future fire.

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[www.smartcooleco3.com](http://www.smartcooleco3.com)



### Smedegaard gives a boost with its MiniFlex range of booster sets



Smedegaard strives for industry excellence and has excelled once again with the introduction of its Boostaflex range of cold water booster sets.

Designed and developed in-house, the MiniFlex range, part of the BoostaFlex family, consists of a single or twin pump booster set and break tank, which are packaged onto a common baseplate. The set is suitable for either floor or wall mounting. The 85-litre break tank is of a rugged construction, manufactured from WRAS-approved material.

● Email [info@smedegaard.co.uk](mailto:info@smedegaard.co.uk) or call 01278 458686

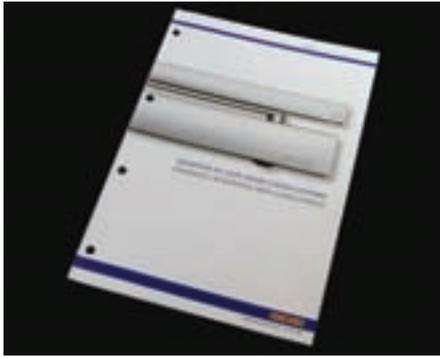
### Tinytag CO<sub>2</sub> data loggers monitor energy efficiency



Researchers at Oxford Brookes University have been using Tinytag carbon dioxide data loggers as part of building performance and air quality evaluation studies

for domestic and non-domestic, new build and refurbishment projects. Recorded data is included with other environmental data and assessed to determine whether overall energy systems are working as intended. If CO<sub>2</sub> levels are too high, this indicates poor air quality, resulting from either poor maintenance or operation of mechanical ventilation systems. Tinytags monitor other parameters such as temperature, humidity and power usage.

● Visit [www.tinytag.info](http://www.tinytag.info) or call 01243 813000



## GEZE UK publishes overview of door closer systems

The UK's leading manufacturer of door and window control systems, GEZE UK, has launched a new technical brochure, dedicated to its door closer systems. Designed to provide architectural ironmongers and specifiers with a concise overview of GEZE UK's door closers and floor springs, the new brochure includes detailed explanations of the many variants and options available, as well as stylish reference photos from projects around the world, technical diagrams and specification information.

● Visit [www.geze.co.uk](http://www.geze.co.uk) or call 01543 443000

## A greater union has commercial angle

Pegler Yorkshire is introducing a new and improved version of its union angle valve, which is used in its thermostatic mixing valves. The growing value these products are now presenting in the UK healthcare and commercial market is supported by the convenience for servicing and maintenance at the point of use. Pegler Yorkshire has experienced huge success among specifiers and installers with its Prestex Thermostatic Mixing Valves since their launch three years ago.

● Visit [www.peglyorkshire.co.uk](http://www.peglyorkshire.co.uk) or call 0844 243 4400



## Drainage networking group celebrates 100th member on LinkedIn

A dedicated drainage networking group established on business social networking site, LinkedIn, has reached a milestone this week with its 100th member. The Building Drainage Network was established exclusively for specifiers, contractors, engineers, and installers of drainage systems for the built environment. Hosted by Mike Rawlings, cast iron drainage specialist at Saint-Gobain PAM UK, the site provides a forum for industry opinion leaders to generate informed debate about all aspects of cast iron drainage systems.

● Visit [www.saint-gobain-pam.co.uk](http://www.saint-gobain-pam.co.uk)



## Danfoss lights the way

Heating controls manufacturer, Danfoss, has launched the TP7001 – the first in a family-style of seven-day programmable room thermostats for domestic heating systems, which combine a large, back-lit digital display for easy reading, with exceptional functionality and ease of installation. Because Danfoss has based the programming of the TP7001 on its tried and tested existing protocols, installers will find the set-up procedure familiar, making it quick to install straight out of the box.

● Visit [www.danfoss-randall.co.uk](http://www.danfoss-randall.co.uk) or call 01234 364 621



## College converted to MHS boilers

MHS Boilers, part of Elco Heating Solutions, has supplied the College of St Barnabas in Lingfield, Surrey, with four 120 kW Thision L boilers on a free-standing cascade frame, complete with pump kits and cascade controls, plate heat exchangers and Pisces pressurisation units. The College of St Barnabas is a residential community of retired Anglican clergy. When the time came to replace its old, inefficient cast iron sectional boilers, the college needed to maximise fuel savings by installing condensing boilers.

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

## eQ Prime air handling units offer cost and energy savings

Fläkt Woods has launched its eQ Prime range of air handling units, designed to reduce capital costs and optimise energy savings. Available in eight sizes, the eQ Prime is compact in size, fully controllable and capable of providing nominal airflows between 0.4 m<sup>3</sup>/s to 6.0 m<sup>3</sup>/s. The eQ Prime contains newly engineered, maximum energy efficient, permanent magnet motors that contribute to lowering specific fan power volume (SFPv) and possibly reducing the overall size of the unit.

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



## Refurbishment of Hickman high-rise social housing apartments

Tenants on the Hickman estate in Wolverhampton are benefiting from a £12m investment as part of the Wolverhampton Decent Homes programme. Two high-rise blocks on the estate, Wodensfield Tower and William Bentley Court, are being completely refurbished and now benefit from the installation of an Evinox communal heating system in each block, which is more energy-efficient than individual boilers.

● Visit [www.evinox.co.uk](http://www.evinox.co.uk) or call 01372 722277



## Construction products industry celebrates innovation



Ariston has been recognised for its innovative NUOS range of heat pump water heaters, in the Construction Products Association's 2012 edition of Construction Products Innovation and Achievement (CPIA). The range's

achievement in the category of Improvements in Site Efficiency is one of only 18 products nationwide to be chosen for this year's publication, which showcases the most innovative products and processes created by the construction products industry during the last 12 months.

● Email [marketing.uk@aristonthermo.com](mailto:marketing.uk@aristonthermo.com)

## Complete control on the GO

To get complete control over every aspect of e-pump performance, Grundfos Pumps has developed the innovative Grundfos GO control software that offers intuitive, handheld pump control. This means that from the user-friendly interface on a smart phone or iPod Touch, you can monitor, set and control any Grundfos e-pump. This innovative step from Grundfos means the industry's most advanced mobile solution has arrived and taken pump control 'on the move' to a whole new level.

● Email [uk-sales@grundfos.com](mailto:uk-sales@grundfos.com) or call 01525 850000



## Baxi boilers for Durham University refurbishment

Baxi Commercial Division has recently supplied Potterton Commercial boilers and a Baxi-SenerTec multi-module Dachs mini-combined heat and power (CHP) system for a refurbishment of the heating system at St Aidan's College, Durham University. The college was designed by renowned architect, Sir Basil Spence, who was famously responsible for the new Coventry Cathedral. The college is built in the form of a hand, with parallel accommodation corridors that enclose a spacious, landscaped garden.

● Email [jeff.house@baxicommercialdivision.com](mailto:jeff.house@baxicommercialdivision.com) or call 0845 070 1055



## Toshiba cools and heats series of new fire and rescue service stations

A series of new community fire and rescue stations being built as part of a major development programme in the north of England are being equipped with state-of-the-art Toshiba air conditioning. A total of 21 fire stations are being rolled out, replacing outdated facilities. To date, 15 of the stations have been equipped with high efficiency Toshiba air conditioning, with remaining sites awaiting completion or fit-out towards early 2013.

● Visit [www.toshiba-aircon.co.uk](http://www.toshiba-aircon.co.uk) or call 0870 843333

## Generation 6 technology to protect the Royal Air Force museum in London

ADT Fire & Security is upgrading the fire alarm system at the Royal Airforce Museum in London from the existing analogue system to its advanced Generation 6 technology. The digital system will provide the highest levels of protection for the museum, helping to significantly reduce maintenance – which, given the sheer size and nature of the site, is extremely difficult to complete. The Royal Air Force Museum is Britain's only national museum dedicated wholly to aviation.

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



## Havells and Furse work together to launch surge protection solutions

Havells, a specialist in low-voltage switchgear, together with Furse, a leader in the design, manufacture and supply of earthing and lightning protection systems, have launched a surge protection solution designed to simplify selection and installation of surge protective devices (SPDs), in accordance with the latest amendment of BS 7671. Surge protection within the Havells Powersafe distribution board range has been optimised through testing with Furse.

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

## Koolduct gets museum on the go

Glasgow's stunning new £74m museum, on the banks of the rivers Clyde and Kelvin, has taken full advantage of the space-saving and single-fix installation benefits offered by Kingspan's KoolDuct System. The Riverside Museum of Travel and Transport, majority-funded by Glasgow City Council and built by BAM Construct UK, has proved a huge success since opening its doors to the public. The museum has welcomed more than one million visitors in the first six months alone.

● Visit [www.kingspaninsulation.co.uk](http://www.kingspaninsulation.co.uk) or call 01544 387 384



## Legrand manages Mann Island power distribution with Electrak and Zucchini solutions

Electrak and Zucchini busbar-based solutions from Legrand have been used to distribute power through Block 3 of the £135m Mann Island development at Liverpool's Pier Head – a world heritage site on the banks of the Mersey. The Neptune Developments and Countryside Properties development comprises three black granite buildings overlooking a tiered canal basin and locks that link with the Albert Dock complex. The development features state-of-the-art restaurants, retail and office space,

● Email [kelly.harper@legrand.co.uk](mailto:kelly.harper@legrand.co.uk), [vikki.clamp@legrand.co.uk](mailto:vikki.clamp@legrand.co.uk) or call 0845 600 6266



## JS Air Curtains provides vital ingredient at Town Hall Hotel in London

JS Air Curtains has supplied and installed a stylish, electrically heated Zen air curtain at the luxury, boutique Town Hall Hotel in Bethnal Green, London. It provides a vital ingredient in the dining experience of its restaurant's clientele by keeping draughts out when the door is open and maintaining a comfortable internal atmosphere. Originally built in 1910, the award winning Town Hall Hotel combines Edwardian architectural splendor with contemporary design in the heart of London's East End.

● Visit [www.jsaircurtains.com](http://www.jsaircurtains.com) or call 01903 858656



## Shropshire success for MHS Boilers

MHS Boilers has supplied three 65 kW Thision L boilers on a free-standing cascade frame and a Pisces Pressurisation Manager to St Leonard's Church in Bridgnorth, Shropshire. The new boilers replaced a 60-year old oil-fired unit during the renovation of kitchen and toilet facilities, and the complete refurbishment of the heating system. The M&E consultant and contractor for the project was Sutton Coldfield-based Hydro Mechanical Services.

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

## Dialight debuts 25,000 Lumen DuroSite LED High Bay to cut costs and energy consumption

Dialight has today announced the immediate availability of its new 25,000 lumen DuroSite LED High Bay to meet the high light output requirements of industrial applications. With its ultra-efficient 100 lumens per watt efficacy, the new 250 W LED High Bay can dramatically reduce energy consumption and maintenance costs as a direct replacement for conventional high-intensity discharge and fluorescent fixtures. Suitable for both indoor and outdoor applications, the new 25,000 lumen high bay is CE compliant and CSA 22.2 certified.

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



## Marking two decades of CableCalc Level P with a free version of new twin and earth calculations

To mark 20 years of CableCalc, Castline Systems has released a new, free version of its popular CableCalc program, which will calculate single-phase radial and ring circuits wired in twin and earth cable. It includes free technical support by email. CableCalc Level P is a fully working, unlimited-use version and provides far more than just simple volt drop calculations. CableCalc Level P can be downloaded from [www.castlinesystems.com](http://www.castlinesystems.com) free of charge.

● Call 01293 871751 or visit [www.castlinesystems.com](http://www.castlinesystems.com)

## Static Systems 900evo fire panel awarded BSI approval

Static Systems Group's 900evo fire alarm panel, believed to be the first truly modular panel with remote primary indication, has received EN54 Parts 2 and 4 third party certification from BSI. There are two aspects to the approval. The first allows for BSI (kite) marking, and the second ensures the panel is Construction Products Requirements (CPR) compliant. Director of product development Richard Tew, said: 'We worked closely with BSI as the modular nature of our panel presented some interesting challenges for EN54 testing.'

● Visit [www.staticsystems.co.uk](http://www.staticsystems.co.uk) or call 01902 895551



## S&S Northern launches new gas interlock

S&S Northern, the UK's leading commercial kitchen gas safety experts, have launched its latest gas interlock product, the Merlin CT1650. The Merlin CT1650 is designed for use in commercial kitchens and supports the TB140 guidance by The Gas Safe Register and IGEM, published in April 2012, which states that a secondary back-up in the form of a carbon dioxide detector may now be used in commercial kitchen applications if the ventilation system fails.

● Email [info@snsnorthern.com](mailto:info@snsnorthern.com) or call 01257 470983

## Employee engagement vital in reducing energy consumption

While much discussion regarding corporate energy consumption revolves around senior-level decisions, a hospitality sector seminar, hosted by ebm-papst, heard that the role of frontline staff cannot be underestimated. The seminar – one of a series of sector-specific meetings hosted by ebm-papst, one of Europe's leading manufacturers of fans and motors – heard firsthand how restaurant chain Nando's more than halved the average energy consumption of its outlets, simply by engaging restaurant staff.

● Visit [www.ebmpapst-ec.co.uk/about-client-centre.php](http://www.ebmpapst-ec.co.uk/about-client-centre.php)



## Vent-Axia launches Energy Recovery Ventilation (ERV) range

Building on the success of Sentinel Totus Demand Energy Recovery Ventilation (D-ERV) Vent-Axia has launched a range of simplified heat recovery ventilation units. Part of the Roof Units range, the new Energy Recovery Ventilation (ERV) series of heat recovery units covers airflow from 500 to 1500m<sup>3</sup>/hr. Offering basic controls and functionality, the ERV units are designed for projects that require cost-effective heat recovery ventilation without the complexities of demand ventilation control.

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

# PRODUCTS & SERVICES

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

## Community grants up for grabs

SPSenviowall has committed to delivering funding to further support the communities in which they have been instrumental in refurbishing. The SPSEnviowall Community Fund was established by the national supplier of external wall insulation to ensure that, when contractors have completed the overhaul of the social housing areas, the community continues to benefit.

From scout huts through to back-to-work mentoring schemes, people living in areas where SPSEnviowall has delivered insulation solutions are able to benefit from the funding on offer.

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

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



## Office move expands Mitsubishi Electric's customer and training facilities

Mitsubishi Electric has opened a sales office near Reigate in Surrey, in a move that also increases the company's training facilities for both air conditioning and heating installers. The 6,000 sq ft site is ideally located close to both the M25 and M23 motorways to serve Mitsubishi Electric's customers in south London and the south of England, and takes over from the previous office in Orpington. 'We now have a fantastic facility that allows us to grow our sales operation to support our customers even more,' said territory manager Steve Warrington.

● Call 01737 387170



## STARK SLE LED new generation

Tridonic has launched the new generation TALEXEngine STARK SLE LED, a sophisticated energy saving system for use with LED downlights and spotlights in general lighting systems. Compared with previous versions, the new STARK SLE boasts 40% more light output and a longer life of up to 50,000 hours. The latest-generation TALEXEngine STARK SLE LED system still consists of a matched LED module and LED converter.

● Email [enquiries@uk.tridonic.co.at](mailto:enquiries@uk.tridonic.co.at) or call 01256 374300

# DIRECTORY Your guide to building services suppliers

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Reference: 120-EA856-1112

NHS Wales Shared Services Partnership-Facilities Services (NWSSP-FS) based in Cardiff is an organisation committed to championing modern, sustainable high quality healthcare environments. We achieve this by providing professional and technical estates related advice and support to NHS Wales and the Department for Health and Social Services at the Welsh Government (WG).

In this role you will provide advice and support to the WG and NHS Wales on all matters associated with mechanical water based systems. As the Senior Performance Standards Engineer(Water) you will support the Head of Environmental Management and Engineering on all issues concerning mechanical water based systems and be the principal source of advice and guidance on legionella and other statutory water compliance matters for NHS Wales.

To meet this challenge you will need to be a Chartered Engineer in an appropriate discipline with relevant experience working at a senior level on complex engineering systems including, preferably in an NHS environment.

Your high level of IT literacy must be complemented by good communication and team-working skills. The post will be Cardiff based although travel across the Principality will be required at times.

For further information please contact Eric Thomas, Head of Environmental Management and Engineering on 02920 315510 or e-mail eric.thomas@wales.nhs.uk

NWSSP-FS is hosted by Velindre NHS Trust.

**To apply please visit [www.jobs.nhs.uk](http://www.jobs.nhs.uk)**

**Closing date: 21 January 2013.**

Velindre NHS Trust is committed to working towards equal opportunities. All employees and job applicants shall be afforded equal opportunities in employment, irrespective of their age, gender, marital status, race, religion, creed, sexual orientation, colour or disability. Velindre NHS Trust operates a no smoking policy.

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An excellent opportunity for a Senior Electrical Design Engineer to join the London building services team of a niche firm of consulting engineers. The successful candidate's will have the opportunity to work on a complete variation of projects across various sectors, including Commercial, residential and Mixed Use Schemes.

**Senior Mechanical Design Engineer**

**Central London, c£45k + Package**

Our client is a medium sized consultancy based in Central London. They are currently looking for a self-starter who can take a lead role on projects, from initial detailed design right through to completion. You will have previously been in a client facing role, having taken the lead on a range of project types and sizes whilst also developing more junior engineers.

**Senior Mechanical Design Engineer**

**Central London, c£45k + Package**

My client is a Multi Disciplinary consultancy with offices across the UK. Based in Central London you should currently be operating at either Associate Director or Technical Director level for an M&E Consultant and be experienced in leading an MEP team and projects, be client facing and assisting in driving a business forward.

**Senior Mechanical Design Engineer**

**Central London, £30phr**

My client is an award winning consultancy currently looking to expand their residential & commercial team. Ideally you will be a Chartered mechanical or electrical de-sign engineer with a proven recent track record within building services. This role is initially a 6 month contract with the potential to be extended.

**For more information or to apply please call 020 7033 8866 or email [contact@skilledcareers.co.uk](mailto:contact@skilledcareers.co.uk)**

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Closing date: 28th January 2013



**Electrical Associate  
London, £50 - £55k + benefits**

A fantastic opportunity has arisen for an Electrical Associate to join a young energetic building services consultancy based in London. Our client has aggressive growth plans for the next 12- 18 months which is underpinned by continual project wins and a strong order book moving forward. The requirement is for a client facing, career minded, and driven individual who can lead a team, run projects, and have ability to develop and implement the current management team's vision.  
BAR 1007/JA

**Associate Fire Strategy Engineer  
Dubai, UAE, £42 - £44k AED PCM**

A fantastic opportunity has arisen within a market leading international multi-disciplinary consultancy, for an experienced Associate level Fire Strategy Engineer to join their Dubai office. The role will involve leading an established team, developing existing and new clients in order to further the success of this division. Candidates will possess proven knowledge/experience within the fire industry, including experience of working to American/UK standards and should have previously worked in the Middle East.  
BAR 1023/PA

For further information and to apply, please call us on **+44 (0)203 176 2666** or email [cv@b-a-r.com](mailto:cv@b-a-r.com)

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**Associate Mechanical Engineer | South Essex  
£50,000 - £55,000 Plus Benefits + Bonus**

Our client is an expanding South Essex based multi-disciplinary consultancy, whose management team works on major accounts as well as generating new business. They currently have an exciting opportunity for an Associate, whose role will be to assist with advancing existing client relations and progressing current projects. You will be responsible for an experienced team of MEP building services engineers, assisting their development and managing them through a varied portfolio of projects. Experience of working on projects such as residential, commercial and education is essential.

**Senior Electrical Engineer | Oxford  
£40,000 Plus Benefits**

Our client is an international design consultancy who are currently seeking a Senior Electrical Design Engineer. You will be working predominantly on projects including rail, residential, commercial and hospital and, ideally, you will have substantial experience within these sectors. Candidates should hold a Degree, HND or HNC in Electrical Engineering, or similar.

**Senior Mechanical Engineer | London Bridge  
£45,000 Plus Benefits**

A leading international engineering consultancy is currently seeking a Senior Mechanical Design Engineer, who is Chartered or is eager to work towards Chartership, by CIBSE and/or IMechE. You will have experience in high end residential projects, as well as large commercial projects. This is an excellent opportunity to become part of an exciting company, who offer and actively encourage excellent career progression, through CPD courses as well as project and client exposure.

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**Senior M&E Design Engineers | Berkshire | to £45K++ | ref: 2919**

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**Mechanical Associate Director | London | to £65K++ | ref: 3138**

You will be experienced in leading major residential and commercial projects. A strong commercial awareness is essential, as well as having the ability to lead the mechanical team and manage major clients.

**Senior Electrical Design Engineer | Oxford | to £45K+ | ref: 3108**

An established M&E consultant requires a senior engineer to work closely with the Electrical Director for the office. Ideal candidates will have a stable employment background and be able to manage their own clients.

**Mechanical Design Engineer | Surrey | £NEG!! | ref: 3120**

Our client requires an intermediate engineer who has previously worked on mission critical/data centre projects. Ideal candidates will be degree qualified and have 5-7 years industry experience.

**M&E Design Engineers | London | to £35K | ref: 3113**

We are looking for a degree qualified engineers who are comfortable attending meetings and working unsupervised. Projects include commercial, residential and healthcare. Experience with Revit MEP would be beneficial.

**Senior M&E Design Engineers | London | to £55K | ref: 3126**

An international multi-disciplined consultancy requires experienced Chartered engineers with a strong background working within a rail environment. Candidates will be familiar with both NR and LUL standards.

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### HVAC Associate

Central London | £55-65k | Ref: 13109

Our client has held a presence within Building Services for over 45 years working in various sectors including Education, Healthcare, Retail, Data Centre's and Residential. They are focused on Low Energy Principals and Sustainable Design and are seeking to recruit an HVAC Associate to join their London office.

Contact: darren.warmington@bsvrecruitment.co.uk

### Intermediate / Senior HVAC Design Engineers

Kent | £32-40k & Benefits | Refs: 13070 & 13093

Two Building Services Consultants based in Kent are looking to strengthen their teams by recruiting HVAC Design Engineers. Demonstrating a good knowledge of Hevacomp & AutoCAD coupled with a professional qualification, full support will be offered for you to further your careers working on highly significant projects in the UK Construction Market.

Contact: darren.warmington@bsvrecruitment.co.uk or paul.bartlett@bsvrecruitment.co.uk

### M&E Design Engineers

West London | £32/40k | Refs: 13104/5

MEP Building Services Consultancy specialising in demanding construction projects. HVAC Design Engineer should be conversant with IES, technically astute and be able to run jobs. The Electrical Engineer should possess good technical skills, AutoCAD / Hevacomp would be desirable but not essential and you will work between office & Heathrow Airport.

Contact: paul.bartlett@bsvrecruitment.co.uk

### HVAC & Electrical Design Engineers

South London & The North West | £ Negotiable Packages | Ref: 13097/8/9

Our Client has a National network of offices throughout The UK. They are seeking to recruit Electrical Engineers for The North West office and HVAC Engineers for London. Works include traditional Building Services, Project Management, Environmental and Sustainable Design. Projects include Education, Retail, Healthcare and Public Service sectors.

Contact: monika.rogalinska@bsvrecruitment.co.uk

For more vacancies please visit [www.bsvrecruitment.co.uk](http://www.bsvrecruitment.co.uk) or call today.

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Gammon Construction Limited is a leading construction and engineering company in Hong Kong and operates in Mainland China and Southeast Asia. To cope with our business needs and expansion, we invite experienced and high caliber talent to join our professional E&M team. We offer a competitive remuneration package, exciting opportunities for career progression and training for continued engineering and management development particularly for the airport projects in the coming years.

### The following positions will be based in HONG KONG

#### Tunnel Ventilation Engineer

As a tunnel ventilation engineer, you will support the project manager as part of the engineering team for design development and co-ordination, carrying out planning and procurement activities and ensuring the works are executed on site to a high safety and quality standard.

#### Tunnel Ventilation PLC Engineer

Reporting to our Project Manager, you will be responsible to co-ordinate the related system design, installation, T&C of our infrastructure projects. You will be responsible for planning and co-ordinating engineering activities to develop and apply standardized design criteria for tunnel PLC applications. You should have good background knowledge of application of PLC in HVAC, electrical, railway or road tunnel industry.

#### Testing & Commissioning Engineer

Reporting to our Project Manager, you will be responsible to develop testing & commissioning methodology, programme and detailed planning and execution for assigned projects. You will also be required to perform regular installation audits, integration testing and final acceptance testing as well as operation trials in order to ensure the systems installed are tested and commissioned according to the industry best practice. You should have solid experience in testing and commissioning, preferably in the building services industry.

#### Planning Engineers – E&M

You will be responsible for developing the most appropriate method and sequence of construction operations for E&M projects. You will assist in planning and anticipating project demands in terms of labour, materials, equipment and technical challenges, developing project master programme & short term programmes, monitoring site progress, and identify changes and impact assessments so as to provide optimum solutions for the works. Preferably, you should have significant years of experience in planning and familiar with the use of Planning software such as MS Project & Primavera 6.



You may apply by email to [hrdept@gammonconstruction.com](mailto:hrdept@gammonconstruction.com), providing your full resume, current and expected salary.

For more information about Gammon Construction Limited, please visit our company's website at <http://www.gammonconstruction.com>.

We are an equal opportunity employer and welcome applications from all qualified candidates. Information provided will be treated in strict confidence and only be used for consideration of your application for the relevant post within the Company. Applicants who are not invited for an interview within 6 weeks may consider their application unsuccessful.

## Estates Department

# the UK's European University

The University of Kent is one of the UK's most dynamic universities with a strong European and international presence. The Estates Department employs over 200 staff with an annual revenue budget of £20.7m and is responsible for the operation and maintenance of some 64 non-residential buildings and the maintenance of 4,800 student study bedrooms across its two main campuses at Canterbury and Medway. It is also responsible for all capital works projects with a five year capital plan approaching some £150m.

The Estates team now has three new roles available to support these requirements:

## Intermediate Building Services Engineer

£31,333 - £36,298 pa

Informal enquiries should be directed to John Morley via email: [J.Morley@kent.ac.uk](mailto:J.Morley@kent.ac.uk)

Ref: OTR0651

## Senior Energy Systems Engineer

£37,382 - £44,607 pa

Ref: OTR0653

## Assistant Maintenance Manager

£31,333 - £36,298 pa

Ref: OTR0652

Informal enquiries for OTR0652 and OTR0653 should be directed to Nick Swinford via email: [N.H.Swinford@kent.ac.uk](mailto:N.H.Swinford@kent.ac.uk)

Further information is available from our website. Applications for these posts must be made via our website: [www.kent.ac.uk/jobs](http://www.kent.ac.uk/jobs)  
Minicom users please telephone 01227 824145.

Closing date for completed applications for all outlined posts: **Sunday 27 January 2013.**

We actively promote equal opportunity in education and employment and welcome applicants from all sections of the community.



# Events & training

## NATIONAL EVENTS AND CONFERENCES

### BAU 2013

**14-19 January, Munich**  
A leading trade fair for architecture, materials and systems.  
[www.bau-muenchen.com](http://www.bau-muenchen.com)

### Lighting masterclass

**31 January, Norwich**  
The Society of Light and Lighting Masterclass season continues its tour.  
[www.sll.org.uk](http://www.sll.org.uk)

### CIBSE Building Performance Awards

**5 February, London**  
Find out who the 2013 winners are at this prestigious industry event.  
[www.cibseawards.org](http://www.cibseawards.org)

### Ecobuild 2013

**5-7 March, London**  
Sustainable design, construction and the built environment.  
[www.ecobuild.co.uk](http://www.ecobuild.co.uk)

### ThinkFM 2013

**10 June, London**  
This year's focus is 'the leadership challenge'.  
[www.thinkfm.com](http://www.thinkfm.com)

### Third symposium on lift and escalator technologies

**26-27 September, Northampton**  
This symposium brings together experts in the field of vertical transportation, offering an opportunity for speakers to present peer-reviewed papers on the subject of their research. Speakers will include industry experts, academics and post graduate students. Papers are now being accepted.  
[www.liftsymposium.org](http://www.liftsymposium.org)

## CIBSE GROUPS AND SOCIETIES

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

### Building information modelling (BIM)

**10 January, Bristol**  
A south west region event.  
[Millham.orchard@tiscali.co.uk](mailto:Millham.orchard@tiscali.co.uk)

### Debate: heat pumps or passive cooling – the most effective low carbon solution?

**10 January, London**  
A debate being held in conjunction with the Institute of Refrigeration. Principal speakers Becci Taylor (Arup) and David Butler (BRE) will discuss which technology will provide the most effective low carbon solution for buildings in the future.  
[tim@timdwyer.com](mailto:tim@timdwyer.com)

### Air conditioning inspections and CFC update

**15 January, Northampton**  
East Midlands region joint meeting with the Building & Engineering Services Association (B&ES).  
[www.cibse.org/events](http://www.cibse.org/events)

### Solutions for combating hospital-acquired infections

**16 January, Manchester**  
Society of Public Health Engineers North West region will be holding a technical meeting.  
[www.cibse.org/sophe](http://www.cibse.org/sophe)

### Introduction to soft landings

**16 January, Birmingham**  
A West Midlands region evening seminar.  
[Nigel.Marriott@gmtreble.co.uk](mailto:Nigel.Marriott@gmtreble.co.uk)

### Controls for daylighting and lighting

**16 January, London**  
An afternoon lecture by John Aston.  
[graham.phillips220@nitworld.com](mailto:graham.phillips220@nitworld.com)

### Part L presentation

**17 January, London**  
A Society of Light and Lighting (SLL) event with speaker Peter Raynham, immediate past-president of the SLL.  
[Ricky.barnes@whitecrofflighting.com](mailto:Ricky.barnes@whitecrofflighting.com)

### The Society of Light and Lighting Code for Lighting (2012) and the use of maintenance factors in design

**22 January, Brentwood**  
A Home Counties North East region and SLL joint event with speaker Peter Raynham, immediate past-president of the SLL and lecturer at University College London. The event will also be available as a webinar.  
[www.cibse.org/events](http://www.cibse.org/events)

### Design and innovation in ETFE foil roofs

**24 January, London**  
Society of Façade Engineering event, in association with The Institution of Structural Engineers. Lecture given by Ben Morris of Vector Foiltec UK.  
[www.cibse.org/sfe](http://www.cibse.org/sfe)

### Integrated building management systems

**30 January, Birmingham**  
A West Midlands region event, with a speaker from ADT.  
[Nigel.Marriott@gmtreble.co.uk](mailto:Nigel.Marriott@gmtreble.co.uk)

### BREEAM: Planning law and carbon reduction commitment update

**5 February, Derbyshire**  
An East Midlands region evening meeting.  
[www.cibse.org/events](http://www.cibse.org/events)

### Lighting design – why maintenance factors matter

**13 February, Birmingham**  
A West Midlands region event, with a speaker from Thorn.  
[Nigel.Marriott@gmtreble.co.uk](mailto:Nigel.Marriott@gmtreble.co.uk)

### Humidity control – solving building performance issues worldwide

**13 February, online**  
Humidity problems associated with three 'real world' building types.  
[tim@timdwyer.com](mailto:tim@timdwyer.com)

### Modern CCTV system design

**21 February, Bristol**  
The very latest developments in the security industry.  
[millham.orchard@tiscali.co.uk](mailto:millham.orchard@tiscali.co.uk)

## International Lighting Conference

12 April, Dublin



SHUTTERSTOCK / CYBERDOC

The Society of Light and Lighting (SLL) and CIBSE Ireland are staging the International Lighting Conference in Dublin.

A panel of world-renowned lighting experts and researchers will present on the day, covering a variety of topics. There will be sessions on standards, energy, quality and innovations, linked by the common thread of energy efficiency.

Papers from as far afield as Tokyo, the USA and Spain are all currently being peer reviewed, and keynote speakers already booked

include Iain Macrae, SLL president from Thorn Lighting, Dr Peter Boyce, SLL Fellow, Mike Simpson of Philips, and Peter Raynham from the Bartlett School of Graduate Studies.

The conference will take place at Croke Park, Dublin, on 12 April 2013.

There are also sponsorship opportunities available for companies.

To book a place or for further information about the conference or sponsorship, contact [kevin.kelly@dit.ie](mailto:kevin.kelly@dit.ie) or visit [www.cibseireland.org/cibse-annual-conference](http://www.cibseireland.org/cibse-annual-conference)

## CPD TRAINING

For more information visit [www.cibsetraining.co.uk](http://www.cibsetraining.co.uk) or call the events team on 020 8772 3660

### Practical project management

**15 January, London**

### Earthing and bonding systems

**15 January, London**

### Building electrics basics 1

**16 January, London**

### EPC training – two-day course

**21-22 January, London**

### Introduction to building services

**22 January, London**

### Mechanical services explained

**22 January, Birmingham**

### Building electrics basics 2

**23 January, London**

### Low and zero carbon energy technologies: undertaking feasibility studies and understanding design considerations

**23 January, London**

### SBEM training

**24 January, London**

### DEC training – two-day course

**28-29 January, London**

### Fire safety in purpose-built blocks of flats

**30 January, London**

### Energy surveys

**30 January, London**

### Introduction to legionella control

**31 January, London**

### Air conditioning basics 1

**31 January, London**

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or call 020 7324 2771

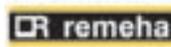


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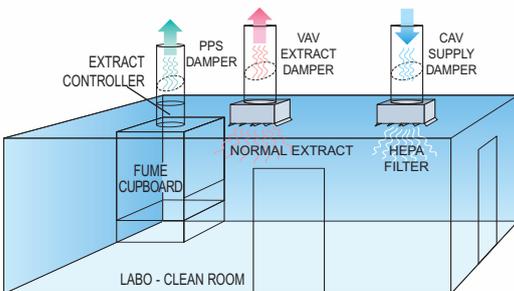


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Panel Mount Pressure or Velocity Transducers with remote alarms, analogue and digital interfaces. Traceable calibration certificates supplied as standard.

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A complete turn-key system to control room pressure to +/-1Pa. Fume cupboard face velocity to 0.5m/s at high speed and provide constant air changes into the labo - clean room.



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Accurate air flow measurement with the unique CMR Venturi built into the airtight shut-off damper to control room pressure or constant volume.

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### PPS EXTRACT DAMPER

Poly-propelene control and shut off valve incorporating the CMR Venturi Nozzle. This is essential when dealing with corrosive extract air especially from fume cupboard systems.

PPS Damper

