

CIBSE

JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

February 2013

NEW DAWN FOR DEC_s

Property sector adopts energy rating schemes as government turns its back on Display Energy Certificates



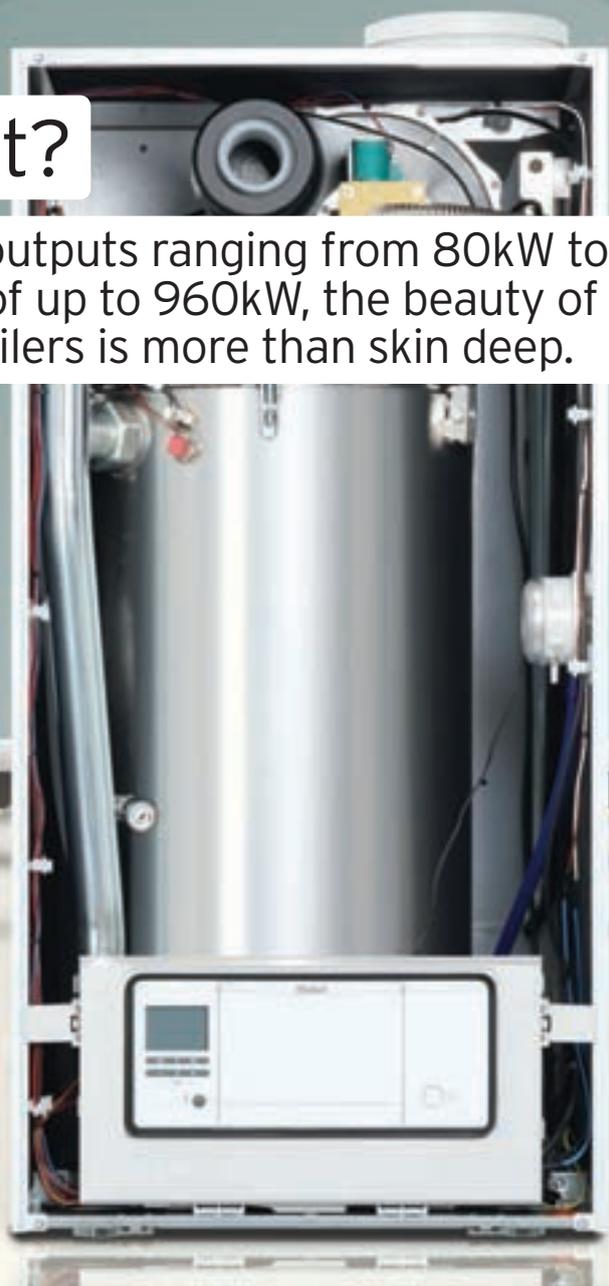
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CIBSE Journal is written and produced by CPL (Cambridge Publishers Ltd) Tel: +44 (0) 1223 477411. www.cpl.co.uk 275 Newmarket Road, Cambridge CB5 8JE.

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

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

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©CIBSE Services Ltd. ISSN 1759-846X

Subscription enquiries

If you are not a CIBSE member but would like to receive CIBSE Journal, subscribe now! Costs are £80 (UK) and £100 (international). For subscription enquiries, and any change of address information, please contact Nicola Hurley at nhurley@cibse.org or telephone +44 (0)20 8772 3697. Individual copies are also available at a cost of £7 per copy plus postage.

The 2013 US annual subscription price is £100. Airfreight and mailing in the US by Air Business, C/O Worldnet Shipping NY Inc, C/O Air Business Ltd / 155-11 46th Street, Jamaica, New York, NY 11434. Periodical postage pending at Jamaica NY 11431. US Postmaster: Send address changes to CIBSE Journal, C/O Air Business Ltd / 155-11 46th Street, Jamaica, New York, NY 11434.

Cover: shutterstock.com



ABC audited circulation:
18,454 January to
December 2011



Measure of profit

Nothing should be off the table in negotiating a new EU treaty for Britain, proclaimed David Cameron in his recent speech on holding a referendum on Europe.

Negotiations will include environmental legislation, which David Cameron said was one of those areas the government would be studying to see whether it 'helped or hampered' Britain.

One issue that will soon be under the spotlight ahead of any renegotiation is that of Display Energy Certificates for public buildings of more than 1,000m². Currently they have to be renewed every year, which would regularly alert building managers to any sharp spikes in energy use, caused either by issues with HVAC systems or changes in occupant behaviour.

The government is proposing to extend their validity to 10 years, an idea that will baffle property professionals who are increasingly using similar ratings systems to cut their energy bills for tenants by up to 60% (see page 26).

Firms such as Hammerson and British Land are using energy ratings to identify profligate energy use in their properties. Their work with tenants to help make buildings more energy efficient is leading to lower costs for tenants and better buildings for landlords.

The Climate Change Property Fund specialises in upgrading office property and uses actual energy ratings to help identify the necessary energy efficiency measures. It says these are vital in motivating tenants to help cut energy bills by up to 60%, adding that the rental value of one property increased 6% as a result.

This response from hard-nosed property people suggests that DEC's are far from the business burden that some in government believe them to be.

CIBSE and other industry bodies have called on George Osborne to improve and extend DEC's as one of five measures encouraging green growth (see page 7). Let's hope the Chancellor examines the business case for energy certificates before dismissing them as EU gold plating.

This month's case study looks at the refurbishment of Arup's Edinburgh office – a modernist 1960s building that was totally unsuited to the requirements of a 21st century office (page 32).

Arup conducted a thorough post-occupancy analysis, to validate the design, and to ensure that the naturally ventilated office offered comfort to occupants all year round, even during the snowiest of weather.

Alex Smith, editor

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NEWS

All the latest news from around the building industry

TRINITY COLLEGE GETS OK FOR SOLAR PANELS

Cambridge University has overcome protests to win permission from city planners to install solar panels as part of the refurbishment of 200-year-old New Court at Trinity College.

The Grade I listed Tudor gothic-style building will also benefit from improved insulation and a ground source heat pump in a bid to reduce carbon emissions by up to 88%.

Cambridge City Council's planning committee have backed the proposals in the face of opposition from English Heritage and other protestors, but the government will make the final decision.



BIM ALREADY CUTTING COSTS

The government claims to have saved £179m from its construction procurement programme by making better use of digital technologies and reducing waste.

Cabinet Office Parliamentary Secretary Chloe Smith said: 'We are taking great strides to make government construction faster, cheaper and more innovative.'

She added that Building Information Modelling (BIM) was already starting to play a role in cutting procurement costs and announced the formation of the BIM 2050 Group aimed at young engineers.

DEC AND EPC CHANGES NOW IN FORCE

New requirements for Display Energy Certificates (DECs) and Energy Performance Certificates (EPCs) came into force on 9 January under changes to the Energy Performance of Buildings Directive.

They include the extension of current requirements for DECs to public buildings above 500m² – previously only buildings larger than 1,000m² were required to display their energy ratings.

Osborne letter calls for smarter regulation

● Industry leaders call for more incentives for green growth

A number of industry bodies, including CIBSE and the Building & Engineering Services Association (B&ES), have sent George Osborne an open letter demonstrating a 'remarkable degree of consensus' over the issues surrounding the potential for 'green growth'.

A letter signed by senior figures within the organisations makes the case for 'smarter regulation' that would drive commercial growth, including:

- Better incentives for the Green Deal
- Reinstatement of consequential improvements
- Ringfenced funding for refurbishing public buildings
- Improving and extending use of Display Energy Certificates
- A commitment for all new homes and non-domestic

buildings to be zero carbon from 2016 and 2019 respectively

The coalition of professional and trade organisations was brought together by the UK Green Building Council (UK-GBC) and the letter was timed to complement the Green for Growth campaign, launched by *Building* magazine and backed by the Confederation of British Industry (CBI) and UK-GBC.

It stated that the organisations had come together 'to demonstrate the remarkable degree of consensus that exists across our industry on the potential for "green growth", which we believe would be instrumental in stimulating economic activity, creating jobs and strengthening our international competitiveness'.

It acknowledged that the industry itself would have to 'take the lead on delivery', but pointed out that there were some things only the

government could do 'to address clear and persistent market failures and create a level playing field'.

CIBSE chief executive Stephen Matthews said more measures were needed to stimulate growth in the built environment: 'There seems to be this misconception that "being green" is a barrier to achieving this growth. It's a dangerous misconception,' he said.

'Instead of spending our cash importing energy, we need to reduce energy demand. We can then spend the money we save on materials and labour for energy efficiency, creating jobs and keeping the money and the benefits within our economy.

'And if we do not need the energy, we do not need to generate it, cutting the bill for new power stations to something more affordable than the estimated £110bn,' added Matthews.

Complying with legislation not enough, say young engineers

● Engineers need to demonstrate sustainability

Engineers need to show more ambition and stop passing the buck to the government, according to former CIBSE ASHRAE Graduate of the Year Angela Malynn.

'I have a real problem with people saying the government should do this and should do that. The government can't install anything,' she said. 'We are engineers and it is up to us to show them the answers and demonstrate how to deliver sustainable buildings.'

Malynn, who is a mechanical engineer at Arup, was chairing a debate about the meaning of sustainability hosted by the Rumford Club and featuring the current Graduate of the Year, Lee Tabis, alongside several former award finalists.

Tabis said that too many



Former Graduate of the Year, Angela Malynn

designers were simply complying with legislation rather than seeking true sustainability. He also lamented the fact that few engineers were influencing how their systems performed.

'We need to encourage contractors to look for simple solutions and make our systems easy to operate,' the NG Bailey engineer added.

Arup's Georgina Donnelly condemned the limitations of 'ticking boxes' to satisfy legislation

and assessment exercises. She urged engineers to be more flexible and consider sustainability from a wider perspective, including waste management and water efficiency.

More focus on occupants and what the building is intended to do would help, according to Calfordseaden's Chris Marien, the runner up in this year's Graduate Award.

'We have been forced to reassess our approach because the financial incentives, like Feed-in Tariffs, don't prioritise supplying energy efficiently. We also need to question the credibility of EPCs and ask who is actually winning – because often it isn't the occupant,' said Marien. 'Engineers need to design for people not other engineers.'

He added that measurable outcomes were crucial. 'We often assume things are happening in buildings because we designed them to, but they are not measured.'

Copper ban throws legionella control into chaos

A ban on a popular water treatment biocide has thrown legionella protection strategies into confusion.

Following the Health & Safety Executive (HSE) decision to prohibit the use of elemental copper in building water systems, thousands of property managers are being forced to carry out reviews of their legionella policies.

The ban, which is part of the EU Biocidal Products Directive, came into effect on February 1 making it illegal to sell or use water treatment systems that use elemental copper for adding copper ions to water.

The HSE said it was working to secure an 'essential use derogation' for use of copper in some legionella control systems in the UK. In the meantime, its inspectors will 'take a sensible and proportionate approach to enforcement' if they continue to encounter copper in systems as their main concern is that legionella control systems are not compromised, while end users look for alternatives.

'HSE's primary concern is that legionella control is not compromised,' a statement said. 'Businesses and organisations have a responsibility to manage the risks from legionella, and it is essential that these duties continue to be met.'

Visit the biocides helpdesk at: www.hse.gov.uk for further guidance.

Hansford launches construction strategy

Peter Hansford, the government's new chief construction adviser, has given several hints about the likely content of the new industrial strategy for construction, which is due to be published this summer.

It will seek to increase the exporting of UK technology and expertise, as well as encouraging British firms to deliver more overseas contracts. He has noted that British contractors are not major international players, and is looking to address criticism that previous strategies have focused heavily on domestic growth.

The government feels there is excess capacity in the domestic market following a 9% drop in output during 2012.

Building Information Modelling (BIM) is expected to remain a key plank of the strategy as Hansford looks to improve procurement processes and integration in the supply chain. He has already moved to join up more relevant government departments by forming a joint steering committee to manage the Treasury's Infrastructure UK department and the team inside BIS that looks after the Government Construction Strategy.

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Pickles' Part L changes face judicial review

● ACE challenges decision to remove 'consequential improvements' from Part L

The Association for the Conservation of Energy (ACE) has called for a judicial review of the decision made by Communities Secretary Eric Pickles to remove 'consequential improvements' from the new Part L of the Building Regulations.

ACE director Andrew Warren responded furiously to the dropping of a measure that he said had widespread public and industry support, and the government's own impact assessment suggested was worth some £11bn to the economy.

'A judicial review is appropriate if a minister is known to have acted irrationally, disregarding the facts placed before them in a consultation, which they initiated. This is particularly so if they fail to explain why they have opted to reject the weight

of evidence before them,' Warren stated.

Consequential improvements would have required anyone extending their property to spend up to a further 10% of the cost on improving the overall energy efficiency of the original building. This was given added weight as the extra cost could have been raised by the property owner through the Green Deal.

Pickles sanctioned a public consultation early last year, which appeared to garner a good level of support for the measure. However, in December he announced that the idea had been scrapped.

According to ACE, this was despite four out of five people who responded to the consultation specifically supporting the concept; and the government's own figures showing that consequential improvements would have benefited the economy by more than £10bn.

Warren says that two million fewer homes will take up the Green Deal as a result of Pickles' decision.

Bluewater seeks to cut energy bill in half



Work has begun to cut the £1.4m annual energy bill at the giant retail park Bluewater by 50%, and to deliver lessons for this energy intensive sector.

The country's 40 largest retail centres are thought to consume more than £40m of energy every year, and the Bluewater project is seen as a model for tackling this huge financial and carbon burden.

'These sorts of figures are typical across the retail industry,' said Mads Jensen, chief executive officer of Sefaira, whose software is being used to calculate and target energy usage at Bluewater.

Sefaira will analyse the data from the building fabric, heating and cooling systems, and lighting, along with the daylight and building controls.

'The process starts with pinpointing inefficiencies across the public areas of the centre's 1.6m square feet of floor area,' said Jensen.

'Then over the next two months we will work closely with the Bluewater team to design a programme of upgrades and improvements to unlock maximum savings at minimum cost – before sequencing these enhancements

in the most capital efficient way possible.'

Lend Lease, which manages and part owns Bluewater, said the approach may be extended to other parts of its property portfolio.

'We have worked very hard to manage energy use at our retail centres, achieving reductions of around 20%,' said Pascal Mittermaier, Lend Lease's head of sustainability for Europe, the Middle East and Africa.

'But we are reaching the limits of what traditional methods can achieve. If we want to make another major step, we need to rethink our overall approach.'

In brief

INDUSTRY HONOURS

A number of leading industry figures were recognised in the Queen's New Year's Honours List.

They include Buro Happold chief executive Paul Westbury, who receives a CBE for services to the industry; and the building operations guru William Bordass, who receives an OBE for his unstinting work with the Usable Buildings Trust to root out poor performance and improve sustainability. OBEs are awarded to Wendy Blundell of the Institution of Civil Engineers in Northern Ireland; and David Bucknall of the Royal Institution of Chartered Surveyors.

Mervyn Richards receives an OBE for his work in the area of Building Information Modelling and construction procurement.

UNITED STATES TO BE ENERGY INDEPENDENT BY 2030

The US will be able to provide 99% of its own energy needs by 2030 thanks to the emergence of shale gas, according to a report published by BP.

The *Energy Outlook 2030* report said the discoveries of new sources of shale gas would help to 'reinvigorate the US economy' over the next two decades. The US produced just 70% of its own energy in 2005. BP is also predicting a 36% increase in global energy use by 2030, along with greater exploitation of unconventional oil reserves, such as tar sands and biofuel.

Developing economies will drive consumption with non-OECD countries using 61% more fuel by 2030, compared with just a 6% increase within the OECD.

B&ES CALLS FOR GREATER INTEGRATION

Senior figures at the Building & Engineering Services Association (B&ES) have called for greater integration across the industry.

Chief executive Blane Judd told the association's annual press lunch that history was littered with examples of industries and trade bodies that had 'fallen by the wayside' after failing to adapt and embrace change.

In brief

WOOD-BURNING MARKET HEATS UP

More heating engineers are looking to add installation of wood burning appliances to their list of competencies, according to the British Flue and Chimney Manufacturers Association (BFCMA).

The association believes that increased interest in low carbon heating solutions has driven up demand for wood burning. It has responded by creating a new website (www.bfcma.co.uk) with a downloadable document giving guidance on the selection and installation on the relevant flues and chimneys.

'The regulations for wood burning and solid fuel are different to those for gas and oil appliances; as are some of the flues that can be used,' a BFCMA statement said. 'So it is important that the appropriate flue or chimney is installed.'

RENEWABLES WILL DIP SHARPLY AFTER 2020

The rate of growth in the renewable industry will slow sharply after 2020, according to new research produced by the Department of Energy and Climate Change (DECC).

It expects to see a tenfold growth in new installations between now and the end of this decade, but a slowdown thereafter, with capacity rising by just 7 gigawatts to around 42GW by 2030.

The fact that these figures come from a government department has caused consternation within the energy industry, which is calling on the coalition to demonstrate longer term political commitment to green energy sources. Many observers say it exposes the policy flaws within the government's Energy Bill, which is currently passing through Parliament.

Some existing green power plants are set to start closing in the 2020s, but according to critics, a lack of government targets for low carbon electricity sources beyond 2020 are also to blame. Renewables will account for 34% of total UK electricity generation between 2020 and 2030.

'Don't be lazy,' says passive design champion



● Debate considers passive design vs heat pumps for low carbon cooling

Sustainability is being 'commoditised' and building services design 'over-regulated', according to a leading young engineer.

Renewable design specialist Becci Taylor of Arup said it was possible to design buildings that met sustainable criteria simply by using 'a list of technologies', but asked: 'Is that building cheaper to run, and better to be in... does it delight?'

Taylor was taking part in a debate at London South Bank University, with David Butler of BRE, on whether passive design or heat pumps represented the best future for low carbon cooling. She argued that passively designed buildings provided a better experience for the occupants and that 'just because we have electricity we should not be lazy and use it as an excuse to ignore opportunities to make more pleasant spaces'.

'The existence of refrigeration technology is not an excuse to design buildings without openable windows,' added Taylor during the discussion, organised jointly by the Institute of Refrigeration and the CIBSE ASHRAE Group.

Engineers should design collaboratively so they do not have to solve problems that 'shouldn't be there in the first place', Taylor said. Building Regulations have improved design elements, but regulations cannot change the design process, she added.

'Sustainability metrics don't directly motivate holistic design... perhaps we need a BREEAM point for architects consulting the engineers before drawing anything,' said Taylor.

Butler argued that it was almost impossible to remove enough heat from urban buildings passively to make them habitable all year round. He said that once indoor temperatures rose above 28°C they started to have an impact on productivity.

He added that most of the world's economic activity took place in cities, so some form of mechanical cooling was always required. The most effective, low cost option was reversible heat pumps, he argued, adding that as much as 40% of UK office and retail floor space would be air conditioned by 2020.

'Unless we use mechanical cooling wisely, it becomes part of the problem and leads to design mistakes like glass box buildings,' admitted Butler. 'However, we have to use buildings intensively in urban areas and that means mechanical cooling is essential.'

The audience agreed that a mixture of passive design and low carbon mechanical cooling was the best outcome, although one delegate labelled passive buildings as 'too expensive to build in cities'.

Green Deal and fuel poverty get target funds

Local authorities are to share a £46m fund aimed at kick-starting 132 fuel poverty and energy efficiency projects.

The organisations were invited to bid for the money as part of a series of competitions. The Department of Energy and Climate Change (DECC) has allocated £31m to help vulnerable householders keep warm this winter and £10m to kick start the Green Deal with 'Pioneer Places' projects.

A further £5m has been set aside to help communities set up collective switching schemes – 'Cheaper Energy Together' – designed to give them access to cheaper energy tariffs.

'The projects we are funding will help people save energy and save money: helping the most vulnerable to heat their homes, getting the Green Deal market up and running, and encouraging people to switch energy suppliers to get their bills down,' said Energy Secretary Edward Davey.

'This £46m will help local councils across England upgrade inefficient heating kit, as well as creating demand for and installing insulation under the Green Deal in homes across their local areas,' he added.

'Funding will also be used to drive forward both collective purchasing and switching initiatives at a local level, helping consumers get a better deal on their energy bills. I am delighted so many organisations want to run new co-operative schemes to help people, especially the fuel poor, to get the best deals in the market.'

Meanwhile, the Green Deal Cashback Scheme is open for applications and 'energy saving has never been so attractive' according to Davey.

The more work a householder carries out, including loft insulation, solid wall insulation and new heating systems, the more cash they could receive under the scheme, which is no longer capped at £1,000.

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Three new guides revealed

● Publications cover CHP, ground source heat pumps and legionnaires' disease

Three new publications are soon to be available from the CIBSE Knowledge Portal, giving members much-needed advice on a number of important topics.

AM12: Small-scale Combined Heat and Power (CHP) (CIBSE Applications Manual 12) focuses on recent developments in the electricity generating, distribution and supply markets. These developments have allowed companies to consider developing electricity-generating plant to meet their own needs, which run in parallel with the grid system.

The manual, available now, provides guidance on the processes and advises how to assess, evaluate, design, install, operate and maintain a small-scale CHP system.

The second handbook, entitled *TM13: Minimising the risk of legionnaires' disease*, available in the next couple of months, offers the reader vital information supporting the effective management of the risks, and demonstrates how to achieve pro-active compliance.

Whether you are a facilities/premises manager, engineer, consultant or other person responsible for designing, installing, operating and maintaining building water systems, this new edition of *TM13*

is an important reference document for keeping water systems safe from the risk of Legionella bacteria.

With concerns about the control of Legionella becoming an ever more significant public health issue internationally, this publication is relevant for a readership well beyond the UK's shores.

The Institution's third manual, *TM51: Ground source heat pumps*, centres on ground source heat

pump systems, which can – if properly designed, integrated and applied – produce large-scale energy and carbon savings.

Planning requirements, such as the renewable requirement in London, and increased energy efficiency measures, such as Building Regulations Part L, have made ground source systems a key part of modern building heating and cooling solutions.

The purpose of this technical memorandum is to provide information for practitioners to enable ground source heat pumps to be properly applied, and their environmental and economic potential to be realised (available mid-February).

These publications will all be available at: www.cibseknowledgeportal.co.uk



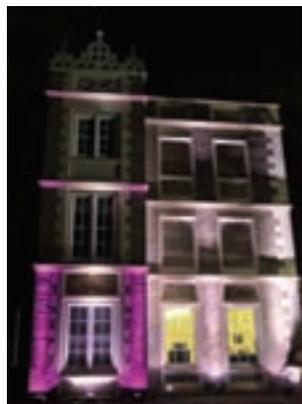
'Ground source heat pump systems can – if properly designed, integrated and applied – produce large-scale energy and carbon savings'

Ready Steady Light open for entries

Entries are now open for the Society of Light and Lighting's 2013 Ready Steady Light competition.

The event, now in its 11th year, will bring together up to 17 teams, competing to design an exterior lighting scheme in just three hours.

This year's theme is once again a 'return to basics', whereby the site should be lit in its natural state without the use of props borrowed from around the site.



The competition is always popular, so entry is restricted to one team per organisation, and teams are particularly encouraged to include first-timers to the event. Each team must be led by a Society of Light and Lighting member.

This year's event will be held on 19 March, at Rose Bruford College, Sidcup.

For more information and to send in your application, visit www.sll.org.uk

CIBSE Membership at EcoBuild

Come to the CIBSE stand during EcoBuild and meet the membership team.

CIBSE will once again be holding a membership clinic at EcoBuild from 5-7 March. The clinic is open to both members and non-members who want advice on joining, upgrading their membership, level of membership, completing their application forms, and any other general membership enquiries. Individuals can book a 20 minute slot with a membership advisor from 10:20 – 16.00 each day of the conference. To book visit: www.cibse.org/membershipclinic.

This is a great opportunity to get individual, face-to-face advice on any membership-related queries you may have.

You can find CIBSE at stand N1150, so do make sure you stop by and say hello.

New Lighting Guide LG1: The Industrial Environment

The Society of Light & Lighting (SLL) has published a new Lighting Guide *LG1: The Industrial Environment*.

The comprehensive guide provides useful information for when designing, specifying or installing industrial lighting. Ensuring the right light gets to the right place on complex production machinery is crucial, particularly to ensure safety and maximum productivity.

LG1: The Industrial Environment therefore covers one of the most important areas within the parameters of lighting design and should be a 'must have' on the bookshelves of anyone with an interest in this area.

The Guide is available from the CIBSE Knowledge Portal at www.cibseknowledgeportal.co.uk

Access to *SDAR Journal* for members

In the December edition of the *CIBSE Journal*, we published an article looking at the savings Ireland's national broadcaster (RTE) was able to make following an audit of its chilled water system. This article first appeared in the newly launched *SDAR Journal*. This is the *Journal for the Sustainable Design and applied Research in Engineering of the Built Environment*, and is jointly published by CIBSE's Republic of Ireland region and the Dublin Institute of Technology. The articles featured to date focus on Irish projects, however the outcomes may be of interest to all practicing engineers.

We would like to remind all members that you can access the *SDAR Journal* for free, at www.arrow.dit.ie/sdar

Make your views known on BIM

Building Information Modelling (BIM) looks set to continue being a focus of much discussion in 2013. NBS is conducting a national BIM survey and is inviting CIBSE members to take part. The survey aims to find out what is really happening in the industry, and how construction professionals are dealing with BIM on a day-to-day basis.

To make your views known, visit: www.thenbs.com/support/survey/bim/index.htm before 28 February. All entrants will be entered into a prize draw for an iPad2.

Diary date

Technical Symposium

● 11-12 April, Liverpool. Practices that ensure buildings realise their energy and environmental promise. groups@cibse.org

Training launched for RHI and iSBEM



PRESSMASTER / SHUTTERSTOCK

● **One-day courses in February and March**

CIBSE has announced it is now offering new one-day Renewable Heat Incentive (RHI) training and iSBEM training events.

On 10 March 2011, the government announced the details of its RHI policy to revolutionise the way heat is generated and used. In July and November 2012, proposals were set out to improve the performance of the scheme. Some of the improvements are designed to tackle the large proportion of issues encountered in RHI applications relating to the installation of heat meters.

These issues not only cause delays in the application process, resulting in later than expected RHI payments, but can also potentially require costly metering changes for the applicant.

To help both with the application process and getting the metering right, CIBSE has two courses starting this spring. They are:

- Applying for the RHI – what do you need to know? (For potential applicants and installers) 11 March, Birmingham
 - Metering requirements for RHI (for Installers and independent meter report providers) 12 March, Birmingham
- For further details of both, and

to book, visit www.cibsetraining.co.uk

Meanwhile, the Institution is offering iSBEM training to support those producing Energy Performance Certificate's (EPCs). The one-day course is aimed at engineers from a building services background who wish to understand the SBEM methodology and demonstrate competence in the use of iSBEM. The course covers software training and practical sessions.

The next training courses will take place on 14 February in Birmingham and 12 March in London.

Full details are available from www.cibsetraining.co.uk/energyassessor/isbem-training

Silver Medal awarded for services

Thomas Chan, past chairman of the CIBSE Hong Kong Branch, was presented with the CIBSE Silver Medal Award in November last year. He received the award from George Adams, president elect, at a dinner ceremony in the Royal Garden Hotel, Hong Kong. Also attending were fellow committee members from the Hong Kong Branch. Chan, being one of a number of distinguished CIBSE members in Hong Kong, was recognised for the work he's done in promoting the betterment of the region's building services engineering profession.



George Adams presents Thomas Chan with his medal



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Your letters



Our Aussie friends can teach us a lot about building performance, says Andrew Pettifer

This month: In defence of biomass, Australia leads way on operational ratings, and who says 'anyone' can be an engineer?

Good NABERS

As an expatriate living and working in Australia, I always enjoy reading the *CIBSE Journal* and catching up with what is going on back in Ol' Blighty.

In many areas of our profession, the work of CIBSE and the other related UK professional institutions and research groups are regarded as representing global best practice. Curiously though, in the area of accurately predicting and then delivering the energy performance of buildings, the UK seems to be lagging, as highlighted by Dave Cheshire (October 2012 *Journal*).

His statement that 'It is rare for designers to be asked to provide a design-stage prediction of energy performance in operation' really struck me – here it is rare that we aren't. The CIBSE team looking at developing a TM guide on this subject would do well to study the National Australian Built Environment Rating Scheme (NABERS). This is now a very mature and well-proven protocol that can

be used to accurately predict real, in-use energy performance in design. Moreover, the NABERS rating is fundamentally about the actual in-use performance, and is now enshrined in mandatory disclosure legislation, requiring that the energy performance of commercial buildings is audited and published whenever a building is to be leased or sold.

There is no question that NABERS has made a major contribution to the understanding of actual energy use in buildings, and the development of a similar approach in the UK is long overdue.

Andrew Pettifer, FCIBSE, principal, Australasia building services leader

Check your sources

I would like to respond to both the biomass article (December *Journal*, page 22) and the letter by David Elloway in the last issue. I did feel that they both painted biomass in a somewhat negative light, and yet biomass does have a bright future on the right sites with the right skills.

While it is true that the burning of wood in an unsustainable way is polluting, when biomass is sourced sustainably it is virtually carbon neutral. To get to this conclusion, one must consider that although there is a carbon cycle of 20 to 40 years for the direct up-take of the carbon emitted, the trees growing and biomass burning occur

in a continuous never-ending process, which does result in a neutral carbon result. The remaining carbon footprint of biomass arises from transport and processing – even this, when compared to oil, is lower. I would refer any who wants to know more to an excellent factsheet by the World Bioenergy Association, called: *The carbon neutrality of biomass from forests*.

Of course, there are limits to the deployment of biomass, both in terms of site suitability and in the basic resource itself. This is true of any resource, including gas and oil. However, we are nowhere near reaching global biomass capacity yet. The Department for Energy and Climate Change (DECC) judges that 40% of UK forests are unmanaged, and there are plenty of suitable sites.

The obvious conclusion is that the future will consist of a wide range of energy sources, selected for suitability of the site conditions and engineered for high efficiency.

There are pitfalls associated with designing and installing a biomass system, and the article rightly identified some of these. However, there are pitfalls with all technology; it's just that we're so used to installing gas boilers that we don't notice them! Biomass is slowly becoming more mainstream, but I would urge the employment of experts to ensure successful project delivery.

The rise of biomass has awoken interest in flues and flue design. I, too, would welcome more guidance on design and the regulations. Perhaps this is something that CIBSE could look at?
*Tim Rook CEng MCIBSE
Sustainability engineering manager*

The editor says: A new CIBSE Application Manual on Biomass Heating is scheduled for publication later this year. CIBSE is also running two training courses focusing on biomass heating, to help both designers and system operators gain background and understanding of these systems:

- *Introduction to biomass heating systems, 5 June, London*
- *Biomass heating systems operations and*

His statement that "It is rare for designers to be asked to provide a design-stage prediction of energy performance in operation" really struck me – here it is rare that we aren't



Australia's best buildings aim for 6



MANUFACTURER'S VIEWPOINT

Will you be joining the expected 60,000 visitors, 1,500 exhibitors, a clutch of the greenest celebrities and government ministers at Ecobuild this year? **Martin Fahey** of Mitsubishi Electric will be

As you sit reading this, I imagine you working out how much time you can spare for Ecobuild in March.

The show has grown from its humble beginnings and now takes over both halves of the giant exhibition space in the ExCel Centre, which last summer played host to the drama and success of the Olympics.

As well as almost 60,000 visitors and 1,500 exhibitors, Ecobuild attracts both green celebrities and government ministers.

Politicians could do worse than listen to the industry and what we collectively have to say about how we can help the country meet the stringent emissions targets that loom ever closer.

The 'ecobuild' sector has grown slowly but steadily throughout the last 10 years and, regardless of incentives or legislation, it stands ready to deliver growth and help move us towards those targets.

Added to this, we have continued uncertainty over the future of our fossil fuels – despite the apparent promise of fracking.

Even if shale gas does offer a short-term solution to the end of the North Sea supply, the country is still likely to remain a net importer, and an overreliance on gas will simply not get us anywhere near the emissions targets we are legally bound to meet.

It is worth highlighting that our demand for heat is the single biggest reason we use energy in our society, more than for transport or the generation of electricity.

Switching just 12% of this heating requirement away from fossil fuels to renewable technologies will help the country achieve around a third of the

renewable targets that simply must be met, while drastically reducing our reliance on fossil fuels.

As a manufacturer, we have seen many of our customers embrace the move to renewables. All of our corporate clients have well developed programmes to install renewable technology to help them reduce their energy bills and meet corporate social responsibility

commitments.

And we are working hard to support and help them, because it is our mission as a manufacturer of energy-consuming equipment to demonstrate sustainability in

the way we do business.

As the UK's largest 'green' show, Ecobuild offers the opportunity to see the latest technological advances in low carbon equipment and futuristic research and development that points to a brighter future.

I don't know about you, but I'm looking forward to 5, 6 and 7 March. Drop in and see me on Stand N3110 if you'd like to discuss any of the issues raised here or in any of my columns. I look forward to seeing you there!

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.



maintenance, 6 June, London
For further details of both these courses and to book visit www.cibsetraining.co.uk

Educate the (bio)masses

It is good to see some debate on renewable heat and biomass in the *CIBSE Journal*, but it is a shame the summary of CIBSE's response to the Department of Energy and Climate Change's (DECC) consultation was inaccurate: 'It warns 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 in weight and easier to match to existing heating systems.' The point is that biomass boilers *do* operate at the same temperatures as fossil fuel boilers and can therefore supply the same distribution systems.

There is real irony here, as CIBSE's actual response highlights the need to give accurate information to consumers. This lack of good information is also evident in some of the letters. I cannot hope to provide extensive responses to some of the queries raised, but hope to summarise some points.

The concept of sustainable development emerged in the

1970s, but despite the laudable aim and reams of paper, policy and legislation, there is very little evidence of *homo sapiens* actually turning the corner.

There is evidence that using biomass fuel can be sustainable but, undoubtedly, it cannot replace 100% of the current – and growing – energy demands of mankind. In the UK we have a stock of what, in energy terms, can best be described as poor quality buildings that will still require heat for the next 50+ years. Only *some* of these would be suitable for biomass heating.



So, for the UK, what level of biomass consumption is sustainable? Research by the UK government suggests at least 10 times more than we consume at present. And then we come to the electricity/heat 'choice'.

If we are going to mobilise biomass for fuel, should we use the vast majority at a conversion efficiency of, say, 30% in thermal power plants, or far less at, say, 75% efficiency in modern heat-only boilers? Let's ignore combined heat and power

From the forums

A selection of the most popular forum threads at www.cibse.org/linkedin

- If you had the chance to address a room of architects, what would you say?
- BIM models – do you keep them in a library or do you use Autodesk?
- Who, like me, thinks that biomass technology is akin to the *Emperors New Clothes* children's parable?



TCHARA / SHUTTERSTOCK

➤ (CHP) for now – I’m trying to broadly summarise.

Biomass boilers are a combustion appliance, and therefore have the same risks as other combustion appliances. This includes abuse and neglect by their owners, as well as flue emissions/pollutants and specific risks associated with getting fuel to them.

I am a strong advocate of using biomass for heating and it was I who raised the potential issue of carbon monoxide (CO) in pellet stores with the Health and Safety Executive (HSE) in 2011. I persisted with the need to air this issue until eventually we got the HSE warning. Unfortunately, the two separate risks became confused in the process – it is not the HSE’s role to give chapter and verse on why and when CO may be present in a pellet store.

De-gassing occurs early in the life of a pellet and is therefore more likely in large stores supplied with very fresh pellets. CO in small-scale heat installations occurs because of poor design, invariably due to flue gasses back-flowing, not de-gassing of the pellets.

Whether you use longhand methods, software or the Department for Environment, Food and Rural Affairs’ nomographs, the basic principles of no horizontal flue runs (certainly <1.5m), stabiliser/back-fire relief and ensuring sufficient draught according to the manufacturer’s specification will go a long way to mitigating risk.

To summarise the summary:

- Using biomass efficiently is several decades away from impinging on sustainability objectives
- All combustion appliances have risks that need managing
- The science and art of proper flue design needs professional recognition

Nick Monether, Greenfields Consulting
CIBSE Low Carbon Consultant

Clarification

Part 2.11 of CIBSE’s response was misinterpreted in the ‘How to engineer demand for renewable heat’ article. For CIBSE’s full response to the consultation, visit www.cibse.org/consultationresponses

‘Anyone’ can be an engineer

In response to the letter from P Childe (December Journal) I felt it was an insult to say all engineers are not adequate in their trade. To say that those who have years of experience cannot carry out their jobs correctly is wrong; it is consumers who are too lazy to research the trade.

My father has been an engineer for the last 30 years and has carried out his craft to perfection. As the consumer it is our responsibility to research who we invite into our homes. If we suffer

6
The science and art of proper flue design needs professional recognition

one bad experience we now have the technology to tar all those who have worked hard for the title of engineer with the same brush.

Do not insult those who have worked hard for that title and are still learning on the job to make themselves the best they can be.

Anonymous

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 any 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.

From the forums

The offshoring of consulting engineering

CIBSE LinkedIn group

Eric Maddison: Most of our food is now imported. Most of our energy is imported. We have seen a lot of our manufacturing industry off-shored and we import much of our manufactured goods. Many of our service industries, such as call centres, are now off-shored. I have recently seen a vacancy for a mechanical electrical plumbing (MEP) principal to run a consultancy in India designing UK projects. Countries such as India have the expertise and the language abilities to do this. How long will it be before the majority of our consulting engineering services are carried out overseas where the same work can be done at lower cost?

John Callaghan: Two years.

Phil Dodd: Ten years ago. I worked with a company that

sent most of its CAD work and some of its engineering work to Manilla to be done. They had a couple of CAD operators in the UK office checking and making minor corrections. It worked quite well as the engineers could finish a drawing at the end of the day, send it to Manilla and have a CAD version back on their desk the next morning. The engineering works OK, provided the overseas company understand all the UK regulations and use software that UK engineers are familiar with and can check properly. **Alistair Fisher:** Generally the quality level of off-shored deliverables has improved considerably in recent years, but schedule achievement, out-sourced staff turnover and retention is a problem. There is a very upwardly mobile, skilled engineering labour market in Mumbai, for example. Another common problem is the constructability of some black discipline designs – structural and piping. Guys who have served their time ‘on the tools’ instinctively know what can and cannot be fabricated, and what works and what doesn’t.

Such experience is very lacking in a design office comprised almost exclusively of university graduates. There’s no substitute for it and it cannot be out-sourced or off-shored. Close mentoring of the design as it matures is essential to avoid costly redesign and rework in the fab shop or (worse still) on site. (Such costs are invariably not factored into the original out-source calculations.)

Andrew McCallum: Strange dilemma this one. Most overseas clients want western engineers to oversee a job due to their experience (especially the gulf states). Then we look to offshore it back to India or the Pacific Rim. Bit of a self-fulfilling prophesy here, as the middle man will get cut out – that is, the UK engineer. With regard to design standards, a high number of UK universities are franchising their building services degree courses to places like China and Oman, so before long their graduates will be the same standard as – or better than – our own homegrown talent anyway...

● Join the debate at www.cibse.org/linkedin

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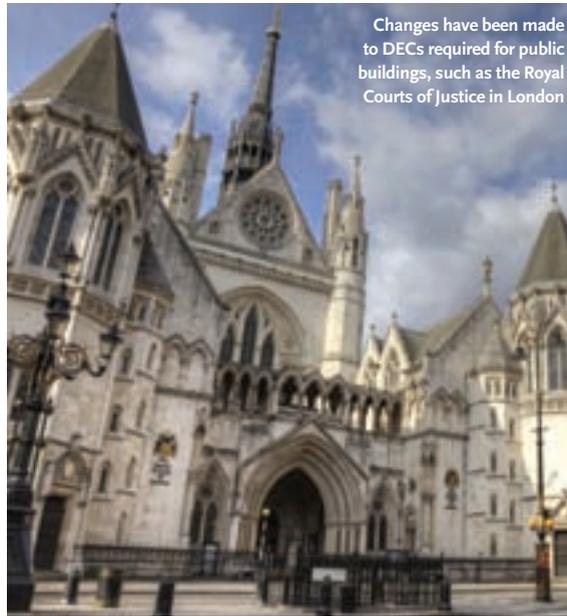
Hywel Davies explains how the recast of the Energy Performance of Buildings Directive is changing what's required from the built environment

The good news is that the original 2007 Energy Performance of Buildings Regulations and the nine different sets of amendments, together with the changes made by the government to implement the alterations required by the 2010 recast of the Energy Performance of Buildings Directive (EPBD), have all been consolidated into one set of regulations¹. These were published on 19 December 2012 and came into force on 9 January 2013. However, given that the recast was adopted shortly after the coalition government came to power in 2010, the publication of these regulations was left late, leaving those who must implement them little time to do so.

The four main changes are that:

- Property advertisements must include details of the Energy Performance Certificate (EPC) rating where available
- Display Energy Certificates (DECs) are required in public buildings more than 500 m² in size. But now DECs for buildings under 1,000 m² are valid for 10 years, instead of one
- Private sector buildings larger than 500 m² that already have an EPC, and are visited by the public, must now display that EPC
- The EPC should include a list of energy efficiency improvements that could be carried out as part of a major refurbishment, and signpost consumers to more detailed information about carrying them out

In addition, government has taken the opportunity to remove what it calls 'gold plating' of the original implementation, by extending the list of exemptions to mirror precisely all the categories in the Directive that member states are permitted to exempt. This is despite the fact that these exemptions relate to when energy efficiency improvement work might adversely affect the character or appearance of these buildings – something an EPC alone cannot do.



Changes have been made to DECs required for public buildings, such as the Royal Courts of Justice in London

PATRICK WANG / SHUTTERSTOCK

They have also removed the requirement – introduced by this government – for estate agents to attach EPCs to written property particulars. They argue that as the property advertisement must include the EPC rating, attaching the certificate is unnecessary. But, since it has to be produced, the cost of a few photocopies and staples to attach them is hardly a huge regulatory burden.

The notes that accompany the regulations state that a number of gold plated provisions have been retained, including the EPC registers, accreditation schemes and assessor accreditation, as well as the requirement for estate agents to ensure that an EPC has been commissioned – but not to ensure it is carried out! The justification for retaining these measures is that they support the Green Deal or other government policies.

One measure that is gold plated has been retained, pending further consultation about removing it. This is the annual update of DECs for public buildings that are more than 1,000 m², and we await the consultation – due 'in the new year' – with interest. CIBSE

The manner of the execution, at the last minute, with no effort to consult anyone with expertise, is a wasted opportunity to deliver lasting value to the property sector

will be responding, and members with views are welcome to send them in early.

One specific requirement of the Directive – which the government has not implemented (although it claims that it has) – is to consult stakeholders. It consulted on the draft Directive in 2009. It claims that the clear majority of the 75 respondents 'supported the government's preferred position'. And so it would have been a terrible burden to consult on the implementation of the actual adopted Directive.

CIBSE argued in its response to the review of the Building Regulations – conducted by Andrew Stunnell in 2010 – that the way to reduce the burden of handling the EPBD, and of the planned 2013 consultation on changes to the Building Regulations, was to run the two exercises in parallel, and to implement the EPBD through the Building Regulations, and not in a separate set of regulations. That fell on deaf ears.

For example, it lost the chance to hear how the present arrangements for DECs on campuses could be rationalised; how information on DECs could be improved and made more useful; and how the cost to the public sector could be cut, all in one simple measure. Plus, it ignored calls to adopt DECs in the private sector.

The consolidation of these regulations helps to bring all the requirements into one place. But the manner of the implementation, at the last minute, with no effort to consult anyone with expertise, is a wasted opportunity to deliver lasting value to the property sector, and a wasted chance to make our buildings more energy efficient.

References

¹ The Energy Performance of Buildings (England and Wales) Regulations 2012, SI 3118, December 2012.

● **HYWEL DAVIES** is technical director of CIBSE www.cibse.org

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DYNAMIC MODELLING



BIM2050 is an up-and-coming new group of young BIM specialists who will help implement the Level 3 agenda, says CIBSE's group representative **Neil Thompson**

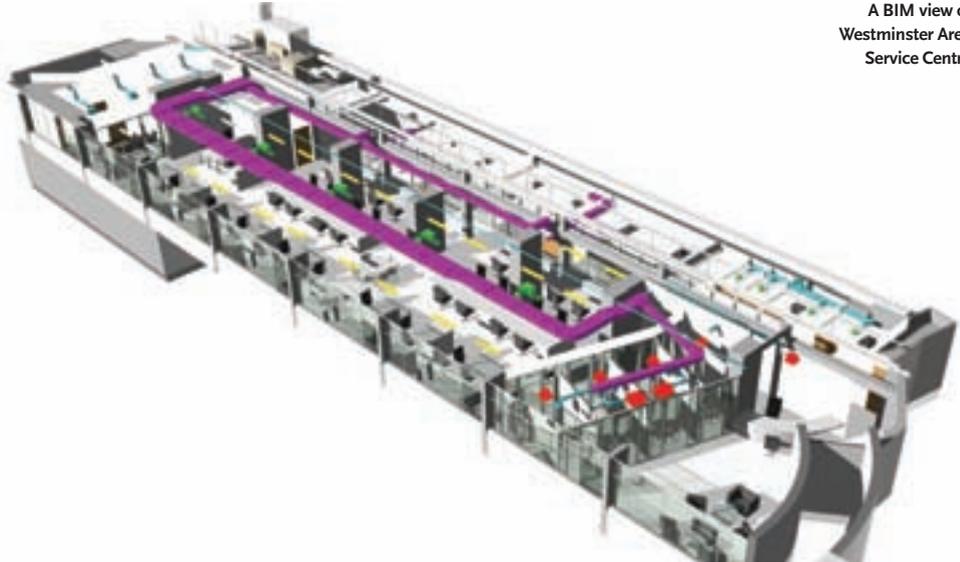
As the adoption and implementation of building information modelling (BIM) continues to accelerate globally, it is vital that the UK stays at the forefront of this race for industry reform. This was the message from the new chief construction advisor, Peter Hansford, at the launch of the BIM2050 Group last week.

I am excited and honoured to be a part of the BIM2050 group. We aim to be an influential collection of knowledgeable and enthusiastic professionals who will hopefully drive the industry forward. The group's membership has a wide selection of disciplines and my position in the group is to represent CIBSE. I hope to emphasise the importance of building services and environmental design in the built environment looking ahead to 2050.

The group, formed via the Construction Industry Council, is made up of 18 young professionals representing institutes from across the entire asset life-cycle. According to David Philp, chairman of the group and head of BIM implementation at the Cabinet Office, the group is seeking to develop 'a culture that enables a digitally integrated approach to positively impact our built environment'.

It will help predict trends in BIM maturity as, ultimately, we move on from Level 2. We are looking to plot a route map, which will enable others to shape the opportunity and, indeed, avoid the risks. Philp believes the Group will be extremely influential and will help the BIM Task Group shape the Level 3 agenda.

There are many contrasting predictions of what may be in store for us in 2050 but, regardless of the outcome, BIM will play an important part in how we solve the environmental problems leading up to 2050. Many people overlook the connections



A BIM view of Westminster Area Service Centre

COURTESY OF DAVID MILLER ARCHITECTS

Building services engineers, especially young ones, must embrace BIM

between sustainability and BIM. The ultimate aim of BIM is to deliver and operate assets in the most efficient way. This is not only financial efficiency, it also includes the efficient performance of the materials and maintainable components.

Young professionals entering the industry today will be in influential posts by 2050. They will be in a position to steer the industry through a time of critical population levels. They will be instrumental in figuring out how we enable our planet to sustain and house the population – not forgetting the impacts of climate change!

The BIM2050 group wants to shape the future of the industry and make a start on producing the stepping stones that the next generation of construction industry leaders need to steer our built environment effectively and successfully through the challenges. We feel that our predecessors have failed to provide a sustainable structure for how we do business and deliver projects.

We are not discarding the achievements of the UK construction industry to date. We appreciate that it has delivered world-class projects throughout its history, and industry

is starting to head in a positive direction but, on average, we are still underperforming.

The BIM2050 group has invited members of CIBSE to come forward to help improve the reputation of our industry and make it the industry of choice for future talent.

We recognise the good work that the CIBSE Young Engineers Network has done on the awareness of environmental engineering in schools and colleges, and I will continue to work with them. We also aim to widen the network of our discipline to introduce interdisciplinary collaboration and to break down the silo thinking that plagues our industry.

Building services engineers, especially young ones, must embrace BIM. It will form a significant part of their future roles and will encourage engineers to make better quality decisions by reducing the amount of time wasted on the administration of project information. This will give more time for creative thought and producing better engineering outcomes.

● **NEIL THOMPSON** is the principal BIM integrator at Balfour Beatty

Future features in CIBSE Journal

March 2013	Air Conditioning
April 2013	Water Heating Data Centres
May 2013	Air Conditioning, Air Movement & Ventilation
June 2013	Chillers BIM Supplement*
July 2013	Air Conditioning Car Park Ventilation Fire & Smoke Design/Management
August 2013	Heat Pumps Healthcare

* = Supplements

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THE HEAT IS ON



Kate de Selincourt (left) and **Sofie Pelsmakers** argue that biomass might just be the biggest ‘sustainable’ elephant in the room

The article, ‘Burning issues’, in *CIBSE Journal* December 2012, highlights several design issues associated with the specification of biomass plant. The article also makes it clear that the main drive for installing biomass boilers is because of biofuel’s supposed ability to provide low-carbon heat. However, the notion that biomass is automatically low carbon is increasingly being challenged. So, a fundamental question is whether we should be heating our buildings with biomass at all?

Biomass produces very large quantities of CO₂ per unit of energy when burned – more than gas or oil² – and any notion that the fuel is low carbon depends entirely on re-uptake of CO₂ through subsequent biomass growth. But the long delay before this happens, and the immediate reduction in growth when trees are felled, means a large and long lasting pulse of CO₂ is emitted for each kWh of biomass heat produced.

The Department of Energy and Climate Change (DECC) itself has admitted that, because of this, using whole trees to fuel production of heat or electricity is a higher carbon option than leaving the trees to grow and producing the energy by burning fossil fuels. This is true for at least 100 years after the energy is produced, and DECC concluded: ‘The use of harvested wood from UK managed forests exclusively for bioenergy (replacing fossil fuels) has higher relative greenhouse gas (GHG) emissions than leaving the trees unharvested in the forest. This means... there is not a strong case to produce bioenergy in this way³.’

While DECC suggests that ‘such a scenario is very unlikely in the UK’, it is already happening. For example, in Ayrshire, pellets are made from entire logs⁴, while overseas pellet



Think passive before biomass: Oakmeadow Primary School achieved Passivhaus certification

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Should we be heating our buildings with biomass at all?

producers also use the entire harvest⁵. Additionally, When a biomass boiler is specified, attention tends to be diverted from a building’s fabric efficiency, because of the belief that ‘the heat is all zero carbon anyway’. The unintended result is that actual emissions are the same as – or higher than – a conventional building, when they could have been reduced⁶. Of course, if, as reported by CIBSE, boilers are frequently operating well below optimum efficiency, emissions will be higher still.

Given that a biomass boiler is usually the most economical option to meet the ‘low carbon’ or renewables targets set by the planning authority, biomass boilers are routinely specified. Yet, increased fabric efficiency – instead of money spent on biomass boilers – leads to genuine CO₂ reductions, lower energy costs and better energy security over a building’s lifetime.

What is really highlighted here is the lost opportunity to deliver better buildings on the same budget. Yet prioritising fabric efficiency over renewable generation is not in accordance with much planning policy – nor has it historically been incentivised by government – a dual scenario that leads to a misplaced focus on the role of on-site energy supply, and to inappropriate strategies.

Processing and transporting

biomass further increases its environmental impact and CO₂ emissions, and importing it from abroad raises additional ethical issues where tropical rainforest or agricultural land has been cleared for fuel crops to heat our buildings.

All evidence suggests it is unwise to believe that biomass could – or should – play any role in the UK’s carbon reduction efforts. To suggest otherwise is misleading and will increase CO₂ emissions. Focusing on efficient building design, and locking CO₂ in trees or in timber building materials for decades (and even centuries), is by far the most robust low-carbon strategy.

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● **KATE DE SELINCOURT** is a writer and editor. **SOFIE PELSMAKERS** is an architect and doctoral researcher at the UCL Energy Institute.

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5 St Philips Place improved its DEC rating from a G to C

LIFE AFTER DECS

The government regards DECs as an irritant from Brussels, but UK property firms are using operational ratings to cut carbon and increase the value of portfolios, reports **Alex Smith**

The final nail in the coffin' for display energy certificates (DECs) was how one energy consultant described recent changes to energy performance regulations.

Having abandoned mandatory commercial DECs in the 2011 Energy Bill, the government has done the bare minimum to implement the recast Energy Performance of Buildings Directive (EPBD), simply requiring public display of energy certificates for smaller public buildings.

But while the UK government may be dismissive of DECs, other countries – including Australia and the United States – are introducing mandatory operational ratings in both commercial and public buildings, in a bid to cut energy use.

In the UK, far-sighted property firms, disappointed by the government's failure to back mandatory ratings, are using their own

rating systems to incentivise energy efficiency measures and make properties more attractive to tenants. Despite the government's negative stance, it appears there is life after DECs.

DECs display actual energy use in buildings, and the idea is that building owners will carry out the energy reduction measures recommended in the advisory reports compiled alongside DECs.

The latest blow to mandatory DECs came with updates in the Energy Performance of Buildings (EPB) regulations, outlining how the government will implement the recast EPBD.

Under the recast, the UK had to regulate for buildings 'frequently visited by the public' with a floor area between 500m² and 999m² and require them to display DECs from 9 January 2013. The EPB regulations put this into law but, rather than requiring DECs to be renewed annually, as they are for buildings of more than 1,000m², it stated that DECs would be valid for 10 years, meaning actual energy ratings could soon be out of date.

'It's desperately disappointing,' says CIBSE technical director Hywel Davies. 'Government has missed a golden opportunity to improve

energy performance and reduce public sector energy bills.’

Davies says the changes are a recipe for confusion, as DEC’s for buildings visited by the public that are more than 1,000m² still have to have annual DEC’s. And the advisory report, which gives cost effective advice to improving the building, will be valid for 10 years for public buildings between 500 and 999m², but only seven years for those of more than 1,000m².

The updated regulations also state that Energy Performance Certificates (EPC’s) – which are theoretical energy ratings used when buildings are built, sold or rented – must now be displayed in private sector buildings of more than 500m² that are ‘frequently visited by the public’, but only if the building already has an EPC issued at the time of construction, rent or sale.

For all the Department for Communities and Local Government (DCLG) claims to have removed gold plating, Davies says that the requirement to display an EPC and not a DEC is just that. The Directive requires these buildings to display ‘an energy certificate’ – that means an EPC or DEC. ‘It will be interesting to see if any of the major property portfolios decide to display DEC’s in direct compliance with the Directive, which under EU law they are allowed to do,’ says Davies.

‘The potential for confusion is deeply concerning,’ says energy consultant David Strong. ‘Government has signalled a lack of ambition to introduce simpler drivers for energy saving measures.’

Phil Jones, energy consultant at Building Energy Solutions, says it shows how little priority the government gives to the ‘measure and manage’ approach. ‘Government sees DEC’s as a burden on business. I see it as reducing business costs, improving profits and generating jobs in fixing bad buildings,’ he says.

The government doesn’t deny the accusations – in fact, it’s positively bullish. In the foreword to new guidance on DEC’s¹, it accuses previous Labour policies of ‘gold plating’ measures when it implemented the EPBD in 2008. It says it has changed the regulation to remove an unnecessary burden on business and will now meet only the minimum requirements of the EU edict.

The move comes on the back of the government’s decision to drop DEC’s for commercial buildings from the 2011 Energy Bill, despite support from leading property firms and the British Property Federation.

‘It’s hugely disappointing,’ says Strong. ‘The government produced a proportional scheme that could be used as a fiscal mechanism to



help improve buildings’ energy efficiency, but the Treasury dropped it at the 11th hour.’

If government is suspicious of DEC’s, property firms are increasingly seeing their benefit. Tim Mockett, joint managing director at the Climate Change Property Fund (CCPF), says use of DEC’s in its property at 5 St Philips Place, Birmingham, contributed towards a 55% saving in tenant energy bills over four years.

‘DEC’s are credible and based on real data, rather than theoretical information. It’s a great motivator and driver and enables you to share improvements,’ he says.

CCPF reduced the DEC from a G to a C through the installation of LED lights, and modification of air conditioning and metering. The display of half-hourly readings for electricity, gas, water and carbon on a television monitor in the lobby helped focus the behaviour of occupiers, adds Mockett.

CCPF set up a green lease with the tenant, requiring them to invest in smart metering, controls, and light reconfiguration. It demonstrates payback of only three years by quantifying the benefits using the CIBSE TM22 energy assessment tool. ‘The benefits for us are a happy tenant, who in turn benefits from the majority of energy savings. They will be encouraged to stay with us for a long time and renew the lease,’ says Mockett.

CCPF is applying the lessons learnt in Birmingham, where it has a single tenant, to the multi-tenanted 77 Gracechurch Street in London. Quarterly meetings are arranged with all tenants to share best practice, says Mockett. ‘It can get quite competitive.’

Having cut energy by 60% since purchasing the building in 2009, CCPF asked a valuer to compare the rental value of 77 Gracechurch with a similar building and found its value was 6% higher.

British Land (BL) provides its own version of a DEC in the form of a twice-yearly building energy report. This separates energy and waste

DEC’s are credible and based on real data, rather than theoretical information. It’s a great motivator and enables you to share improvements’
Tim Mockett



77 Gracechurch Street has saved 60% in energy bills since 2009

by landlord and tenant, and provides details of water usage for the whole building. Justin Snoxall, head of BL's business group, says the reports and engagement with tenants is helping to cut energy use by huge amounts across its portfolio.

'We review energy ratings regularly with each tenant, and see who is not achieving reductions. It's becoming self-fulfilling. They come to us to see what they could be doing to reduce energy use,' says Snoxall.

From 2009 to 2012, BL cut landlord-influenced energy by 27% across its portfolio, enabling it to cut tenant bills by £3.3m. It is aiming for a 40% reduction by 2015.

Paul Edwards, head of sustainability at property firm Hammerson, is also supportive of DECs. 'They are a common language by which people can make decisions, whether they are tenants, investors or landlords.'

Edwards says Hammerson is considering performance-based contracts to ensure actual energy use mirrors theoretical performance at design stage. 'If we link energy performance certificates with DECs, we can put performance contracts in place,' he says.

Edwards is chairman of the Better Building

The Manhattan project

New York leads the way when it comes to mandatory energy ratings in the US. In 2009, Mayor Michael Bloomberg announced plans for mandatory benchmarking for private buildings more than 50,000 ft² (4645 m²) and public buildings, more than 10,000 ft² (929 m²). The policy is central to NYC plans for reducing CO₂ by 30% by 2030.

As part of the NYC's Green Greater Buildings Plan (GGBP), buildings are graded using the government-backed energy performance rating system, Energy Star. Building managers file details of energy and water use in the Energy Star Portfolio Manager and this is kept on record at the NYC Department of Finance. A building will receive an Energy Star if it is in the top quartile of energy performers for its building type.

Andrew Burr, director of building energy performance policy at building performance consultant IMT, says New York and other US cities use Energy Star because it is established and, more importantly, free to use. But Robert Cohen, technical director at energy consultant Verco, says the rating has its drawback. 'Only the top quartile get an Energy Star so it's relative, not absolute. You could be rewarding the equivalent of an E-rated building if every other one is an F.'

To identify measures that improve



SONGQUAN DENG / SHUTTERSTOCK

performance, mandatory reports based on energy audits will be rolled out from 2013. The reports must be carried out by approved energy auditors such as ASHRAE. Valid for 10 years, they include the commissioning of HVAC systems in existing buildings.

Last autumn, NYC published a benchmarking report² for private buildings and then revealed the Green Star ratings of office buildings. There were some surprises: 7 World Trade Center has a gold LEED rating, but narrowly missed a Green Star with a score of 74, while '30s architectural icons, the Chrysler Building and Empire State Building, achieved scores of 84 and 80. Burr says disclosure is the first step towards identifying the energy use in buildings and understanding the measures needed to improve energy efficiency.

Tenanted spaces aren't measured separately, so landlords cannot determine the tenant's share of energy use. America has yet to adopt asset rating tools such as EPCs, which enable energy managers to assess fabric and systems.

Early adopters, such as New York and San Francisco, are inspiring other cities to look at mandatory ratings. 'Cities are focused on economic development, and anything that provides jobs, reduces carbon emissions and cuts energy costs will be welcome,' says Burr.

He adds that the momentum is coming from local businesses calling on councils to help drive the energy improvement market and create jobs. This explains why Minneapolis, a conservative city in middle America, is set to adopt operational ratings in the coming weeks.



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LEAD SUPPORTERS



6 Benchmarking will be the catalyst for improved behaviour. A comparative measure will incentivise companies to improve energy performance
Justin Snoxall

Property with high ratings in Australia can see a 6% uplift in asset value



GEORGE PHOTOGRAPHY / SHUTTERSTOCK

Energy down under

The Better Building Performance Landlord Energy Rating system is based on the National Australian Built Environmental Ratings Scheme (NABERS), which rates buildings according to actual performance using energy data. The system takes account of how well the building is designed and managed, and rates buildings from zero (poor) to six stars. NABERS is available for offices, hotels, housing and retail.

NABERS, first launched as the Australian Building Greenhouse Rating (ABGR) in 1998, became mandatory for government agency office buildings measuring more than 2,000 m² in 2006. In that year, Green Lease Schedules were created to commit building owners and tenants to make improvements in energy efficiency.

Due to the huge number of government buildings, the scheme gained traction and, in 2010, NABERS was made mandatory for commercial buildings of more than 2,000 m². They are valid for 12 months and must be

disclosed on a publicly accessible register.

‘One of the biggest driving factors for the significant improvements witnessed in Australia is the part played by the government as an occupier,’ says Keith Bugden, executive programme director of the Better Buildings Partnership. ‘By stipulating that they will not occupy any building that has a lower than 4.5-star NABERS energy rating, they have forced landlords to improve both their stock and their management practices.’

NABERS can be awarded for the tenanted spaces and central services, as well as the whole building and central services. This means energy use can be separated for landlords and tenants, enabling building owners to target energy performance for tenants.

The first major study on NABERS³ reveals a positive impact on property values, vacancy rates and yield, while economist Professor Neil Fox says offices with 4.5 stars or more enhances asset value by 6%.

► Partnership (BBP), which is currently working on a new rating system for landlords and tenants based on the DEC’s methodology.

‘We all want a mandatory system in the UK, but we’re going to implement a voluntary system anyway to iron out the bugs,’ he adds.

This voluntary Landlord Energy Rating (LER) will be based on the National Australian Built Environmental Ratings Scheme (NABERS) system, which has transformed the multi-let office market there (see box, left). It accounts separately for occupier energy use – small power and lighting – and for the energy landlords supply for common parts, such as lobbies and lifts, and shared services – heating, ventilating and air conditioning systems.

‘This provides a far greater level of understanding of how energy is used and supplied between owner and occupier,’ says Keith Bugden, executive programme director of the BBP. ‘It will enable occupiers to compare buildings they are interested in and see how efficiently they are operated.’

British Land is closely involved with the LER and Snoxall says it will provide vital benchmarking data that will show comparative performance between lettings. ‘Benchmarking will be the catalyst for improved behaviour,’ says Snoxall. ‘A comparative measure will incentivise companies to improve energy performance.’

BBP asked Verco and the Usable Buildings Trust to study NABERS and help establish a specification and benchmarking method. LER is expected to be available later this year.

CIBSE is among many organisations calling for the government to improve and extend DEC’s (see page 7). The DCLG appears to be intent on eroding DEC’s. The only buildings that require an annually updated DEC are public buildings of more than 1,000m², but the government has now announced that this ‘gold plated’ measure will be consulted on to see whether it will remain.

The government’s attitude will not deter the commercial sector, while it sees DEC’s saving energy and increasing the value of its portfolio. ‘Building owners understand the benefits of DEC’s, and these are hard-nosed business people who have got shareholders to keep happy,’ says Davies. **CJ**

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COLD REMEDY

The renewal of Arup's Edinburgh office meant upgrading a listed 1960s building with an energy-efficient design that met the firm's 21st century requirements.

A post-occupancy evaluation proved that the occupants were working in a comfortable environment whatever the season



Arup's Edinburgh office is a 1960s modernist masterpiece designed by the renowned Arup Associates architect Peter Foggo. The single-storey Scotstoun House was designed to maximise natural daylight and ventilation, as well as give occupants a strong sense of health and wellbeing.

In October 2005, Historic Scotland awarded the office a Grade B listing, which recognised the importance of the building, but also provided Arup with significant challenges when it came to extending it and upgrading the energy performance and usability of the existing structure.

By the early 2000s, the original building, designed to house 60 occupants, was now accommodating 100 staff, which had started to put a strain on the existing design. Architects HAA Design were engaged to work on the redevelopment of Scotstoun House, while all structural, sustainability and other engineering design elements were carried out by Arup.

The Grade B listing introduced major challenges with regard to achieving

the desired BREEAM (Building Research Establishment Environmental Assessment Method) Excellent rating, and the development therefore became a detailed balance between preserving the qualities of Scotstoun House and meeting the needs of a 21st century office building.

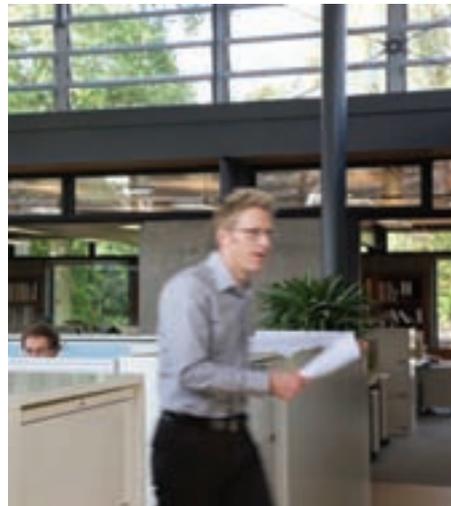
This involved maximising the space in the original building and complementing it with an extension containing support functions. The link between old and new created a useful intermediate zone for break out, group working and informal interaction.

To assess the success of the project, Arup undertook a post-occupancy evaluation (POE) using the Building Use Studies (BUS) method to obtain occupant feedback (see box, page 33). Through metering, it also compared actual energy consumption with modelling predictions.

The main principles of the development lay in opening up the

“The new design was required to show innovation, creativity and technical excellence





SCOTSTOUN HOUSE FACTFILE

Arup first began to practise in Edinburgh in 1960. The late Peter Foggo, of Arup Associates, was commissioned to design a new purpose-built office for Arup in South Queensferry, 8km west of Edinburgh. This original building, designed in 1964/65, was a very elegant single storey pavilion building, set within the walled garden of a previously demolished country house in the grounds of a 2.43ha estate.

The modernist principles of 'light and air' were key aspects of the original design, maximising natural daylighting and natural ventilation, as well as creating a visual link between the office areas and the surrounding landscape and gardens. The main purpose of these modernist design principles was to create a building that would allow for occupants to work in an environment with a strong sense of health and wellbeing.

Foggo formed Foggo Associates in 1989, going on to design the first four phases of Broadgate in London and 123 Buckingham Palace Road, the commercial offices adjacent to Victoria station.

➤ original space, converting the open courtyard, which it formerly enclosed for more offices, and extending along the eastern boundary of the walled garden that lies to the north.

This east-facing new-build component houses a new main entrance and reception area, meeting rooms, toilets, print room and staff area. The original stable blocks to the north beyond the walled garden were converted into mechanical and electrical plant space, facilities for staff showers, an independent remote conference room and a new cycle shed to store up to 20 bicycles.

The structure

The original building comprised timber joists, boarding and roofing felt, all supported on steel universal beams spanning between precast concrete wall units. The roof overhangs the external walls to provide a cut-off from solar glare.

The northern half of the new extension utilised the original east-facing stone garden wall, which required underpinning for stability and support. New precast concrete columns support glulam beams connected back onto it.

In the southern part of the new extension, structural steel links onto the original overhanging steel beams give a rim band of glazing between the new extension and the existing structure. The overhead glazing allows natural light into the informal seating area below.

The new design was required to show innovation, creativity and technical excellence. The main project objective was to create a world-class environment for employees and visitors, combined with an energy efficient, sustainable design.

To achieve this, the project team took a hierarchical approach. First, the building form was optimised so that, by considering building massing, orientation, and envelope performance, it was possible to enable a highly energy-efficient building. Only once the building performance was optimised were the specific low energy systems selected.

Natural ventilation and light

Dynamic thermal analysis was used to design the building as fully naturally ventilated. The original office was 2.4 m deep, and great care had to be taken to control air movements through the redeveloped building. This was achieved by building an atrium pod in place of the courtyard, which draws air from the perimeter through the offices in a controlled manner. The natural ventilation strategy was also tested, using bulk airflow calculations for various wind directions, to ensure that the passive approach would operate correctly throughout the year. The scheme is further enhanced by the use of phase change thermal mass incorporated in the ceiling.

Rising energy costs, coupled with the requirement to reduce carbon footprints, make the need for feasible and effective ways to introduce natural light into buildings greater than ever. The existing offices in the deep plan building at Scotstoun House presented considerable challenges to maximising natural light. This was remedied in the redevelopment by incorporating sun pipes throughout.

The 90 sun pipes form a zero energy light source, which is of particular use in the winter months when there is less daylight from the external glazing.

The planning constraints required that the building achieve a BREEAM Very Good rating, and again this goal was exceeded by the project being certified as BREEAM Excellent. It was required that a minimum of 15% reduction in carbon emissions by the systems serving the building be provided by low-to-zero carbon (LZC) technology. This planning condition was achieved through the use of a biomass boiler. ➤



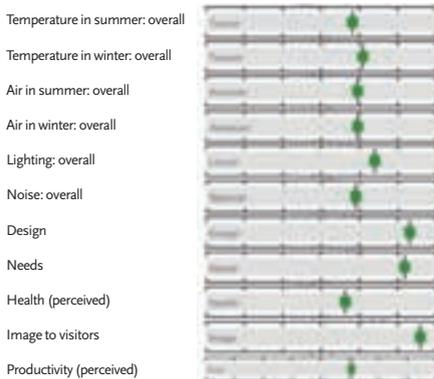
Post-occupancy evaluation

As well as energy consumption and carbon performance ratings, it is becoming increasingly important to understand how satisfied people are with the building they work in, given the growing pressure on businesses to reduce space, increase productivity and use less energy.

As a part of the POE undertaken by Arup, the Building Use Studies (BUS) analysis method was used to obtain occupant feedback.

The BUS analysis method is a quick and thorough way of obtaining high-level feedback data on building performance from the occupants of that building. Twelve key summary variables are considered, including scores for comfort, noise and lighting, through to design, needs and image.

In the 'slider' graphics included (below and adjacent) the building scored highly in all aspects of the assessment, such as temperature, air quality, lighting, noise and design. The occupants reported a perceived increase in productivity and healthy environment.



The building was assessed and compared to other similar buildings. Scotstoun House was assessed against 60 other buildings as a part of the assessment. The graphic below benchmarks Scotstoun House against the comparison buildings for comfort; Scotstoun House is placed very high against the comparison buildings.

In addition to the BUS, Arup undertook POE of many aspects of the design. The intention was to validate the original analysis and to review lessons learned. This has included daylight performance and internal thermal environment.

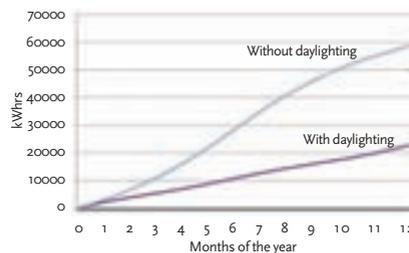
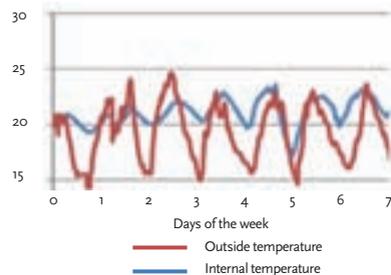
Actual daylight levels were measured and compared with the daylight modelling results. The measured average daylight factor of 6.3 compared favourably with the modelling results of 6.6.

As a part of the monitoring, actual energy consumption was measured for the artificial lighting and compared with the modelling predictions. Again, the comparison was favourable and has demonstrated that the solar tubes are delivering a 60% reduction in energy consumption

for artificial lighting. The results are included in the graph below.

Scotstoun House has temperature monitoring sensors throughout its occupied spaces. The control system also includes a weather station. Data has been continuously collected from these sensors and assisted in the seasonal commissioning for the building to optimise temperature control. Below are extracts from the monitoring.

During July 2010, the external temperature peaked each day in the range 23°C to 25°C, which represented design summer conditions. The internal temperature was in the range 20°C to 23°C and regularly less than the peak external temperature. The thermal mass provided by the phase change board in the ceiling, coupled with the night-time cooling control, is effectively maintaining a comfortable environment in the building.



The design team has built on the simplicity of Peter Foggo's original design and has created an elegant refurbishment, which still adheres to the modernist principles of 'light and air'





The redevelopment has achieved an Energy Performance Certificate A rating, a significant achievement for a 1960s Grade B listed building

Low carbon architecture

The team took a holistic design approach, integrating the architecture, building services and structural engineering. The end result is an exemplary sustainable and low energy environment, which uses passive design techniques and renewables.

A low carbon design was a key aspect of the brief. As already noted, the project is extensively daylit and uses natural ventilation throughout the occupied spaces, thereby negating the need for mechanical cooling.

Comprehensive integrated control was required, and the chosen system successfully integrates the control of the electrical and mechanical services, with comprehensive monitoring and metering. As an example, the gas and water meters are monitored, the latter enabling any leaks in the buried distribution mains to be identified.

The lighting system's electricity consumption is also extensively metered, and the data from this helps to optimise the lighting control, which in turn assists in maximising the performance of the daylighting strategy. The internal and external environments are comprehensively monitored for temperature, relative humidity, CO₂, and

light levels. The system includes a weather station, the output of which has been used to validate the original modelling of daylighting against measured values.

Making the grade

The redevelopment has achieved an Energy Performance Certificate A rating, a significant achievement for a 1960s Grade B listed building. Even with the restrictions imposed by the listing, the permitted U-values of the building elements are significantly better than required by the UK Building Regulations. For example, the U-value of the glazing is 1.6.

Optimisation of thermal comfort is in part achieved by the use of the phase change thermal mass that is incorporated into the ceiling construction. Solar-powered 'windcatchers' have been provided for the natural ventilation of internal meeting rooms.

The design team has built on the simplicity of Peter Foggo's original design and has created an elegant refurbishment, which still adheres to the modernist principles of 'light and air'. What's more, the POE reveals that, despite the challenges, the occupants are comfortable and impacts on the environment are minimised. **CJ**

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Imtech Aqua was named Contractor of the Year at the 2012 Building Performance Awards for masterminding a complex £4.4m building services programme for a three-storey build in the heart of Cambridge.

A collaborative approach to M&E in the design and build contract proved key to the success of the project. The design consultant Cunnington Clark was novated by the main contractor to the design and build

contractor Imtech. By working closely with the designer Imtech carried out value engineering without compromising the key elements of Cunnington Clark's building services strategy.

The Lord Ashcroft building at Anglia Ruskin University was a redevelopment following the demolition of the central structure in a three-building campus – during the build the campus had to remain in operation, with no disruption to the education of 6,000 students.

The new 7,679m² building is home to the International Business School and consists of classrooms, breakout rooms, offices and lecture theatres, including an auditorium with seating for 400. >

DESIGN & BUILD RELATIONSHIPS

An innovative approach to collaboration by 2012 Contractor of the Year Imtech meant Anglia Ruskin University's building was built on time and with passive elements intact, reports Ewen Rose

FACTFILE: IMTECH AQUA

Cambridgeshire-based Imtech Aqua is part of Royal Imtech NV, which employs 27,400 employees worldwide and has an annual turnover of €5.1bn. It celebrated its 150th anniversary in 2010 and last year was granted the right to use the 'royal' designation by the Queen of Holland.

Formerly called the Aqua Group, Imtech Aqua is a multi-disciplinary building services provider. It consists of a building services contracting arm; a controls company that delivers BEMS and structured cabling solutions; and a maintenance division.

Primarily passive

The building is primarily passively cooled and ventilated, although close-control air conditioning is used in the IT suites, and involves widespread use of chilled beams. There is a CHP engine in the ground floor plant room and solar photovoltaic (PV) panels provide 10% of the building's electricity load.

Initially, Imtech Aqua was engaged as the design and build contractor working to main contractor VolkerFitzpatrick. Part of the tender selection process was to provide innovative value engineering options without compromising the final built environment or quality expected by the university – Imtech Aqua made a saving of £400,000-worth of costs without compromising the programme.

However, things got even more interesting when it was mooted that the design consultant Cunnington Clark, who had been novated to the main contractor, should instead work directly to Imtech Aqua because of the innovative nature of the M&E package. It was an unusual arrangement.

'I'm sure there was plenty of early apprehension on the part of Cunnington Clark,' says Wardley. 'However, it was this alliance between designer and contractor that

became pivotal to the success of the whole project.'

Cunnington Clark was persuaded to switch to Imtech from Stage D of the design right through to Stage F, despite the initial misgivings of director Andrew Cunnington about the impact on his practice's concept design. 'It would be fair to say we approached this relationship with a degree of trepidation,' he says. 'We had developed an ambitious concept for the building services and our concern was that many of the key components would not survive the value engineering phase and we would have little authority to protect them. We have historically found design and build procurement to be a largely confrontational process.'

In the end, he found the opposite to be true on this project. He saw that the relationship, not only protected the energy efficiency elements of the design, but ensured they were 'progressed jointly into more rounded solutions'. Cunnington added that he would recommend this 'co-operative, collaborative' approach as a welcome procurement model 'for any project in the future'.

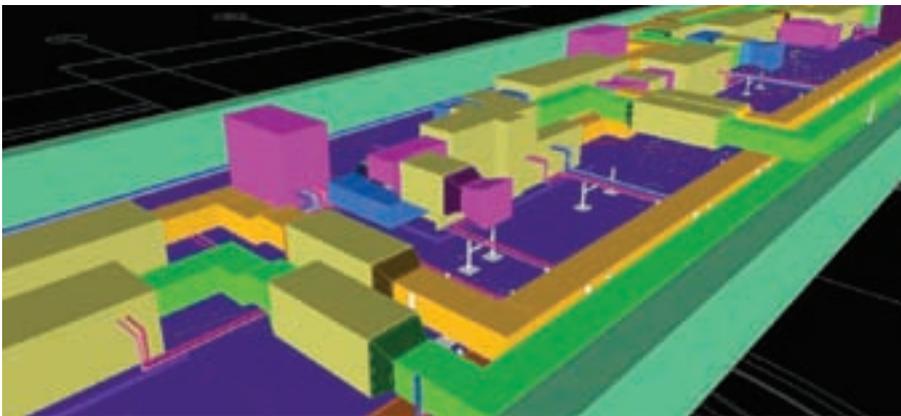
3D cooperation

Personal relationships were key, but there was also a technological element. Planning was completely collaborative and the Imtech team, led by contracts director Paul Carless, shared its programme aspirations with the designers, who were involved via a 3D co-ordination model that flagged up detailed technical issues from the outset. They also used a 'traffic light' system to inform the value engineering. 'Red' designated elements of the design that Cunnington Clark would fight to hold onto – 'green' could be changed and 'amber' was up for discussion.

One example was the chilled beam system, which was part of the initial specification. Switching to a different supplier would have produced a major cost saving, but Cunnington Clark felt the originally selected manufacturer would give better performance and held firm. However, some compromises were reached on the lighting specifications, without reducing the lux targets required for teaching and learning purposes.

Imtech Aqua took another unusual decision to base themselves in the same site offices as the Volker Fitzpatrick team three months before the project started on site. This turned out to be both a sensible logistical decision, as well as key to establishing the positive working relationship. It increased face-to-face contact and speeded up decision making – so any differences in opinion were rare and problems

The extra dimension



The 3D model identified potential 'pinch points' in the co-ordination of the builders' works and this proved critical, due to the fact that penetrations into the concrete structure had to be carefully planned with exposed surfaces an important element of the passive cooling design.

'The model also flagged up some issues with the floor voids and the difficulty of siting certain equipment,' says project manager Dan Wardley-Smith.

'So, because we had very detailed 3D images to show the remainder of the construction team, we could approach achieving a solution in a very positive way. Often consultants will try to cling onto their original concepts, but in this case we got

to the point where we were regularly exchanging ideas and solutions that were both technically and aesthetically in keeping with the client's expectations and budget.'

This was demonstrated during the construction of the 400-seater lecture theatre where ventilation and service points for each small cluster of seats required three air handling units to be manoeuvred into the confined space beneath the theatre floor. This turned out to be a considerable challenge that was only overcome by very careful planning and sequencing of the works, which was achieved by virtue of having 3D drawings identifying the co-ordination required, so it could be planned before the works started.

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PREFAB PIPES

There was a noticeable spirit of 'can do' on the project, which proved extremely valuable when the schedule started to slip due to hold ups with the shell construction. Imtech suggested fabricating three plant rooms and the roof pipework offsite at its own premises in nearby Swavesey to claw back some time. This also meant that the ground floor area set aside for the plant room could remain open for use as a materials delivery point and lorry access to the site for longer, further improving the workflow.

The fact that they had been using detailed 3D drawings through the project meant it was relatively straightforward to switch to offsite fabrication.

'Our philosophy now is that you need to have a reason NOT to do prefab,' says contracts director Paul Carless. 'We were able to considerably reduce on-site time and minimise hot works on site. Our 3D model was also able to prove the solution before installation, which gave everyone confidence in this approach.'

6 The fact that they had been using detailed 3D drawings through the project meant it was relatively straightforward to switch to offsite fabrication

► were solved because the team was solution driven.

Building trust

Again the fully integrated planning model used by Imtech meant they could more easily co-ordinate the programme and workflow with their main contractor colleagues.

'You can't do this on every project because it comes down to the personalities involved,' says project manager Dan Wardley-Smith. 'We'd like to do it more, though – it makes life so much easier for everyone.'

Wardley-Smith also completely reworked his programme in collaboration with his opposite number at VolkerFitzpatrick and managed to claw back three months by re-sequencing events and the overall critical path of works.

'Volker asked if we could speed things up for them and when you are in a positive relationship you will look to do what you can. So, the two of us took ourselves away for a few days and went through everything in detail,' says Wardley-Smith. 'Trust is a big issue in our industry. If you are going to work in collaboration you have to accept that people will make mistakes. Rather than trying to turn that to your advantage you work for the common good and get the project back on track.'

At the same time, the team also took the decision to switch from standard pipework to a carbon steel press fit system, which not only cut the fitting time in half, but also improved safety. 'Press fit pipework enabled us to complete a floor in four weeks rather than the standard eight,' adds Wardley-Smith. 'We now try to use it on every project, but some clients still resist despite the manufacturers offering 25-year warranties.'

The revised work schedule meant the team could start putting services into the floor voids

before fitting the flooring. This saved waiting until the building was watertight and, as it transpired, the glazing contractor got into financial difficulties so the team would have had to wait even longer.

Soft landings

All parties signed up to using the BSRIA roles and responsibilities of design and engineering format, which was extended through the defects liability stage and on into 'soft landings', although the latter was not a formal agreement. 'The client did consider a formal soft landings process, but realised they didn't need it,' says Wardley-Smith. 'We already offer a 12-month free maintenance service and tend to work on past handover as a matter of course to minimise defects!'

Another challenge was to integrate the new BeMS control systems with the campus-wide BeMS already in use and so Imtech provided a data point next to the existing head end with the appropriate software written in-house.

This was helpful for the university's FM team who were already regularly involved in the project simply due to the fact they were on site running the other two buildings. The FM team also provided feedback on material and equipment choice from its 'users' perspective via regular feedback meetings.

It is clear the relationships up and down the supply chain worked well on this project, but nobody was naive enough to assume that the financial side would be radically different as a result. Avoiding the likely delay was a good outcome for everyone, particularly the client, but Imtech still had to wait in line to receive its full payment after final accounts were presented.

'Money is always going to be an issue – that will never change,' says Wardley. 'However, if you have a good relationship then you know you will be paid in the end and people will be fair.'

'Being part of a big organisation can give some clients the perception that we can afford to wait for our money, but we have the same demands to pay our overheads, labour, suppliers and subcontractors – we have the same cash flow issues as any other business.'

Wardley is doubtful that any of the plans for modernising cash flow in the construction industry will materialise in the short term.

So some things may never change, but achieving better co-operation and co-ordination between contractor, consultant, main contractor and client is clearly possible, as the Anglia Ruskin project demonstrated – and that model has positive outcomes for all. CJ

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DISTANCE

The correct absorption distance is essential for a humidifier to function effectively and to avoid dripping ductwork, explains **Andie Chessun**, group chair of FETA's HEVAC humidity group



f the many factors that need to be considered in the design and installation of a building or factory humidification system, one of the most important is humidifier absorption distance.

With the correct absorption distance, mist or steam introduced to the airstream by a humidifier can be evaporated, or mixed sufficiently, to prevent water droplets precipitating or water vapour condensing at obstructions, where the airflow is more turbulent, such as dampers, turning vanes, attenuators or filters.

The wrong absorption distance, however, will lead to incomplete absorption. Not only will this lead to poor humidification control but incomplete absorption can result in ductwork becoming wet, which could lead to it rusting or even to water dripping from ducts into occupied rooms or industrial spaces. Worse, wet surfaces are susceptible to mould and microbial growth, which could affect occupants' health or result in contamination of

industrial processes. With a basic understanding of the factors that affect absorption, however, it is possible to enjoy all of the benefits of humidification without the need to worry about wet ductwork.

Humidity is fundamental to ensuring a comfortable, healthy environment in which people can live and work. Correct levels of humidity improve occupancy comfort, reduce static electricity and provide the optimum environment for material handling and industrial processes. Humidification is about increasing the amount of water vapour in the air – see box: *four reasons why humidity control is important*. As a general rule, the humidification load is the amount of moisture required to treat outside – or make-up – air supplied to a space.

There are two main types of humidifier: steam (isothermal) and cold water humidifiers (adiabatic). A kilogram of water needs about 2500kJ of energy to change to vapour; this change of phase can occur either isothermally or adiabatically. An isothermal humidification system uses heat from

ANNOUNCE

LEARNING

an external source such as electricity or natural gas to convert water to steam, which is injected into the air stream; an adiabatic system works by dispersing a mist of fine cold water droplets or aerosol into the air stream; it uses heat from the surrounding air to convert this mist into vapour. For this reason, when specifying an adiabatic unit, designers should take extra care to ensure sufficient heat is available in the airstream to vaporise the water spray being added. Droplet separators or eliminator plates should be fitted beyond the absorption distance to remove any stray droplets.

Regardless of the type of humidifier, there are many elements that need to be considered in the humidification system's design.

The amount of moisture air can hold is related to its dry-bulb temperature. An increase in dry-bulb temperature will lead to a corresponding increase in the air's ability to hold water vapour. The air is saturated when no more water vapour can be added to the air. Generally, the more vapour that needs to be added to the air the higher its temperature will

need to be and the longer absorption distance required.

Absorption distance is defined as the dimension from the point where moisture is discharged from the humidifier lance or nozzle to the point at which wetting will not occur. Beyond this distance, obstructions will remain dry unless they are cooler than the airstream such as in a cooling coil, for example.

The absorption distance required for a particular installation is dependent on many variables. The temperature of the airstream will affect the absorption distance, because cool air absorbs less moisture than warm air and therefore requires a longer distance for absorption. Smaller sized water droplets are absorbed more quickly; steam droplets are the smallest, mist droplets from adiabatic humidifiers are larger. The temperature difference between the water droplets and the air stream will also impact absorption distance.

The speed of the air stream also has an impact on absorption distance. The faster the airstream the greater the distance covered before full evaporation can

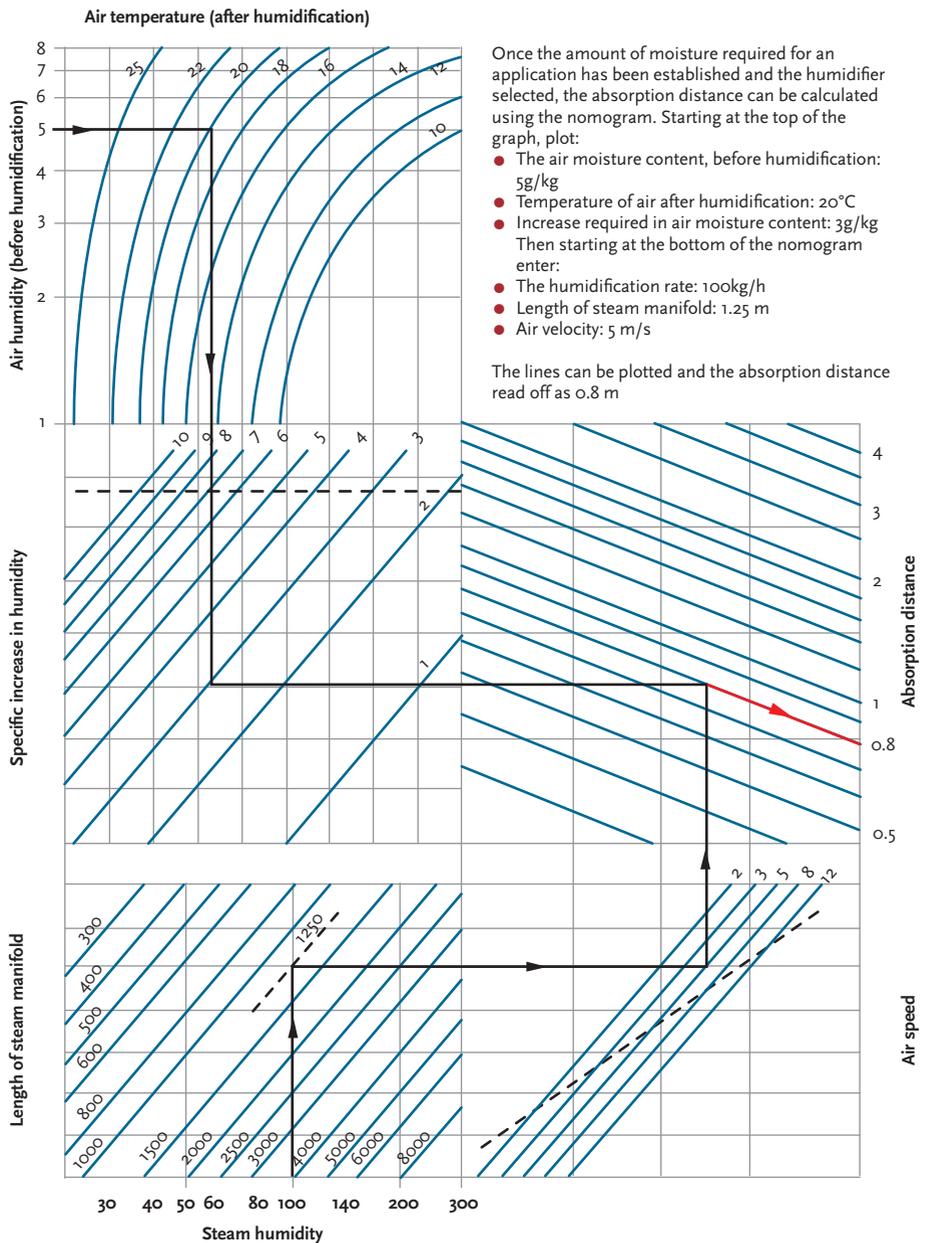
6 Designers should ensure airflow is even across the humidifier, otherwise this can affect the air's ability to mix the droplets or vapour

Hygromatik's Vortex Steam module, which can be placed in front of a steam manifold to spin the air to help it mix



Too often absorption distances are compromised by contractors installing a humidifier where it is easiest to fit, rather than in its optimum location

Example of absorption distance nomogram for a steam humidifier



occur. Increasing the number of humidifier injection nozzles and/or lances ensures maximum moisture dispersion into the airflow to help shorten the absorption distance.

Where space in an air-handling unit is limited, a simple device such as Hygromatik's Vortex Steam module can be placed in front of a steam manifold to spin the air; this will help it mix with the steam to shorten absorption distances by up to 50%. For optimum humidifier performance, designers should ensure airflow is even across the humidifier, otherwise this can affect the air's ability to mix the droplets or vapour.

Humidifier manufacturers supply data on recommended absorption distances.

Specifiers can get accurate data using an absorption distance calculator, which are generally available on manufacturers' websites. Absorption distances can also be derived using an absorption distance nomogram. Figure 1 is an example of the nomogram used by HygroMatik (www.hygromatik.com) to calculate the absorption distance for a specific steam humidifier.

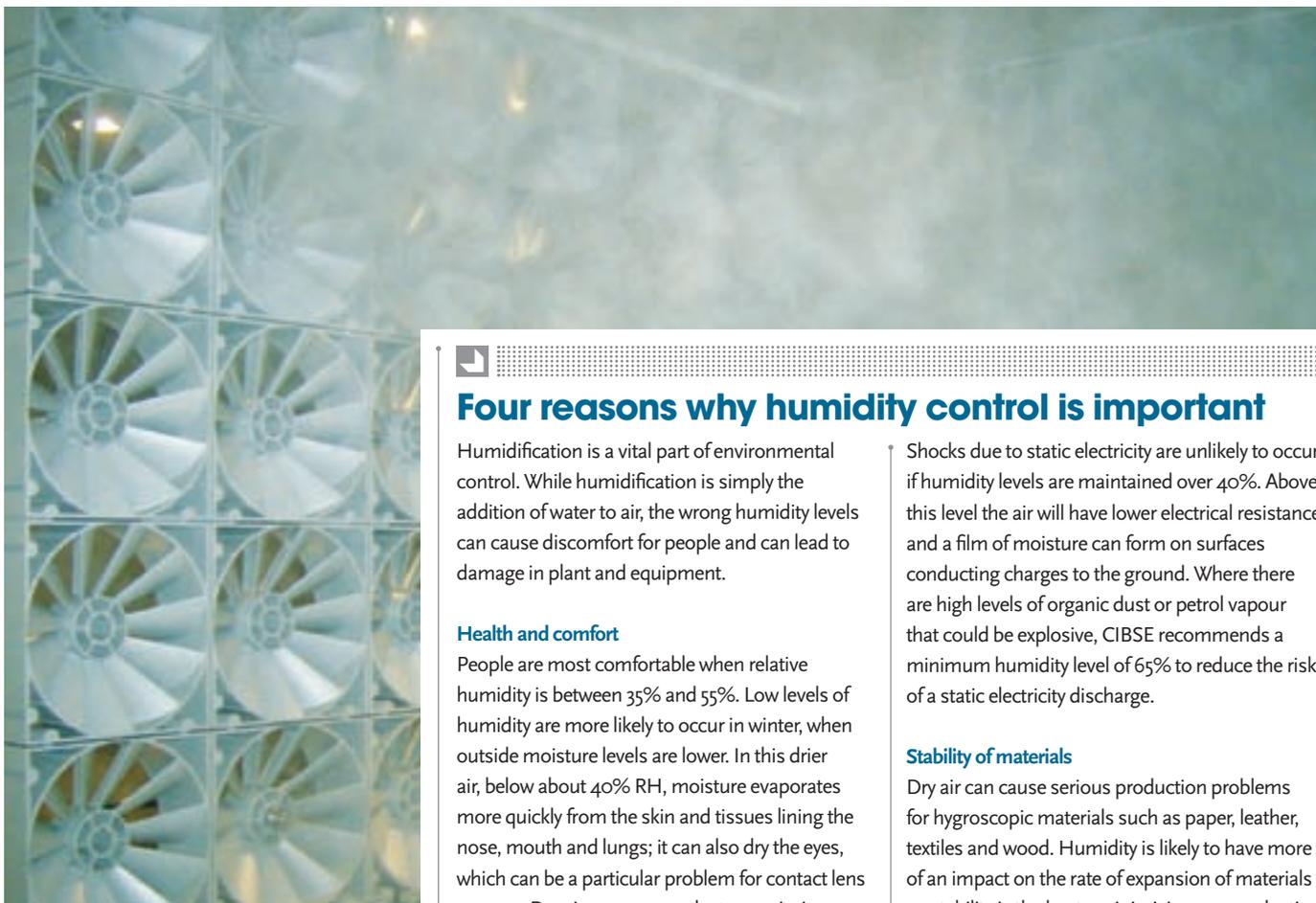
The new CIBSE Knowledge Series publication, *KS19: Humidification (2012)* (to which the HVAC humidity group contributed) also covers this aspect on pages 31-33. Once the absorption distance is known, the location of the humidifier can be determined based on the system.

Of course, all of this work will count for



KS19: Humidification (2012)

The new CIBSE Knowledge Series publication, *KS19: Humidification (2012)* is available from the CIBSE Knowledge Portal at www.cibseknowledgeportal.co.uk



Four reasons why humidity control is important

Humidification is a vital part of environmental control. While humidification is simply the addition of water to air, the wrong humidity levels can cause discomfort for people and can lead to damage in plant and equipment.

Health and comfort

People are most comfortable when relative humidity is between 35% and 55%. Low levels of humidity are more likely to occur in winter, when outside moisture levels are lower. In this drier air, below about 40% RH, moisture evaporates more quickly from the skin and tissues lining the nose, mouth and lungs; it can also dry the eyes, which can be a particular problem for contact lens wearers. Dry air encourages the transmission of airborne viruses through the evaporation of droplets released by people coughing and sneezing. Conversely, high levels of humidity above 70% can lead to the growth of mould. According to the CIBSE Knowledge Series publication, *KS19*, CIBSE recommend maintaining a normal maximum of 60% for air-conditioned spaces.

Controlling static electricity

Voltages accumulate on surfaces so that when a surface at a higher voltage approaches one at the lower voltage, a discharge occurs. Voltage spikes can be particularly damaging to the electronic chips at the heart of most electronic devices.

Shocks due to static electricity are unlikely to occur if humidity levels are maintained over 40%. Above this level the air will have lower electrical resistance and a film of moisture can form on surfaces conducting charges to the ground. Where there are high levels of organic dust or petrol vapour that could be explosive, CIBSE recommends a minimum humidity level of 65% to reduce the risk of a static electricity discharge.

Stability of materials

Dry air can cause serious production problems for hygroscopic materials such as paper, leather, textiles and wood. Humidity is likely to have more of an impact on the rate of expansion of materials so stability is the key to minimising any production problems. However, if humidity levels are too high, the hygroscopic nature of these materials makes them susceptible to mould. Impermeable materials such as metals benefit from low levels of humidity.

Food storage

Humidity is critical for food storage in maintaining freshness and to minimise product weight loss. Refrigerating food will cause it to lose a significant amount of moisture, unless high levels of humidity are maintained. If humidification is used in conjunction with effective defrosting systems, the problem of icing up will be minimised.

➤ nothing if the humidifier is incorrectly installed on site. Too often absorption distances are compromised by contractors installing a humidifier where it is easiest to fit, rather than placing it in its optimum location. However, with the system designed correctly and the humidifier properly installed, a comfortable, healthy, humidified environment awaits. **CJ**

ANDIE CHESUN is national sales manager at HygroMatik, which is a member of the HEVAC Humidity Group. The group is committed to the correct provision of humidification across all applications. Visit: www.feta.co.uk/humidity for more details.

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FLOWING HOT & COLD

Many building managers would agree that the symptoms of indoor climate problems most often surface as complaints from tenants. Living or working spaces are too cold in winter, too hot in summer or a combination of both extremes. **David L Hudson**, senior product engineer at Victaulic, explains how circuit balancing can help minimise the gripes

All too frequently, 'fixes' to heating, ventilating and air conditioning (HVAC) systems prove both costly and ineffective. Costs may include the installation of larger pumps, the resizing of components, the changing of night-setback and morning startup times, and flow adjustments in mains, branch lines and circuits. For example, the resetting of a workplace HVAC system startup time from 7.30am to 5.30am leads to a plant operating at capacity two additional hours per day.

This equates to a 25% increase in energy consumption, cancelling any energy savings that night setbacks are designed to achieve.

Additional consequences include increased wear on pumps and HVAC components, and reduced control-valve authority.

Indoor temperature and climate problems are not typically caused by control malfunctions or sizing errors. Often, they can be traced to incorrect flow rates attributable to improper terminal-unit balancing. Engineers normally design HVAC systems with excess capacity in mind, so that the ability to provide necessary heating or cooling energy is present. Transferring that energy to terminal units and air-handling units (AHUs) is the challenge. Therefore, the key to HVAC-system effectiveness and efficiency is properly controlled flows from production and delivery units to terminals.

Balancing flow for comfort and control

Balancing valves maintain flow conditions so that control valves can function properly, providing correct flows to the heat transfer coils, which results in the correct output of energy to a space.



For every single degree temperature above 20°C, there is an 8% increase in heating costs

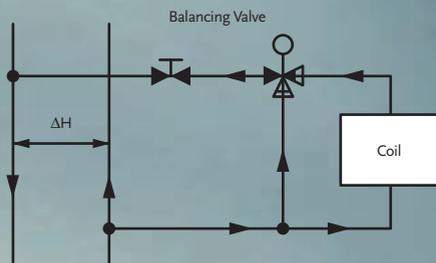


Figure 1: Coil-CW/HW schematic drawing

HVAC system flows are dynamic, changing throughout a typical 24-hour period. Because of heat gain from the sun and changes in building occupancy, the demand for heating and cooling varies, not only throughout the day and night, but also by building sector. An effective and efficient HVAC system must provide correct energy output when and where required, and proper hydronic balancing is the key to proper performance in the most cost-effective way.

Circuit balancing is essential to ensuring that heating and chilled-water systems deliver correct flows to all terminal units in an HVAC circuit. In an unbalanced system, sectors of a building have underflow or overflow conditions that impact control-valve authority and, therefore, indoor climate. For instance, areas closest to an energy production and delivery source could receive excess flow, resulting in excessive heating or cooling. On the other hand, areas furthest from an energy production and delivery source could receive insufficient flow, causing inadequate heating or cooling.

For every single degree temperature above 20°C there is an 8% increase in heating costs, while each and every degree of cooling below 23°C adds 15% to costs.

By properly applying circuit balancing techniques to each balancing valve it is possible to achieve proper balance throughout a system, so that all circuits receive specified design flows for optimal performance. When pumps, chillers and other components operate at the lowest possible load, owners benefit from less wear and tear, longer equipment life and lower energy and maintenance costs.

Isolating system trouble spots

An improperly adjusted balancing valve, clogged strainer/coil or other system issue that changes the specified flow rate through a coil or air handling unit (AHU), typically causes insufficient or excessive heating or cooling. Diagnostic analysis can be performed readily by checking the rate of flow through a balancing valve. Moreover, issues can be identified during building commissioning and before tenant move-in.

In addition to providing a comprehensive record of specified and actual flows, circuit balancing helps simplify the setup and monitoring of control equipment. This reduces capital costs, as well as the time needed for commissioning.

Conclusion

Far too many buildings are plagued by temperature variations that can lead to tenant complaints, high energy consumption and increased operating expenses. In most cases, these faults can be easily resolved through proper balancing of the heating or cooling system in conformance with original design performance specifications.

In addition to ensuring occupant comfort and minimising energy and operating costs, effective circuit balancing can help determine the causes of improper heating and cooling. Therefore, a comprehensive circuit balancing programme should be integrated into any commissioning to save time and energy and to improve the long-term value of the building.

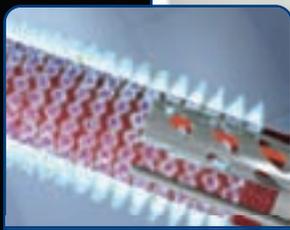
DAVID L HUDSON is a senior product engineer for Victaulic. He is a practising mechanical engineer with more than 26 years of experience.

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CORROSION GUIDANCE IN THE PIPELINE

Failure of pipework in heating and cooling systems can result in expensive remedial work. New guides and standards should help to reduce the risk of corrosion in closed water systems, says **Reginald Brown**

“If a pipe fails due to corrosion, then the cost of damage to the building and remedial work to preclude further failures can be enormous

For building services engineers, water is both a required service for an occupied building and an efficient and virtually free medium for heat transfer.

Unfortunately, mains water, which contains dissolved oxygen, is also potentially corrosive to metals in the pipework system and the plant it passes through. If a pipe fails due to corrosion, then the cost of damage to the building and remedial work to preclude further failures can be enormous.

In principle, it should be possible to select a set of non-corrodible materials and use untreated water as the heat transfer medium, without any additional measures to avoid corrosion. In small and simple systems this may be a feasible approach, though we should also consider other possible issues, such as biofouling.

In larger and more complex systems, construction using wholly non-corrodible or corrosion resistant materials may be impractical or simply too expensive. Generally, there will be some corrodible material within the system and it will be necessary to manage the corrosion risk for that material.

There are several implications of using corrodible materials within a closed heating or cooling system:

- The corrosion process will begin as soon as the material is wetted, usually at the pipework pressure testing stage
- The period between initial wetting and commissioning should be kept as short as possible as the system cannot be completely protected in the absence of flow
- The pre-commission cleaning phase may need to include chemical cleaning to remove oxidation debris and biofilm for subsequent water treatment to be effective
- Failure to monitor and maintain water treatment during commissioning, and

remedial works when oxygen levels are likely to be high, may have dire consequences

- Oxygen levels in use must be reduced as quickly as possible and kept as low as possible by sufficient system pressurisation, effective venting and minimising the addition of fresh water
- All areas of the system must frequently receive flow to allow the water treatment chemicals to reach the vulnerable surfaces
- The water treatment regime must be maintained through the life of the building

The factors that lead to corrosion and potential failure of pipework systems have not changed in 100 years or so, since piped heating systems became common, so why do corrosion failures seem to be increasing, sometimes even before the building is handed over? The major factors are changes in the materials and system design, coupled with a lack of awareness of the risks.

Traditional steel pipework systems are readily corroded by fresh water but can sustain significant surface corrosion without danger of perforation or detriment to the overall life of the system. Also, the corrodible surface area is large, relative to the volume of water in the system so that, in closed systems the oxygen level will drop quickly as it is used up in the chemical corrosion reaction, and the corrosion is, to some extent, self-limiting. This is why we often see old steel systems that have never been chemically treated but are in remarkably good condition. Of course, this can only happen when there is no fresh water or air being added to the system. If that is not the case, then chemical inhibitors are necessary to reduce the rate of corrosion in the continuing presence of dissolved oxygen.

Rapid pitting corrosion

This is particularly important when using thin wall carbon steel pipe, which is attractive to contractors on the grounds of cost and speed of installation, but rather less tolerant of corrosion than traditional steel pipe.

It is particularly susceptible to rapid pitting corrosion if oxygen continues to enter the system, and can potentially fail within months if maltreated. One manufacturer suggests that the corrosion risk increases when the oxygen concentration exceeds 0.1 mg/l (presumably in the absence of an inhibitor).

The concentration of oxygen in tap water is around 10 mg/l, so particular attention must be paid to the avoidance of fresh water additions (or air ingress through other routes), plus a well-monitored and effective chemical inhibitor regime.

► If the system is predominantly constructed of non-corrodible materials, with only a small proportion of corrodible material, then the corrosion process is not self-limiting, as it will not significantly reduce the concentration of oxygen in the circulating water. The corrodible materials will therefore be vulnerable to continuing high rates of corrosion if they are not protected by chemical inhibitors and/or the use of oxygen reduction technologies, such as vacuum deaeration. Particular care must be taken with the specification of plastic pipework, which – while not affected by corrosion itself – may allow oxygen permeation to adversely affect other components.

Another feature of modern commercial buildings is the increased use of two-port valve control of terminal units, combined with variable speed pumping. There is no doubt that this strategy can result in a significant reduction of pumping energy and lower return temperatures for heating (higher for cooling) that improves plant efficiency.

The downside can be branch pipework with very low flow rates and out of season stagnation. Low flow rates and stagnation lead to deposition of suspended solids, reducing the effectiveness of corrosion inhibitors and increasing the risk of microbiological problems. The effects of stagnation can be easily reduced by incorporating a daily circulation routine in the control strategy – for example, one hour per day (out of normal operating hours), with automatic control valves fully open. The issue of low flow rates in distribution pipework, particularly to fan coils, can only be addressed at the design stage by selecting smaller diameter pipe and control valves to maintain a reasonable flow velocity.

Managing water quality

The BSRIA guide to *Pre-commission cleaning of pipework systems (BG29/2011)* includes new recommendations for the management of system water quality between the pre-commission cleaning and practical completion stages. In particular, the guide recommends that the pre-commission cleaning or water treatment specialist be contracted to monitor and maintain the system, with two-weekly sampling until practical completion, and to ensure that water treatment is not neglected during this critical period.

In parallel with the development of *BG29*, BSRIA worked with industry representatives and BSI to produce a new British Standard BS 8552:2012: 'Sampling and monitoring of water from building services closed systems – Code of practice', which was published in

The inner surface of a piece of 67mm thin wall carbon steel pipe from a heating system that perforated less than two years after installation due to severe oxygen pitting corrosion



November 2012. In essence, BS 8552 explains the sampling and monitoring process in terms of where, when and how to sample, while BSRIA *BG29* (slightly revised in 2012) provides practical guidelines for interpretation of the results, up to and including practical completion.

Taken together, *BG29* and BS 8552 provide a framework and guidance for the management of closed system water quality during construction projects, and should help to reduce the risk of premature failure of pipework systems due to corrosion.

However BS 8552 does not stop at practical completion, but provides detailed recommendations for water sampling and monitoring through the entire life of the building until demolition.

So, where are the guidelines for water quality in use? Unfortunately, the simple answer is that such guidelines are difficult – if not impossible – to provide in absolute terms, as many of the parameters used to judge the water quality and the condition of the system depend on the specific water treatment strategy being employed. Therefore, the best source of water quality guidelines for a specific system is the water treatment specialist looking after it and their chemical supplier.

Nevertheless, BSRIA is currently working with the Water Management Society (WMS), British Association of Chemical Specialities (BACS), Institute of Corrosion (ICorr) and Commissioning Specialist Association (CSA) to produce a new guide to water treatment that will explain the principles and processes involved, to be published in 2013. **CJ**

REGINALD BROWN is head of energy and environment at BSRIA. www.bsria.co.uk

Why do corrosion failures seem to be increasing, sometimes even before the building is handed over?

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A CLEAN BILL OF HEALTH

Clean water is an essential ingredient in an efficient heating system. John Bailey explains

Modern heating systems are very sophisticated. Boilers incorporate an array of technologies, materials and means of control that make them as efficient in operation as possible. Electronic gas and air modulation systems, flame lift detection systems and two-stage and fully modulating pumps can be found within the most modern boilers, helping them achieve full load efficiencies of around 98%.

Renewable technologies allow heat and domestic hot water demands to be met, at least in part, by natural resources. Converting energy from the sun – air or ground – has become an increasingly common means of heating our homes and commercial buildings reliably, affordably and cleanly.

The controls that knit systems together and ensure they are meeting our requirements as efficiently as possible are ever more sophisticated too. Electronic control panels, weather and room compensators, wireless sensors, and even controls that can be adjusted remotely via a smartphone app, are no longer the preserve of tech-hungry early adopters.

Yet, despite all these technological advances, the most important component of any heating system is perhaps the most basic entity of all – clean water. Without it, the efficiency benefits promised by this advanced hardware will be compromised, sometimes severely.

Clean water cannot be assumed, however. In existing systems, water will almost certainly be contaminated with debris, imbalances and scale. New systems invariably contain contaminants and debris from component manufacture or from the system installation work itself, while water from municipal sources will typically contain constituents that, over time, will compromise system performance.

Unfortunately, in the pursuit of visible sustainability, the rudimentary is often overlooked in favour of the advanced. A back-to-basics approach is therefore strongly encouraged, whether commissioning an all-new system or refurbishing an existing system with new hardware.

The type and extent of debris, dirt and fouling commonly found inside central heating circuits largely depends on the age and nature of the system and how well – or poorly – it has been maintained. Even well-maintained installations may have accumulations of sludge and scale. Microbiological slimes and contamination may be found in all systems, regardless of age.

The natural chemical constituents found in supply water can also vary and the quality of this water may ultimately have effects on the efficiency and effectiveness of boilers and heating systems. Detrimental effects include metal corrosion, circulating particulate debris, settled sludge, extraneous noise, interference with moving parts, poor water flow or

6 Adding a new, clean boiler to a dirty system can achieve very little in terms of efficiency gains



John Bailey



The ground source heat pump system at Vaillant's Derbyshire headquarters was sanitised by Sentinel Commercial

In the pursuit of visible sustainability, the rudimentary is often overlooked in favour of the advanced

blockage, degradation of boiler efficiency or system effectiveness and, ultimately, loss of system integrity. A study commissioned by Sentinel Performance Solutions, a leading water treatment specialist, showed that contaminants can cause a reduction in efficiency by up to 15% on some heat emitters (radiators, for example), which translates into an overall system loss of 3%.

In commercial buildings, where five- and six-figure fuel bills can be commonplace, 3% represents a significant expense. The size of commercial systems also means they are more vulnerable to scale build-up. The investment in cleaning, flushing

and periodical treatments can therefore be recouped with comparative ease.

Sentinel's study made use of a purpose-built replica of a simple domestic installation, where the hydraulic load was accurately balanced, with the flow and return temperatures set at 65°C and 47°C respectively.

Starting with a clear system, the thermal efficiency was measured to provide a benchmark, before the system was fouled with sludge. Measurements were then taken to determine the effect of this on the system's thermal performance. A new boiler was then fitted and the measurements taken again to provide an analysis equivalent to retrofitting a new boiler without first power flushing the system. Finally, the system was power flushed and the tests repeated once again.

The results were startling. Perhaps most notable was the insight that sludge deposits can cause a reduction in the effectiveness of the system as a whole by as much as 3%, and that adding a new, clean boiler to a dirty system can achieve very little in terms of efficiency gains.

The presence of sludge has an effect on both the flow and distribution of water within the system. Reduced system flow was associated with a reduction in boiler output, which reduced heat output to the point where the system was no longer capable of transferring the required heat to the building. This needed to be countered by turning up the pump or opening the valves, resulting in the return water temperature increasing.

The loss of heat transfer surface meant the boiler flow temperature had to be raised, lowering boiler efficiency still further. More significantly, however, this in turn raised return temperatures, causing further loss of efficiency.

Case study

Vaillant Group's £3.5m redevelopment of its headquarters in Belper, Derbyshire, fulfilled an ambition to create a zero-carbon building, incorporating the group's portfolio of renewable energy products, including a ground source heat pump, air-to-water heat pumps, air-to-air heat pumps, solar thermal and photovoltaic systems.

Sentinel Commercial, supplier of commercial heating and renewable system cleaners and inhibitors was brought in at the commissioning stage of the 30kW geoTHERM ground source heat pump (GSHP) system in order to ensure efficiency was maximised through optimum system cleanliness and glycol heat transfer performance.

The process began by pressure flushing the entire GSHP system to perform an initial cleanse. Once filled with mains water, initial tests found that bacteria levels were above the ideal level for system performance – unsurprisingly, since the installation environment cannot be completely sterile. One gram of soil can contain more than 100 million bacteria.

To remove the bacteria, R700 Sanitiser was

added in the correct proportion to the volume within each loop, and this fluid was then pumped through each subsequent loop, using the isolating valves in each section. Bacteria levels were tested once again, using dip slides (for a general aerobic bacteria count) and ATP bio assay techniques (to measure general micro-biological activity and kill rates during the sanitisation process while on site), while the active level of R700 was measured using a product-specific dip test kit.

Results showed that the GSHP system had been completely sanitised, and the recirculating water was visually clean and contained no physical debris.

Following sanitisation, the ground loop was then filled with R500C, a glycol-based thermal fluid specifically designed for use as a highly efficient heat transfer fluid, which was diluted to the correct concentration using mains water. Safeguarding against corrosion, microbiological fouling, scale deposits and glycol degradation, this product also provides excellent frost protection down to temperatures of -22°C.

A distortion to the water flow caused parts of the system to display unusually high-pressure drops, a phenomenon that can eventually lead to the water flows through the system becoming unbalanced. A lack of hydraulic balance makes it difficult to keep heat emitters at the desired temperature without setting the pump to maximum – which in turn can lead to pump noise and excessive velocity in the main flow and return circuit, and wasteful losses resulting from having to operate at full capacity.

The requirement to raise water temperature in the central heating circuit has a significant effect on boiler efficiency, especially with modern condensing boilers.

In all cases, these effects can be avoided by pre-commission cleaning and flushing, the application of water treatment and periodic system water checks and maintenance. A thorough system clean not only restores system efficiency and effectiveness, but is critical in preparing interior surfaces for effective corrosion and scale inhibition.

This approach brings about a secondary benefit in that it also contributes to the life expectancy of plant. It shouldn't be forgotten that sludge can lead to both boiler and pump

failure, while scale will compromise the performance of heat exchangers.

Similarly, state-of-the-art boilers incorporate multiple heat sensors on the heat exchanger and flow and return pipes to accurately monitor temperatures, as well as a vortex flow switch to ensure there is sufficient flow of water through the heat exchanger. All these sensors work together through the electronics of the boiler management system to ensure the boiler not only delivers the correct temperature to the system, but also operates at the highest possible efficiency whatever the heating load.

This process can be compromised if any of these sensors become coated in debris and dirt from the system, resulting in a fluctuating temperature and a loss in efficiency.

In conclusion, modern boilers and renewable technologies can deliver substantial returns in both domestic and commercial systems, but if their full potential is to be realised, they must be operating on an 'as new' system, with water treated to render it fit for purpose. **CJ**

JOHN BAILEY is commercial systems director at Vaillant.

Sludge taken from a central heating system



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Saving energy through simple HVAC heat recovery

In this module we look at heat recovery in mechanical ventilation systems using plate heat exchangers and methods to compare annual heating performance

The reduction of energy use in buildings is not only an economic issue but also increasingly linked with opportunities to lessen the demand on the primary energy source (and distribution networks), as well as reducing life cycle environmental impact. This CPD article will consider heat recovery in mechanical ventilation systems using plate heat exchangers and show how to compare annual heating performance using binned weather data.

Heat recovery systems

Heat recovery in HVAC systems will typically exchange heat between the discharged room air and that being

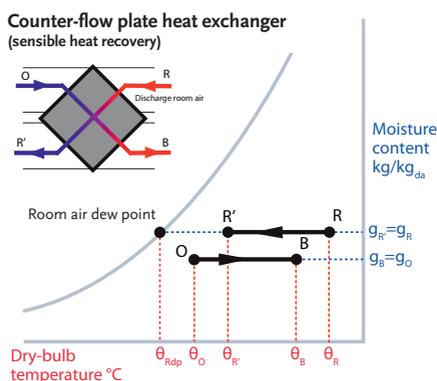


Figure 1: Psychrometry of cross-flow plate heat exchanger

introduced from outdoors. The system may be designed to exchange only sensible heat or both sensible and latent heat. Details of the principal system types may be seen in Section B of the CIBSE Guide.

An example of a sensible heat recovery process is shown in Figure 1.

This psychrometric process indicates an increase in the sensible heat of the incoming air that could take place in a cross-flow plate heat exchanger, a (regenerative) thermal wheel or a run around coil. The process is a basic sensible heating or cooling process – depending on the temperature of the opposing airstreams.

The heat exchanger sensible heat effectiveness, $\epsilon_s = \dot{m}_O(\theta_B - \theta_O) / \dot{m}_R(\theta_R - \theta_O)$, where \dot{m}_O and \dot{m}_R are the respective air mass flow rates of air at outdoor temperature θ_O , θ_R the room temperature, and θ_B being the temperature of the outdoor air after it has been through the heat exchanger.

Considering Figure 1, if the temperature of the incoming air, θ_O , is below the dew point temperature of the extracted air, θ_{Rdp} , there is likely to be some condensation in the airstream that is coming from the occupied space, so providing increased heat exchange. But, in the case of a simple impermeable plate heat exchanger, there is no transfer of water vapour. The heat

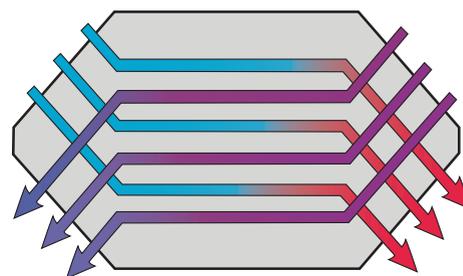


Figure 2: A section through a combined counter-flow and cross-flow plate heat exchanger

of condensation will add to the recovered heat. In recent years, the simple cross-flow plate heat exchanger has been developed to provide an additional counter-flow component, as illustrated in Figure 2.

Owing to the extended heat exchange surface, the effectiveness is increased (as is the air side pressure drop). The manufacturer¹ reports a seasonal sensible heat exchange effectiveness of 85%; such a process is illustrated (approximately) in Figure 3, where the condensation from the discharge air further increases the dry bulb temperature of the incoming outdoor air.

The additional resistance to air flow will require energy for fan power (W) given by:

$$\text{Power} = Q \cdot \Delta P / \eta_{fan}$$

where Q is the air volume flow ($\text{m}^3 \cdot \text{s}^{-1}$), ΔP is the additional pressure drop through

Counter-flow plus cross-flow plate heat exchanger

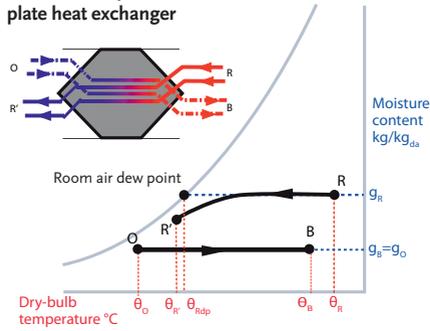


Figure 3: Plate heat exchanger with condensation in the discharging room air

the device (P_a) and η_{fan} is the total fan, drive and motor efficiency. This will be additional direct electrical power, which is likely to be more costly – and have twice the carbon footprint – of any natural gas heating that is being offset or any cooling savings (owing to the coefficient of performance (COP), refrigeration electrical power consumption will typically be less than half the cooling delivered). The heat recovery device will also require a bypass to avoid unwanted heat transfer to the incoming air in summer conditions.

Application of heat recovery model

In this CPD module, a simple example building will be used to examine the impact of heat recovery in a very common application of ventilation in the UK (with no cooling). This is an example of a comparative method that may be used – it can be quickly developed in a spreadsheet that can readily be expanded to explore other sensitivities, including NPV analysis. The building is a small, detached store 20m wide, 10.2m deep and 3m floor-to-ceiling height, situated adjacent to a busy road on the outskirts of London. The building has triple-glazed windows (and doors) along 50% of the long south-facing wall, and has been constructed within the last two years.

The heating and ventilation air is being provided by a mechanical ventilation system to maintain a minimum temperature of 21°C. The occupancy will be

Roof	0.18 W·m ² K ⁻¹
Walls	0.26 W·m ² K ⁻¹
Floor	0.22 W·m ² K ⁻¹
Glazing	1.80 W·m ² K ⁻¹
Infiltration rate	0.4 hour ⁻¹
Winter outdoor design temperature	-4°C

Table 1: Example building data

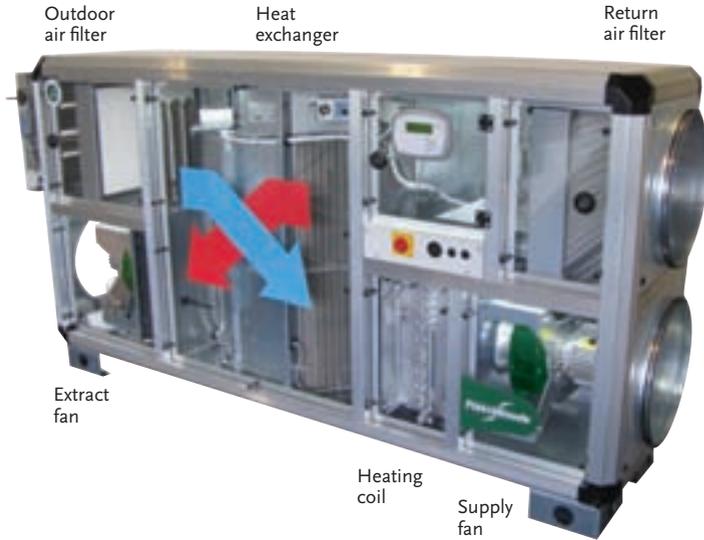


Figure 4: Energy recovery unit integrated into an AHU. Air returns from the rooms in the direction of the red arrow and the outdoor air path is indicated by the blue arrow.

one person, 24 hours a day, and the lighting provides a heat gain of 10 W·m² floor area, with no other equipment use. Owing to the materials stored in the building, full fresh air ventilation is required at a rate of at least six air changes per hour. The building's data required to undertake heat loss calculations are given in Table 1.

A heat recovery system is often incorporated into packaged air handling units similar to that shown in Figure 4, designed for mounting in ceiling voids.

To examine the building and the

application of heat recovery in detail requires a dynamic simulation package. However, by using binned outdoor temperature data together with the building heat loss coefficient and assumed casual gains, a reasonable comparative study may be undertaken. The outdoor temperatures for the suburbs of London (hourly data measured over 20 years) is given in the first two columns of Table 2. This type of data can be readily obtained for most global locations from local meteorological offices.

The basic building heat loss coefficient²

Outdoor air mid band temperature (2K bands)	Hours occurring per year	Building heat loss kW	Casual gain kW	Heating load less casual gains kW
< -4	28.93	6.39	2.14	4.25
-3	71.88	6.14	2.14	4.00
-1	193.73	5.63	2.14	3.49
1	435.67	5.11	2.14	2.97
3	626.77	4.60	2.14	2.46
5	814.36	4.09	2.14	1.95
7	988.80	3.58	2.14	1.44
9	1070.33	3.07	2.14	0.93
11	1037.02	2.56	2.14	0.42
13	972.15	2.05	2.14	–
15	880.98	1.53	2.14	–
17	697.77	1.02	2.14	–
19	431.29	0.51	2.14	–
21	263.86	0.00	2.14	–
>22	252.46	–	2.14	–
Total	8766 hours			

Table 2: Frequency of outdoor air temperature for London suburb (24-hour, hourly data), together with building heat loss at mid band temperature, casual gain and resulting banded heating load

Without heat recovery

Outdoor air mid band temperature	No casual gains		With casual gains	
	Supply air temp	Heating energy over year kWh	Supply air temp	Heating energy over year kWh
-4	26.20	1075	24.46	1013
-3	25.99	2563	24.25	2409
-1	25.57	6333	23.83	5918
1	25.16	12947	23.42	12014
3	24.74	16763	23.00	15422
5	24.33	19360	22.59	17617
7	23.91	20569	22.17	18453
9	23.49	19084	21.75	16793
11	23.08	15408	21.34	13189
13	22.66	11556	–	–
15	22.25	7854	–	–
17	21.83	4147	–	–
19	21.42	1282	–	–
21	21.00	0	–	–
22	–	–	–	–
		138938 kWh		102828 kWh

Table 3: Ventilation heating energy with no heat recovery

may be determined from:

$$\Sigma(AU) + C_v = \Sigma(AU) + 0.33 NV = (20.0 \times 10.2) \times (0.18 + 0.22) + (10.2 + 10.2 + 20.0 + 10.0) \times 3 \times 0.26 + 10 \times 3 \times 1.80 + 0.33 \times 0.4 \times (20.0 \times 10.2 \times 3.0) = 255.7 \text{ W} \cdot \text{K}^{-1}$$

where A = element area (m²), U = U value (W · m²K⁻¹), C_v = ventilation conductance (W · K⁻¹), N = infiltration rate (hour⁻¹) and V = volume of space (m³).

Using the heat loss coefficient, the building heat loss at each band is evaluated from:

$$(\Sigma(AU) + C_v) \times (\theta_R - \text{mid band temperature}).$$

The casual gain is shown as a constant at 2.14 kW (comprising the lighting gain plus one person), and this will offset some of the need for heating throughout the whole heating season. When undertaking such an analysis, there would normally be a diversity factor estimated to account for variations in such things as occupancy, lighting and equipment. The final column of Table 2 shows the heating required in the room at each corresponding band of outdoor temperature.

For each band, the required supply air temperature, θ_s, may be calculated from:

$$\text{Heating load} = \dot{m} C_p (\theta_R - \theta_s)$$

where C_p is the specific heat capacity of air, 1.005 kJ kg⁻¹K⁻¹. The approximate mass flowrate of air (in this particular case) is determined by the required ventilation rate of six air changes per hour (and taking the

specific volume of air as 0.83 m³kg⁻¹)
 so $\dot{m} = 6 \times (20.0 \times 10.2 \times 3) / (3600 \times 0.83) = 1.22 \text{ kg s}^{-1}$

With 50% effective heat recovery

Outdoor air mid band temperature	Incoming air temp after HRU	No casual gains		With casual gains	
		Supply air temp	Heating energy over year kWh	Supply air temp	Heating energy over year kWh
-4	8.50	26.20	630	24.46	568
-3	9.00	25.99	1502	24.25	1348
-1	10.00	25.57	3711	23.83	3297
1	11.00	25.16	7587	23.42	6655
3	12.00	24.74	9824	23.00	8482
5	13.00	24.33	11346	22.59	9603
7	14.00	23.91	12054	22.17	9938
9	15.00	23.49	11184	21.75	8893
11	16.00	23.08	9030	21.34	6811
13	17.00	22.66	6772	–	–
15	18.00	22.25	4603	–	–
17	19.00	21.83	2430	–	–
19	20.00	21.42	751	–	–
21	21.00	21.00	0	–	–
22	–	–	–	–	–
			81424 kWh		55596 kWh

Table 4: Ventilation heating energy with 50% effective sensible heat recovery

The resulting supply temperature (both with and without allowing for casual gains) is given in columns two and four of Table 3. The sum of the energy used over a year (relating to each band) is then calculated from:

Hours occurring per year $\times \dot{m} C_p (\theta_s - \theta_o)$ where θ_o is the particular outdoor air mid band temperature. These are then summed to give the total ventilation heating energy used per year – so, in this case, with casual gains being taken into account, this would be 102,828 kWh for a full fresh air system.

Having established a base case (illustrated in Table 3) the impact of adding a heat recovery device may be assessed, as in Table 4.

As the supply and extract mass flowrates are equal, the temperature of the outdoor air leaving the device, θ_b, which enters the subsequent heating coil, may be determined from:

$$\theta_b = \theta_o + \epsilon_s (\theta_R - \theta_o)$$

where θ_o is the particular outdoor air mid band temperature. This has been undertaken for a heat recovery effectiveness, ε_s, of 50% and is shown in column two of Table 4. (The 50% figure is representative of the seasonal efficiency of an average cross-flow plate heat exchanger.) The sum of the energy used over a year

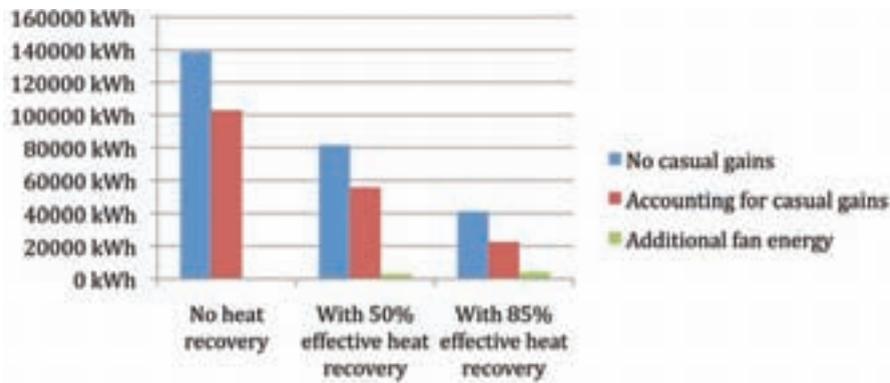


Figure 5: Summary of annual heating energy supplied by ventilation systems and additional fan energy required to overcome heat recovery device resistance

(relating to each band) is then calculated, but this time only requiring heating from θ_b to the supply temperature, θ_s .

The additional fan power (Wh) required to overcome the resistance of the heat exchanger and the additional return air filter may be calculated from:

$$(Q \cdot \Delta P / \eta_{fan}) \times \text{hours of operation.}$$

For the cross-flow heat exchanger, a pressure drop of 100Pa (for each of the flow and return paths) is typical, and a panel filter would add 30Pa. The total fan efficiency is related to the fan type and the motor/drive mechanism – in this example, a value of 70% has been used although direct drive EC motors can approach 90% as may be needed to meet regulatory Specific Fan Power requirements.

So additional annual energy use = $(1.02 \times (100 + 100 + 30) / 0.7) \times 8766 / 1000 = 2938$ kWh. This will be electrical power, whereas the savings in heating energy could be savings in gas or electricity (or other fuels), depending on the method used for heating on site.

The combined counter-flow/cross-flow heat exchanger can be examined in exactly the same way as the cross-flow but with the efficiency amended to 0.85 (85%) and the pressure drop increased to 150Pa. The results from that analysis, together with the others, are summarised in Figure 5.

The annual energy consumption may be used to provide a simple approximate cost saving (in terms of heating energy less the additional fan energy), as shown in Figure 6. A similar exercise could be undertaken to show notional CO₂ saving.

It is important to note that this simple model is based on a 24-hour-a-day application with low casual gains. In other applications of 10-hour working and higher occupancies and equipment loads, the savings will not be so dramatic. The application of a compliance tool such as

SBEM or, preferably, dynamic modelling software, together with independently certified performance data, will provide a more complete picture of the whole life impact of a heat recovery device.

Appropriately applying this simple technology can increase flexibility in building design, while still meeting rigorous carbon targets. The size of associated heating systems may also be reduced, saving on both capital and installation costs.

© Tim Dwyer, 2013.

Further Reading

- Air Conditioning Engineering*, Jones WP, Butterworth 2001, Section 6.6.
- ASHRAE HVAC Handbook 2008*, Chapter 25.
- CIBSE Guide B*, Section 2.5.6, 2005.

References

- Fisher, J., *Reducing your Total Building Emissions using High Efficiency Energy Recovery*, FlaktWoods, 2012
- CIBSE Guide A*, Section 5.6.2, 2006
- CIBSE Guide F*, Section 5.2.5.5, 2012.

Clarifications contributed by CIBSE members on last month's CPD

In January's CPD, *Simple thermal analysis for buildings*, the electrical analogy used for admittance was somewhat confused. A more appropriate description would be '...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'

Figure 2 also lost some details – principally the omission of decimal points in the ordinate values.

We thank David Findler for his input on the electrical analogy and were particularly pleased to be contacted by the original author of the work on which much of the article was based, John Harrington-Lynn.

John pointed out that, although the mathematics behind the admittance concept assumes that the weather data and usage patterns are repeated over several days, the majority of buildings are subject to regular 24-hour usage patterns and so the method can be applied to assess the performance of a building both in winter as well as summer, with appropriate data. The method will cope with a variable infiltration/fresh air rate. To cope with more complex systems, it would be necessary to use the calculated cooling/heating load and the designers knowledge of the proposed air handling system to calculate the air handling volumes. As part of his clarification of the figure in the article, he explained that Admittance or U values should meet on the Y axis at a value of approximately $5.5 \text{ Wm}^{-2}\text{K}^{-1}$, since the solution of the matrix equation for an infinitely thin membrane produces a Y-value and U-value equal to $1/(R_{si} + R_{se})$. (Typically for a vertical surface, $R_{si} = 0.12$, $R_{se} = 0.06$ giving a Y or U value of $5.55 \text{ Wm}^{-2}\text{K}^{-1}$.)

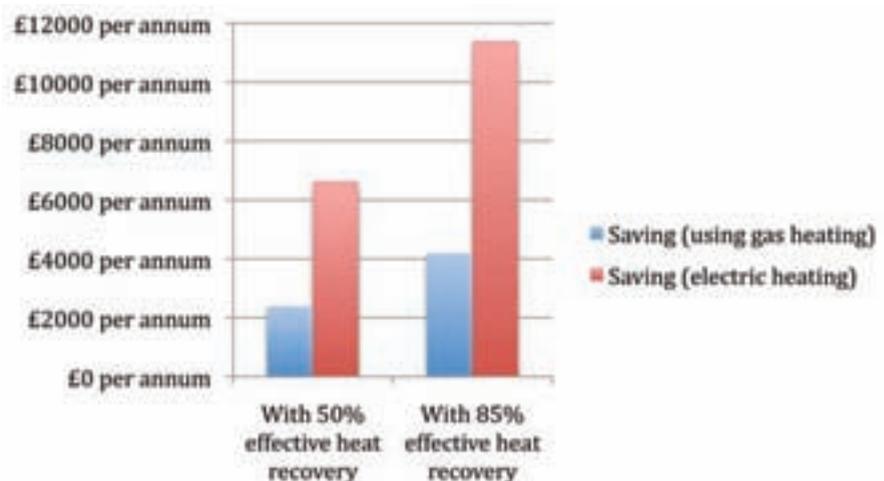


Figure 6: Approximate cost savings applying heat recovery for a system that uses gas heating and one that uses electric heating

Module 49

February 2013



1. Which temperature in Figure 1 is the temperature of the room air after it has passed through the heat exchanger?

- A B
- B O
- C R
- D R'
- E R_{dp}

2. What is effectiveness of the combined counter-flow and cross-flow heat exchanger referred to in the article?

- A 10%
- B 30%
- C 50%
- D 85%
- E 100%

3. Why is energy required for the fan power potentially more costly than the energy for an equivalent power cooling process?

- A Fans using electricity
- B Cooling systems use electricity
- C Fans have a efficiency of only 70-90%
- D Refrigeration systems benefit from COP
- E Heating may be provided by a biofuel

4. If the room air, θ_r , was 20°C, what is the approximate temperature of the outdoor air as it leaves the heat exchanger, θ_b , if the outdoor air, θ_o , enters at 0°C and the units effectiveness, ϵ_s , is 75%?

- A 0°C
- B 5°C
- C 10°C
- D 15°C
- E 20°C

5. If the supply ductwork was reduced in size and so added 20Pa to the example system pressure drop, what would be the (approximate) additional fan power?

- A 10W
- B 20W
- C 30W
- D 40W
- E 50W

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CP launches batten-mount PIR detector range

New from CP Electronics is a series of miniature PIR (passive infrared) presence detectors designed to provide automatic control of lighting loads using an infrared handset. Engineered for mounting directly onto a batten-style luminaire (either inside or out), the miniature detectors can also be controlled manually if required. When movement is detected by the PIR sensor, the load will switch on, and when the area is vacated the load will switch off, following an adjustable time out period.

● Email enquiry@cpelectronics.co.uk or call 0333 900671



Vent-Axia's revolutionary Lo-Carbon Tempra wins energy award

Vent-Axia, a provider in low carbon ventilation, is celebrating winning the 'Energy Efficient Product of the Year' category at this year's Energy Awards. The company scooped the award for its revolutionary Lo-Carbon Tempra single room heat recovery unit at an awards ceremony held at the Grosvenor House Hotel in London. The event was attended by more than 500 of the energy industry's key players. The Energy Awards recognises and rewards both supply and demand-side excellence within the energy sector.

● Call 0844 856 0590



ADT continues roadshows in 2012

In 2012, ADT Fire & Security held a number of free events around the UK, including a series of expert seminars and CPD workshops supported by key partners exhibiting the latest fire and security solutions. With more than 340 attendees overall, ADT Fire & Security is now registering interest for seminars in 2013. The ADT New Technology Roadshows are open to estate managers, specifiers, consultants, IT managers, facilities managers and contractors.

● Email mrunnalls@tycoint.com or call 01932 743133



Fläkt Woods makes fire dampers available nationwide



In recognition of the need for fire safety in modern building design, Fläkt Woods manufactures an extensive range of high quality, circular and rectangular

fire dampers, including the ever-popular ETPR-17 (manual fire damper) MFD. Specified for their superior design and manufacturing excellence, the ETPR-17 MFD fire damper and other models in the range are available exclusively through Fläkt Woods' nationwide network of approved distributors.

● Visit www.flaktwoods.co.uk

AET offers flexible control for underfloor aircon with its FLEXmatic controller



AET has introduced the new FLEXmatic controller to accompany its successful underfloor air conditioning range, the Flexible Space System. Capable of monitoring and adjusting up to 16

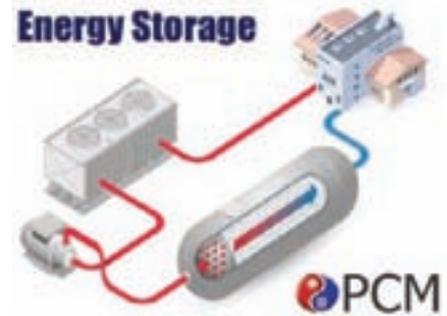
individual zone units, the FLEXmatic controller offers increased user friendliness through additional easy-to-operate control features. Available for wall mounting, the FLEXmatic can now monitor up to 24 master fan tiles and seven slaves per fan tile, per zone unit, with each zone unit delivering air through the floor void to individual 'fan tile' air terminals.

● Email sales@flexiblespace.com or visit www.flexiblespace.com

Thermal energy storage

TES is the temporary storage of thermal energy for later use, bridging the gap between energy availability and energy use. TES can reduce the chiller size by 50% by simply spreading the load over a 24-hour period. It also reduces the running cost by using overnight lower ambient air temperature (possible free cooling) and lower electricity costs, as well as offering smaller roof space and full stand-by capability, using +8-15°C phase-change material (PCM) containers for conventional chilled water applications.

● Visit www.pcmproducts.net or call 01733 245511



Oventrop keeps control at Irish university

A range of Oventrop valves, including differential pressure regulating and Aquastrom T Plus hot water service valves, have been supplied to the National University of Ireland Galway's new Engineering Building. The installation provides energy savings by thermostatically controlling temperature and flow in the hot water system, as well as offering a reduction in commissioning time. The building brings together the five engineering faculties from 13 separate locations across campus into a single facility, accommodating more than 1,100 students.

● Call 01256 330441



BASF House wins Microgen award



British Gas has won the Innovation of the Year Award at the Micropower Council Awards 2012, for a project involving Panasonic's Aquarea air source heat pump.

One such achievement was the teaming up of British Gas, Cool Planet and Panasonic for the Creative Energy Homes Project at the University of Nottingham. This project resulted in an industry-leading eco heating solution for the BASF House, which was installed with the pioneering 9 kW Aquarea monobloc air-to-water heat pump unit.

● Visit www.panasonic-heating.co.uk or call 01344 853390

Electrak unveils desk modules

Electrak has further enhanced its position as a leader in commercial power distribution solutions by unveiling its next generation desk module, Intersoc-R. An evolution of the company's existing Intersoc range, Intersoc-R has been designed with the aim of delivering significant new user benefits for everyone, from installers through to the end user. Key features include: an enhanced shuttered electrical connection; improved push-fit action; a choice of fixed or rotatable sockets; a comprehensive selection of international sockets; and a wider range of outlet connections.

● Visit www.legrand.co.uk



Passive cooling thermal energy storage (TES)

TES is the temporary storage of thermal energy for later use, bridging the gap between energy availability and energy use. Over-night cool energy is stored in the form of 20°C to 27°C phase change material (PCM) filled containers and later used to absorb the internal and solar heat gains during day for an energy-free passive cooling system. This technology offers an environmentally friendly, short payback, maintenance and energy-free cooling solution that can be applied to both new or existing buildings.

● Visit www.pcmproducts.net or call 01733 245511



LG's hands-on approach to green deal

Secretary of State for Energy and Climate Change, Ed Davey, visited Oldham College to meet the team running the government-approved Green Deal Advisor training scheme. He was shown the training facilities for renewable technologies, which included the latest heating, ventilating and air conditioning equipment supplied by LG. The Secretary of State's visit coincided with the announcement of the domestic section of the Green Deal. This Government initiative offers tenants and homeowners the opportunity to install energy efficiency products with no upfront costs.

● Visit uk.lgeaircon.com

JS Air Curtains at Beaufort House

The aesthetic design and performance of the Rund air curtain from JS Air Curtains made it the ideal choice to complement Beaufort House, a prominent building in the City of London. The property has around 4,000 occupants passing through the entrance atrium each day. The constant use of the double door elliptical air pod made the reception area cold. Four two-metre high Rund air curtains were installed at either side of the doors to heat the air in the pod and create a barrier against cold air.

● Visit www.jsaircurtains.com or call 01903 858656



Metropolitan's Ashmole Estate boosts efficiency with MHS Boilers

Six Thision L boilers on free-standing cascade frames and three Ultramax R600 boilers with plate heat exchangers from MHS Boilers have been installed as the new district heating system at the Ashmole Estate in south-west London. Part of an extensive refurbishment project for Metropolitan, the new products have replaced the old, inefficient oil-powered system responsible for heating the 18-storey Sirinham Point tower block, as well as the Coney and Cottingham apartments for the elderly.

● Visit www.mhsboilers.com



Expert advice from Polypipe

Polypipe Ventilation has revamped and relaunched its *System and Product Selector*, with the latest products and technical information on energy-saving ventilation systems. The catalogue has been designed as a comprehensive guide that will assist distributors, specifiers, developers, installers and engineers in the specification of ventilation systems that meet Building Regulations and save time and money on site. Clear and concise selector tables are provided to help the customer choose which ventilation technology is best suited for a specific dwelling.

● Visit www.polypipe.com/ventilation or call 08443 715523

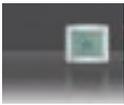
Golden moment for Grundfos

Grundfos Pumps has been recently awarded a Gold Green Apple Award at the House of Commons in recognition of its environmental efforts relating to the refurbishment of its UK office headquarters in Leighton Buzzard. Grundfos prides itself on its wide range of energy efficient pumps, which offer savings of up to 80%, and wanted to ensure the building upgrade would not simply offer staff an improved environment and facilities, but also include as many energy efficiency and other green considerations as was feasible.

● Email uk-sales@grundfos.com or call 01525 850000



Clear and simple heating with PTSRT from Myson thermostat



The Myson Floortec Programmable Touchscreen Room Thermostat (PTSRT) has a range of features that make controlling the temperature of underfloor heating clear and simple. The PTSRT gives a fantastic, modern look to a very practical piece of household technology, as Myson continues to respond to customers' desires for aesthetically pleasing, yet energy efficient heating. Additionally, using Myson's Smart Start technology, the thermostat also delivers the desired temperature when it is needed.

● Visit www.myson.co.uk



Commercial director
Mark Henderson

FSW expertise offers new sectors for Mitsubishi Electric

Mitsubishi Electric has appointed FSW as a reseller. The company has 23 branches across the country and prides itself in being a product specialist in all areas of refrigeration and air conditioning. FSW will be marketing the range of Mitsubishi Electric equipment, including the M Series, Mr Slim, City Multi VRF systems and Lossnay heat recovery ventilation units. 'This is an exciting development for FSW and expands our offering to the air conditioning sector,' said Mark Henderson, commercial director.

● Visit www.fsw.uk.com or call 01543 437010

EcoMESH adiabatic air inlet cooling

The EcoMESH concept is based on intermittently spraying water onto a mesh, placed in front of the heat reduction surface. Thus reducing power consumption by as much as 30% to 40%, improving the performance of air cooled chillers, dry coolers and condensers and refrigeration plants. EcoMESH is a unique mesh and water spray system that improves performance, reduces energy consumption, eliminates high ambient problems, is virtually maintenance free and can payback in one cooling season.

● Visit www.pcmproducts.net or call 01733 245511



SE Controls solves corridor overheating in multi-storey buildings

An effective solution to overheated corridors and communal spaces in multi-storey residential buildings has been developed by SE Controls, which exploits the versatility and performance of the company's smoke ventilation systems, allowing the controlled ventilation of hot air to maintain comfort for residents. SE Controls has designed a solution that allows its smoke ventilation systems to also operate as a precisely controlled passive or mechanically assisted natural ventilation system, to help maintain comfortable temperatures and energy efficiency. By using sensors to monitor the temperature on each floor, the smoke ventilation system's control panels automatically manage the proportional opening of end of corridor vents, smoke shaft doors and roof vents, which allows the controlled venting of hot air to cool the corridors. SE Controls' combined smoke ventilation and natural ventilation solution not only enables the integrity of the fire safety system to be maintained, but also provides an effective answer to corridor overheating, which has already been proven on a number of new build and refurbishment projects.' SE Controls specialises in the design, project management and installation of advanced smoke ventilation and natural ventilation solutions.

● Visit www.secontrols.com or call 01543 443060

Unicon launch ProkPakt air handling units with heat recovery up to 90%

New from Unicon is its ProkPakt compact range of air handling units offering energy efficiency to class



A with low SFP ratios. Units have integrated automatic controls with intelligent logic and user interface for easy 'plug and play' installation. The use of the European Commission's Energy Related Products-compliant fans throughout reduces energy consumption by up to 50% compared to air conditioning. Available in seven sizes with plate or rotary exchangers.

● Visit www.uniconenvironmental.co.uk or email unicon@btinternet.com

Evinox work with E.ON on regeneration

E.ON and Evinox are working together to provide the energy needs of a major regeneration at Myatts Field North, in Lambeth, which will transform the area into a new mixed and sustainable community. E.ON are providing the district heating network using an energy centre located in an existing 'submarine' structure. This will supply low temperature hot water for space heating and domestic hot water. From this network, Evinox ModuSat heat interface units contained in each dwelling will convert the heat generated by the energy centre into independent, fast recovery hot water and high efficiency heating for each residence.

● Call 01372 722277 or visit www.evinoxenergy.co.uk



George Fischer fabrication day hits target

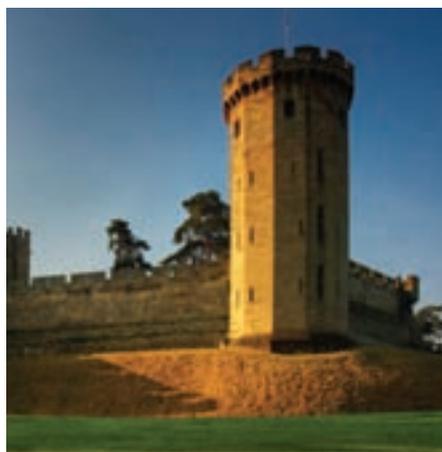
George Fischer Piping Systems celebrated the opening of its 1,000 sq m fabrication unit within the company's large and impressive storage and distribution centre at Coventry. GF's 'Fabrication Day' proved to be great success from the business and social point of view and was enjoyed by the large number of stockists and specifiers who attended. Michael Trevaskis, managing director of GF's UK operation, greeted the guests before giving an overview of the company and showing a brief film of the group's worldwide activities.

● Call 024 7653 5535 or email uk.ps@georgfischer.com

Condensing water heaters approved for enhanced capital allowances

Hamworthy Heating's range of direct-fired condensing water heaters – the Dorchester DR-FC Evo and the recently launched Dorchester DR-TC solar water heater – have been included on the government's Energy Technology List (ETL), providing significant financial advantages for purchasers through the government's Enhanced Capital Allowances (ECA) scheme. The water heaters join a number of Hamworthy products that are already listed, including the award-winning Fleet range of condensing boilers and the new Stratton wall-hung boiler.

● Call 0845 450 2865 or email sales@hamworthy-heating.com



Replacement Potterton boilers by Baxi installed at Warwick Castle

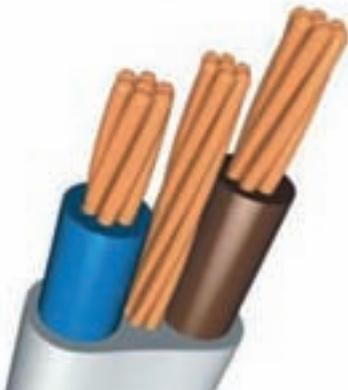
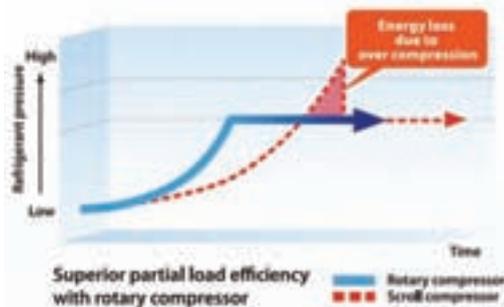
Baxi Commercial Division has supplied three Potterton Commercial cast-iron boilers for a refurbishment of the heating system serving Warwick Castle. One of the country's premier visitor attractions, Warwick Castle dates back to the 13th century, when it was first constructed in stone. Previous owners include Richard Neville, better known as 'Warwick the Kingmaker' during the Wars of the Roses and, over the years, Royal visitors have included Queen Elizabeth I, Queen Victoria and HM Queen Elizabeth II.

● Call 0845 070 1055 or visit www.pottertoncommercial.co.uk

Toshiba delivers world-class energy efficiency performance

Toshiba's latest generation of superheat recovery VRF air conditioners, the SHRM-i series is the most efficient product on the market at part-load conditions. Toshiba believes performance ratings for systems at full capacity can be misleading. 'In the UK, air conditioning only operates at maximum capacity for a small proportion of the time,' says David Dunn, commercial director. 'Most of the time, systems operate at part-load – therefore it makes sense to focus on efficiency in this range.'

● Call 0870 843 0333 or email general.enquiries@toshiba-ac.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 free of charge.

● Call 01293 871751 or visit www.castlinesystems.com



LG's brand new Multi V III installed

LG has installed a new Multi V III heating and cooling system to benefit children and young people at a Hampshire children's home. Swanwick Lodge is a purpose-built facility providing care for children between 10 and 17 years of age, and for two consecutive years it has scored an 'Outstanding' Ofsted rating. An exceptional establishment needs exceptional services, and when the existing heating and cooling system needed replacing, LG's new Multi V III was installed, a brand new product to the market.

● Visit uk.lgeaircon.com

Solar Thermal Energy Storage (TES)

TES is the temporary storage of thermal energy for later use, bridging the gap between energy availability and energy use. Using conventional solar collectors, one can provide not only hot water, but also low-grade, underfloor heating, utilising +27°C (81°F) phase change material (PCM) containers, which can be provided, eliminating the need for any other heating source. PCM energy storage offers an environmentally friendly, short payback and effective energy/fuel-free heating solution.

● Visit www.pcmproducts.net or call 01733 245511



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A complete solution from Marflow Hydraulics

Marflow Hydraulics has strengthened its portfolio to include a range of solutions that offer customers a complete package to suit their needs. Xterminator prefabricated valve assemblies will save time on site and reduce costs, while remote commissioning speeds up the process and helps with continuous commissioning. Optergy Energy Management provides users with an ongoing energy monitoring solution that will give them insight into their energy usage. To find out more, download *The Future is Saved* brochure by visiting www.marflowhydraulics.co.uk/solutions.

● Call 0845 643 9096
or email
solutions@marflow.co.uk



Stokvis units suit wide range of applications

Heating or chilled water systems within industrial and commercial premises can be efficiently and effectively pressurised with the specification of Econopress units, manufactured and supplied by Stokvis Energy Systems. All of the single and twin pump pressurisation units are manufactured to high tolerances and quality standards, with a wide choice of performance parameters and various electronic control systems. Each unit is supplied mounted in a polyester powder coated mild steel cabinet, for integration into the building's plant room.

● Call 0208 733 3050 or email info@stokvisboilers.com



Green hybrid van to deliver Ecodan for Mitsubishi Electric

Mitsubishi Electric is using a DAF-LF hybrid delivery truck to carry its Ecodan renewable heating systems to installers around the country. Ecodan is a leader in the market in residential air source heat pumps because of its performance, ease of installation and use, reliability, and the comprehensive technical support offered by the company. It is also the only air source heat pump to be endorsed by the Noise Abatement Society with its prestigious Quiet Mark.

● Email heating@meuk.mee.com

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Foster + Partners

Foster + Partners has an integrated approach to design, in which engineers work alongside architects from the beginning of the design process. In doing so, we believe that we can learn from one another and combine our knowledge to devise fully integrated design solutions.

Our current team of around 70 engineers are engaged in designing buildings and master plans with particular emphasis on sustainability. We are involved in a range of prestigious international projects at all design stages, from concept to construction.

As a result of our increasing workload, we are expanding the team in London at a variety of levels of experience. Successful candidates will join a dynamic group, with opportunities for career progression, to work on some of the most exciting projects in the world.

The following positions are available.

Senior Level Mechanical Engineers

(Ref: LME0113)

Candidates applying for the senior level Mechanical Engineer need to be Chartered Engineers (or equivalent) and have proven design and leadership skills.

They will be involved in all aspects of environmental design including passive and active techniques, system optimization and delivery and the use of models and full scale mock-ups to develop and prove out the engineering and integration.

Electrical Engineers

(Ref: LEE0113)

Electrical Engineering candidates should have a keen interest in developing their lighting design and vertical transportation skills as well as other electrical systems.

Candidates applying for the Electrical Engineer positions must be progressing towards Chartership or be a recently Chartered Engineer (or equivalent).

Environmental Water / Public Health Engineers

(Ref: LEW/PHE0113)

Environmental Water/Public Health Engineering candidates should have a keen interest in developing their skills in sustainable water technologies both within buildings and across large sites.

Candidates applying for the Environmental Water Engineer/Public Health Engineer positions must be progressing towards Chartership or be a recently Chartered Engineer (or equivalent).

More information about Foster + Partners and the job descriptions can be found at: www.fosterandpartners.com

To apply please send a covering letter and CV stating the reference number to: careers@fosterandpartners.com

Foster + Partners
Riverside, 22 Hester Road
London, SW11 4AN

Foster + Partners is an equal opportunities employer



For a confidential chat,
Call us **8am to 8pm**

Senior Mechanical Design Engineer | Wimbledon £40,000 - £45,000 Plus Benefits package

We have a fantastic opportunity for a Senior Mechanical building services engineer to join a well renowned building services consultancy. Currently enjoying a busy order book, the consultancy has identified the need to recruit a hungry, motivated, aspirational mechanical engineer to supplement the established team. The ideal candidate will have experience with dealing with data centres and large commercial projects, making this an exciting and diverse role.

Successful candidates will be experienced in initial and detailed design from conception stage to completion, including working closely with clients, attending design/client meetings and leading projects. Full clean UK driving license is essential, as the role may involve travelling.

Our client is ideally seeking engineers who are looking to build a long term career with them, and will actively encourage your training and further development.

Associate Electrical Engineer | Central London £65,000 Plus Benefits

An ambitious large international multi-disciplinary consultancy is currently seeking an enthusiastic, talented and experienced individual to join them at Associate level.

Undertaking projects from major commercial works, labs, residential and data centres you will be expected to run the Electrical team and be responsible for the management of all building services engineers on a number of projects, ensuring the team undertake detailed design to the required standards, deliver projects on time and profitably, manage graduates and technicians and take into full consideration CDM and QA standards, and the programme deadlines. At a project level, the role will include Project Manager Duties. The successful candidate will be encouraged to develop new relationships with their own clients through repeat business and manage the fees and invoicing on their particular projects. The ideal candidate could come from an electrical background and should be Chartered, with previous experience of running teams on projects.

Contact: george@conradconsulting.co.uk | 0203 159 5387
Find more jobs online at www.conradconsulting.co.uk

www.desco.uk.com



Desco (Design & Consultancy) Ltd is an award-winning building services engineering consultancy with offices in the UK, Middle East and Far East.

The practice has continued to develop an excellent reputation for delivering a professional quality service, much of which can be attributed to the talented people who work in the business.

We are currently expanding and seeking to recruit enthusiastic, talented individuals to fill the following design engineering vacancies:

UK Offices: Sunderland and Epsom

- Senior Mechanical, Electrical & Public Health Engineers
- Mechanical, Electrical & Public Health Engineers

Middle East Office: Doha, Qatar

- Associate Mechanical Director
- Senior Mechanical, Electrical & Public Health Engineers
- Mechanical, Electrical & Public Health Engineers

Far East Office: Manila, Philippines

- Engineering staff at all grades
- CAD staff at all grades

If you are interested in joining our committed, professional team and have the relevant experience and qualifications, then please email your application with a full CV, indicating which vacancy you are applying for, to: jobs@desco.uk.com

We are an equal opportunities employer

Direct applications only please; recruitment agency applications will not be considered.



The Miller Group Ltd is a major UK property business specialising in house-building, commercial property, construction and integrated asset management services.

Miller Services, part of Miller Construction (UK) Limited, is seeking to recruit consultants / senior consultants to join our energy consultancy team. The consultancy provides specialist energy and carbon management advice to internal and external clients. Our current offer includes:

- Energy Surveys
- Energy Audits
- Energy Management Strategies
- Low Carbon Design Consultancy
- Low Carbon Compliancy
- Sustainability Consultancy
- BREEAM Assessments
- M&E Design Strategy Reviews and Advice
- M&E Design

We require consultants who can provide some or all of the above services and work closely in support of the Miller Services Facility Management team and Miller Construction's regional businesses. The roles will be based in the North West or the Midlands and will involve travel throughout the UK to our Regional Offices and our National Client locations.

Suitable candidates will have a comprehensive understanding of energy efficiency legislation and compliance, the sustainability agenda and Government targets for carbon emissions with specific

reference to the built environment. This knowledge would be reinforced with experience of building design and/or maintenance.

Ideally successful candidates will be able to demonstrate the following:

- **Good communication and presentation skills**
- **Degree or equivalent qualification in Building Services or Environmental Studies**
- **Five years post-graduate experience within design, facilities management or energy consultancy**
- **Experience of building design and operation**
- **Membership of a relevant professional body**
- **Experience and understanding of BREEAM**
- **Experience and understanding of the 'Energy Performance Directive' and associated national legislation**
- **Experience and understanding of the 'National Calculation Methodology' and associated software**
- **Energy assessor accreditation and/or low carbon accreditation**
- **BREEAM Assessor or AP accreditation**

This is an exciting time to be joining a key growth area of The Miller Group Ltd and will serve to underpin our continued focus on providing innovative energy management and other technical solutions.

To apply please submit your current Curriculum Vitae including your existing remuneration package to Carol Watt, HR Advisor, Miller Group via email: Carol.Watt@miller.co.uk. Closing date for applications 18th February 2013.

Miller Group Ltd is an equal opportunities employer and has Investor in People status. We are committed to Equal Opportunities and actively encourage applications from disabled people. Disabled applicants will be offered an interview providing they meet the minimum criteria for the job.



HAYS Recruiting experts in Building Services

EXPAND YOUR HORIZONS

**ESTIMATING MANAGER
DRIVE STRATEGIC SUCCESS**

Kent, up to £65,000 + benefits

This successful M&E contractor with strong track record of growth seeks an Estimating Manager with mechanical or electrical bias to drive the success of their strategic plan.

They offer a wide range of building, M&E and renewable services to the housing, hospitality, commercial and healthcare sectors. You will join a stable management team and liaise with an impressive list of clients.

You will either have a proven M/E estimating background and looking to progress into a manager's role or currently be in a similar post with a distinguished M&E contractor **Ref: 1815770**

For more details contact Aadil Cockar on 020 8464 6678 or email aadil.cockar@hays.com

**SENIOR ELECTRICAL DESIGN ENGINEER
LIMITLESS POTENTIAL**

London, £45,000 + benefits

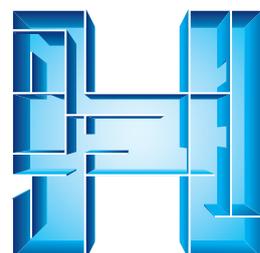
This well-known multi-disciplinary consultancy based in central London seeks an ambitious addition to their team. With numerous offices nationwide, they have always been at the forefront of stunning design work.

You will take leadership on a range of projects and use your experience to produce innovative concept designs.

You will be degree qualified or equivalent in electrical engineering or building services and be looking at progressing into chartered status. International project experience will be beneficiary. **Ref: 1885623**

For more details contact Ben Styles on 020 7259 8760 or email ben.styles@hays.com

These are just a selection of the opportunities we have to offer, please contact your local office for expert advice and confidential discussion 0800 716 026 or to find your local office, visit hays.co.uk



hays.co.uk/buildingservices



PROJECT MANAGER

Space Engineering Services delivers nationwide refrigeration, mechanical and electrical services to a range of business customers. From design and manufacture to installation and service and maintenance, we are committed to excellence in understanding, delivering, and managing our customers' needs.

Brief

As a result of recent business wins in our Building Services Department, we are now recruiting for a Project Manager to join our growing team. This is a great opportunity for somebody in the early stages of their project management career to join a vibrant organisation and to move their career to the next stage. We are looking for an ambitious and energetic project manager, with the skills and personal impact to make a significant contribution in a dynamic and growing organisation.

As part of the departmental Project Management team, you will lead the delivery of building services commissions for our retail clients. You will be responsible for delivering projects safely, on time, to the right quality, and within budget. You will be given significant responsibility and autonomy, but with the support and guidance of a strong back office network behind you.

Person Profile

Essential:

- Demonstrable track record of project management in a Building Services contracting environment.
- Willingness to work outside of normal office hours, and to undertake significant travel to client sites.
- Commercially astute; able to recognise risk and opportunity and create strategies to deal with both.
- Proactive attitude and ability to work with minimal supervision.
- Credibility and influencing skills; the ability to represent Space Engineering's interests in the face of client and/or supplier resistance.

Desirable:

- Experience of working within a retail environment.
- Building Services technical grounding.

Location

Based from our Bristol HQ, but will require travel to client sites across the UK, predominantly in the south.

For the full job description please visit:

<http://www.space-engineering.co.uk/work-for-us/careers/building-services/>



Specialists in Building Services Recruitment

Senior/Principal M&E Design Engineers | Berkshire | to £55K++ | ref: 2919

Our client, a blue-chip consultant, is looking for candidates who are ideally Chartered and who have a proven track record working on large commercial and residential projects.

Electrical Assoc Director/Team Leader | London | to £80K++ | ref: 2660

A major international M&E consultancy has an opportunity to work on large commercial and data centre projects alongside signature architects. Commercial awareness is essential.

M&E Design Engineers | London & Bristol | to £35K | ref: 3113

We are looking for client facing degree qualified engineers. Projects include commercial, residential and healthcare. Revit MEP experience would be beneficial, but not essential.

Senior M&E Design Engineers | London | to £55K++ | ref: 3126

An international multi-disciplined consultancy requires experienced Chartered engineers with a strong background working on rail station projects. Candidates will have a good knowledge of NR and LUL standards.

Int/Senior Electrical Design Engineer | Essex | £30-£45K | ref: 3222

A busy M&E contractor is looking for qualified engineers to work within the retail sector. This is an excellent opportunity to progress to Lead Engineer/Design Manager within 6-12 months.

M&E Design Engineers - all grades | Hampshire | £NEG! | ref: 3217

Many of our clients in the Hampshire area are looking for graduate through to senior and principal engineers. Projects include local authority, education, and large scale commercial and residential.

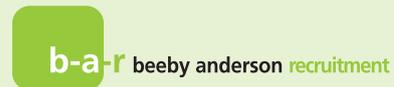
Senior Mechanical Resident Engineer | London | to £35LTD | ref: 3247

A leading multi-disciplined consultant is looking for a site based mechanical engineer to work on a data centre refurbishment, which will remain live throughout the works. 12 month contract.

t: 02392 603030

e: cv@blueprintrecruit.com

www.blueprintrecruit.com



Director of Mechanical Dubai, UAE - 55k AED (PCM)

This client is one of the largest International consultancies, employing well over 14,000 staff in its 280+ offices. They undertake a variety of schemes worldwide; the Middle Eastern region carries out projects within the healthcare, government, commercial, and education sectors. They are looking for a technical authority that is a natural leader of people. The candidate should have a background in building services design, be employed in a similar position within a consultancy, and possess a very well developed commercial acumen.

BAR 1047/PA

Head of Electrical Engineering Macau, Asia, 100,000HKD (PCM)

A fantastic opportunity has arisen with a world renowned Hotel/Casino chain, who are currently extending their operations in Asia by creating a prestigious new hotel/mixed use development. The opportunity they have is for an experienced electrical project design engineer, to take on a project management role and represent their interests as this project develops. You will be a technical expert, who is experienced in delivering large scale projects and who able to articulate in a professional technical manner.

BAR 992/PA

Senior Public Health Design Engineer

Dubai, UAE - 30k-35k AED (PCM)

We are currently recruiting for an internationally renowned consultancy, who have a presence in over 30 countries across the globe and who have forged a fantastic reputation for themselves in the Middle East. Their team in Dubai continue to win a variety of large scale projects and require an experienced Public Health Design Engineer to join their established expat team. Applicants will be from a building services design consultancy background, having had extensive experience in PH design on a range of project types/sizes.

BAR 1015/PA

Intermediate Electrical Building Services Design Engineer

London - £30k-£35k pa

We have an excellent opportunity for an Electrical Engineer to join a well-established, award winning Building Services consultancy in central London. Our client has 8 offices across the UK employing over 180 staff. The consultancy has been established for more than 50 years and has worked on high profile projects across a variety of sectors. With a strong focus on training and development through their CIBSE accredited skills programme our client offer a fantastic platform to progress your career.

BAR 920/JA

Senior Mechanical Building Services Engineer

Berkshire - £40k-£45k pa +Car Allowance +Bens

A fantastic position has arisen within an award winning multidisciplinary consultancy for a Senior Mechanical Design Engineer with unrivalled career progression opportunities. The client we are working with has been established for almost 70 years and have forged a solid reputation for themselves within the building services industry. Their 100+ strong team operate out of 8 UK offices covering a full range of project sectors, including but not limited to Commercial, Retail, Residential, Leisure, Education, Healthcare and Heritage projects.

BAR 1043/JA

For further information and to apply, please
call us on **+44 (0)203 176 2666**
or email **cv@b-a-r.com**

Thinking of your future

www.b-a-r.com

Events & training

NATIONAL EVENTS AND CONFERENCES

CIBSE Building Performance Awards
5 February, London
 Find out who the 2013 winners are at this prestigious industry event.
www.cibseawards.org

The future of light sources
12 February, London
 A Society of Light and Lighting lecture, with speakers Stewart Langdown and Peter Thorns.
www.sll.org.uk

Lighting Masterclass
28 February, Liverpool
 The Society of Light and Lighting Masterclass season continues its tour.
www.sll.org.uk

Ecobuild 2013
5-7 March, London
 Sustainable design, construction and the built environment.
www.ecobuild.co.uk

CIBSE Technical Symposium
11-12 April, Liverpool
 Two-day symposium with a focus on practices that ensure buildings realise their energy and environmental promise.
groups@cibse.org

ThinkFM 2013
10 June, London
 This year's focus is 'the leadership challenge'.
www.thinkfm.com

CIBSE GROUPS AND SOCIETIES

For more information visit
www.cibse.org/events

BREEAM: Planning law and carbon reduction commitment update
5 February, Derbyshire
 An East Midlands region evening meeting.
www.cibse.org/events

Lighting Education Trust – lighting teachers' meeting
6 February, London
 Meeting in association with Society of Light and Lighting and the CIBSE Daylight Group
Graham.phillips220@ntlworld.com

Wireless communications in buildings
8 February, London
 Joint event with Institution of Engineering and Technology (IET), Wireless Friendly Buildings Forum and CIBSE Intelligent Buildings Group.
www.theiet.org/wireless-buildings

Lighting design – why maintenance factors matter
13 February, Birmingham
 A West Midlands region event, with a speaker from Thorn.
Nigel.Marriott@gmtreble.co.uk

Humidity control – solving building performance issues worldwide
13 February, webinar
 Free webinar presented by Lew Harriman, Mason-Grant Consulting.
www.cibse.org/events

CIBSE ASHRAE Group AGM
13 February, London
 AGM to be followed by a presentation by Lew Harriman, which will also be webcast.
tjm@timdwyer.com

Modern CCTV system design
21 February, Bristol
 A south-west region event presentation covering the latest developments in the security industry, followed by a practical demonstration.
millham.orchard@fiscali.co.uk

Student event
26 February, Nottingham
 An East Midlands event in conjunction with local colleges and universities.
www.cibse.org/events

Developing membership evening
26 February, Bristol
 A south-west region event giving members and non-members the opportunity

to learn more about CIBSE membership and developing membership.
millham.orchard@fiscali.co.uk

Energy related event
26 February, Chelmsford
 A home counties north-east regional event with an energy focus.
robert.harness@uk.ebmpapst.com

Automatic power transfer systems
28 February, High Wycombe
 Home-counties north-west region event, with an introduction to Emerson Network Power.
www.cibse.org/events

CPD TRAINING
 For more information visit
www.cibsetraining.co.uk
 or call the events team on 020 8772 3660

Lighting legislation (including daylight)
5 February, London
Part L Building Regulations 2010
6 February, Birmingham

Unvented and other types of efficient hot water systems
7 February, London

Low and zero carbon energy technologies: undertaking feasibility studies and understanding design considerations
7 February, Manchester

Understanding and application of psychrometric charts
12 February, London

EPC training (training days)
12 February, Birmingham

Smart metering
12 February, London

Electrical services explained (three days)
12-14 February, Birmingham

Preparing FM and maintenance contracts
13 February, London

EcoBuild 2013
5-7 March, London



Last year's conference sessions were very well attended

CIBSE will have a stand celebrating building performance excellence at this year's Ecobuild conference and exhibition.

The event is billed as the world's biggest for sustainable design, construction and the built environment. This year Ecobuild will include more than 130 sessions and 500 industry experts, ministers and VIPs over a three-day period, while the exhibition will feature more than 1,500 exhibitors showing the latest products and services from across the built environment.

As a lead supporter, CIBSE will have a stand – N1150 – to give visitors the chance to find out more about the engineering excellence that underpins the world's best buildings.

This year the Institution will showcase the exemplar buildings, technologies, systems and products that featured in the CIBSE Building Performance Awards, which are due to take place on 5 February.

Seminars and case study presentations will offer an opportunity to meet those who are at the forefront of developing and operating some of the world's finest performing buildings as they share the best practice, technological advances and innovations that contributed to their success.

CIBSE will also once again be holding the popular Membership Clinic for members and non-members to answer any membership queries (see page 13).

To book your free place, visit www.ecobuild.co.uk

Lighting and energy efficiency
13 February, London

iSBEM training
14 February, Birmingham

Mechanical services explained (three days)
19-21 February, Bristol

Variable flow water systems design
21 February, London

Air conditioning inspection for buildings
21 February, London

Writing a comprehensive and compliant air conditioning report
22 February, London

Air conditioning basics 3: air conditioning plant
25 February, London

Air conditioning basics 4: automatic controls and refrigeration
26 February, London

How to specify ground source energy systems
27 February, London

Building electrics basics 3: physical distribution within building constraints
27 February, London

Introduction to energy efficiency
28 February, Newcastle



Partneriaeth
Cydwasaethau
Gwasanaethau Cyfleusterau
Shared Services
Partnership
Facilities Services

Senior Performance Standards Engineer (Water)

£38,851 - £46,621 Band 8a

Permanent, 37.5 hours a week

Bevan House, Llanishen, Cardiff

Reference: 120-EA856-1112

This is an excellent opportunity for an ambitious engineer eager to further their career to join the senior engineering team at NHS Wales Shared Services Partnership-Facilities Services (NWSSP-FS).

NWSSP-FS is based in Cardiff and 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 at least 5 years 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

Closing date: 22 February 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.



ME Engineers is a global engineering design firm with a 30 year history that includes the engineering of some of the largest and most recognised buildings in the world. Our portfolio includes all building types with our work in sports and healthcare design placing us at the top of those categories.

The firm has an extensive sustainable portfolio and is ranked in the top 3 MEP firms on the ENR Top 100 Green Design firm list. Our clients include architects, facility managers and government agencies. Our projects include new construction, renovations and energy retrofits.

As our success continues across Europe, the Middle East and Asia, we are looking to recruit talented engineers to work out of our London offices.

To apply, you will have achieved a good engineering qualification (preferably a Degree), be a team player as well as a practical thinker and be able to demonstrate excellent technical experience.

We currently have permanent vacancies for the following:

- **Mechanical and Electrical Graduate Engineers**
- **Mechanical and Electrical Intermediate Engineers**
- **Mechanical and Electrical Associate / Senior Engineers**
- **Public Health Engineers Senior / Intermediate**
- **Lighting Designer**
- **BIM / Revit Technicians**
- **Document Controller**

We offer excellent career prospects coupled with a competitive employment package.

To apply, please send your CV, contact details and the position for which you are applying to: info@me-engineers.co.uk or by post to: Human Resources, ME Engineers Limited, 57 Great Suffolk Street, London, SE1 0BB.

www.me-engineers.com



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Contact the sales team on 020 7880 6212
www.cibsejournal.com/jobs



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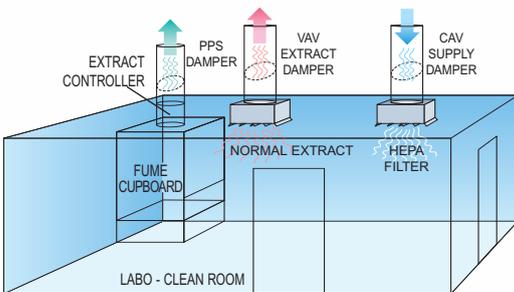


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A complete turn-key system to control room pressure to +/-1Pa. Fume cupboard face velocity to 0.5m/s at high speed and provide constant air changes into the labo - clean room.



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PPS Damper