

CIBSE

JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

September 2011

AIR CONDITIONING
BENEFITS OF VRF

MODEL PERFORMER
NEW SBEM TOOL

ENERGY MEASURES
LANDMARK OFFICE
BLOCK ASSESSED

WELL-LIT SPACE?
NEW GUIDELINES ON WORKPLACE LIGHTING

Low carbon cooling

There is a new innovation revolution in cooling technology which will change the way buildings are cooled forever. Cosaf are the UK's leading solution provider for evaporative cooling systems - delivering solutions for warehouses, factories, education centres, leisure centres, airports, offices, data centres and retail environments.

Using the latest Climate Wizard and Breezair technologies Cosaf can provide cooling systems that can save up to 90% on energy costs versus traditional air conditioning systems.

With no harmful refrigerant gases - our low carbon cooling system is the most environmentally friendly solution on the planet. Using water as a natural refrigerant, our cooling systems can deliver cool temperatures inside, regardless of what the temperature is outside.

Cosaf can provide cooling systems to almost any building environment, either retro fitted or as part of the building process.

Find out more view our video online at cosaf.co.uk/evaporative-cooling/

To arrange a free consultation or audit contact us today on **0845 873 0660** or info@cosaf.co.uk



Breezair
NUMBER ONE IN NATURAL COOLING
EXCLUSIVE DISTRIBUTOR

Contents

September 2011

NEWS

6 News

Insulation helps cut energy usage in homes by half; Green Deal pilot homes reject retrofits; contractors seek better employment model; and planning reforms target red tape.

15 CIBSE News

Call for papers; improve your appeal to employers; and New National Planning Policy Framework.



7

OPINION

18 Home advantage

What's stopping industry opening up the renewables sector to small households?

19 Your letters

We can do better with logbooks; wasted opportunity for Olympic sites.

19 Manufacturer's viewpoint

What still needs to be done to kickstart the retrofit revolution in existing buildings.

20 Regulations

Hywel Davies explains why anti-bribery laws will have major implications for firms in the sector.



18



34

Features

22 Energy measures

An energy efficiency health check reveals some useful findings at a landmark building in the City of London.

28 Model performer

Has the new version of the SBEM design tool kept pace with the stiffer requirements of the Building Regulations?

34 Cover story Well-lit space

Do the revisions to the latest European standard on indoor workplace lighting go far enough?

41 In the flow

Reducing energy losses in air conditioning by using variant refrigerant flow climate control systems.

51 Comfort zone?

New guidelines to help engineers design buildings with user comfort in mind.

55 Disjointed approach?

Why it is vital for design and installation teams to work together when creating a safe fire and smoke ventilation project.

LEARNING

59 CPD

Maintaining effective operation pressures in water distribution systems.

CLASSIFIED

65 Products

Products and services that are available now in the industry.

70 Directory

Your guide to building services suppliers.

PEOPLE, JOBS, EVENTS

71 Appointments

Find your next job here and online at jobs.cibsejournal.com

74 Looking ahead

The AECB annual conference, plus events and training in the months ahead.



Lowara OEM Partnership

Original equipment manufacturers sourcing pumps and other solutions can rely on Lowara to maximize performance, value, and efficiencies. Lowara's ability to meet the complex needs of OEM customers includes:

- **EuP Ready Products**
 - Extensive engineering and application expertise
 - Keen market insight
 - Global water leadership
 - Effective, practical, and innovative technology

We can offer OEM pumps and products for the following Markets:

- Domestic / Industrial Boilers
- Micro CHP
- Underfloor Heating / Mixing Modules
- Solar
- Condensate Removal
- Secondary Hot Water Pumps
- GSHP
- Electric Heaters
- UV
- Spa Pumps
- Heat Exchangers
- Expansion Vessels

OEM customers become partners with Lowara to form a successful team. To ensure that common goals are met, Lowara representatives and engineers work with partner companies every step of the way from idea, design, manufacturing, and quality control, through delivery, installation, and operation.

LOWARA UK Limited, Millwey Rise Industrial Estate, Axminster, Devon EX13 5HU
Tel: 07748 761078, Fax: 01297 630270, Email: lowarauk.marketing@itt.com <http://www.lowara.co.uk>



www.cibsejournal.com

Editorial

Editor: Bob Cervi
Tel: 01223 273520
Email: bcervi@cibsejournal.com
Reporter: Carina Bailey
Tel: 01223 273521
Email: cbailey@cibsejournal.com
Senior designer: David Houghton
Technical editor: Tim Dwyer

Advertisement sales

Sales manager: Jim Folley
Tel: 020 7324 2786, jim.folley@redactive.co.uk
Sales consultant: Mark Palmer, Tel: 020 7324 2785, mark.palmer@redactive.co.uk
Sales executive: Darren Hale
Tel: 020 7880 6206, darren.hale@redactive.co.uk
Recruitment sales: Stephen Fontana
Tel: 020 7324 2787
stephen.fontana@redactive.co.uk
Advertising production: Jane Easterman
Tel: 020 7880 6248
jane.easterman@redactive.co.uk

For CIBSE

Publishing co-ordinator: Edward Palmer
Tel: 020 8772 3697, epalmer@cibse.org

Editorial advisory panel

George Adams, engineering director, Spie Matthew Hall
Laurence Aston, director, Buro Happold
Annabel Clasy, mechanical building services engineer, Atkins
Patrick Conaghan, partner, Hoare Lea Consulting Engineers
Rowan Crowley, director, inside track
David Hughes, building services consultant, MTT Consulting
Philip King, director, Hilson Moran
Chani Leahong, senior associate, Fulcrum Consulting
Nick Mead, group technical director, Imtech Technical Services
Christopher Pountney, graduate engineer, AECOM
John Rene, engineer/acoustician, Max Fordham
Alan Tulla, independent lighting consultant
Ged Tyrrell, managing director, Tyrrell Systems
Ant Wilson, director, AECOM
Terry Wyatt, consultant to Hoare Lea

CIBSE Journal is written and produced by Cambridge Publishers Ltd. Tel: +44 (0) 1223 477411. www.cpl.biz 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.

CIBSE, 222 Balham High Road, London SW12 9BS
Tel: +44 (0) 20 8675 5211. www.cibse.org
©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 Edward Palmer at epalmer@cibse.org or telephone +44 (0)20 8772 3697. Individual copies are also available at a cost of £7 per copy plus postage.

The 2011 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 146th 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 146th Street, Jamaica, New York, NY 11434.

Cover photo: Shutterstock



ABC audited circulation:
19,139 January to
December 2010



Green shoots or wilted specimens?

While the industry is still sitting around waiting for the big day when the Green Deal will finally emerge into the daylight, there are worrying signs that the government's flagship policy for greening the housing stock may already be dead in the water. A series of pilot studies that were meant to provide 'green shoots' for the policy have thrown up some rather wilted specimens: of the 126 households in the pilot that received free energy audits and were offered the apparent no-brainer of an improvement package that would pay for itself through energy savings, 67 said 'no thank you' (News, page 7).

The report on these 'Pay As You Save' pilots, published by the sustainability body BioRegional, states clearly the main reason why so many households turned their backs on the package: if the answer to the question 'what does this offer me' is simply 'one bill

is replaced with another of similar or equal value' – the energy bill being replaced with the loan repayment – then there is not enough motivation for consumers to take action.

The Green Deal may have a good chance of succeeding if the lessons from such pilot studies are learnt and implemented. However, it is still a very big ask of consumers to take on the disruption, risks and long-term

uncertainty of major whole-house improvements on the basis of their environmental consciences. As BioRegional's report points out, the Green Deal needs to be 'financially compelling' for households. It is also a big ask of contractors that they should bear the responsibility, as the report puts it, to 'educate' householders about changes in their own behaviour that are needed to reap the full benefits of the improvements. Planners will also need to change their behaviour. Certain measures – including, crucially, external wall insulation – have to be able to be carried out without the requisite planning permission, the report argues.

As another new study shows, energy consumption in Britain's homes would be double the current level without the energy efficiency measures of the past 40 years (News, page 6). Let us hope the Green Deal, when it finally emerges in legislation, does offer consumers a compelling case for taking action.

Bob Cervi, Editor

bcervi@cibsejournal.com



In Brief

CONSTRUCTION SECTOR FACES ECONOMIC 'STORM'

The construction industry faces an 'economic storm' for the foreseeable future, according to head of Laing O'Rourke. Ray O'Rourke, the construction giant's chairman and chief executive, made the prediction following the release of its full-year results. He said: 'Looking forward, the engineering and construction sector will continue to face into an economic storm for the foreseeable future. However, O'Rourke was confident that the company would see more revenue growth from 2012-13.'

OUR READERSHIP SURVEY OFFERS A CHANCE TO WIN £100 OF VOUCHERS

In the past 12 months *CIBSE Journal* has continued to develop and we'd like to ask you what you think of how we are doing. Please spare five minutes to complete our survey. If you do, you could be in with a chance of winning £100-worth of vouchers of your choice. To complete the survey, visit www.cibsejournal.com

Insulation helps cut energy usage in homes by half

● Latest DUKES data show that efficiency measures are having an impact

Energy consumption in Britain's homes would be double its current level without the energy efficiency improvements made in the past 40 years, according to government figures.

They also show that gas provided almost half (47%) of the fuel used by power stations to create electricity, with renewables making up just 6.8% of UK electricity generation – 0.1% higher than in 2009.

The latest DUKES report ('Digest of United Kingdom Energy Statistics 2011') says: 'It is estimated that – had the savings through insulation and heating efficiency improvements from 1970 onwards not been made – then energy and consumption in homes would be around twice current levels.'

However, energy usage in Britain's homes rose by 12.6% in 2010 compared with the previous year – much of the hike due to 2010's unseasonably freezing winter.

Between 1990 and 2010, domestic energy consumption rose by 19% to its highest level since the peak of 2004.

The number of households in the UK has increased by 17% since 1990, with the population growing by 9%.

The figures also show that in 2009, space heating accounted for 61% of all energy consumed in the domestic sector, water heating for a further 18%,



prism63/shutterstock.com

'Had savings through insulations not been made, energy consumption would have been double'

lighting and appliances also 18%, and cooking 3%.

Overall energy consumption across all usage sectors fell by 0.4% in 2010 compared with 2009, continuing the downward trend of the last five years, according to adjusted data that exclude the effect of the bitter winter.

However, including the effects of the winter weather, overall energy consumption rose by 3.2% in 2010.

Four publications have been published by the Department for Energy and Climate Change: *Digest of UK Energy Statistics 2011*; *UK Energy in Brief*; *Energy Consumption in the UK*; and *2010 Energy Flow Chart*.

For more information visit: www.decc.gov.uk



JetSpray



HumEvap MC3



Condair FF2



Condair Dual 2

JS Humidifiers

The UK's widest range of adiabatic humidifiers.

Humidification & up to 12°C evaporative cooling.



E: sales@jshumidifiers.com

T: +44 (0)1903 850200

W: www.jshumidifiers.com



RETAILING RUSSIAN STYLE

Mott McDonald has been appointed as design engineer for a new 127,000 sq m retail centre in St Petersburg, Russia. The centre, which will be one of the largest in the city, will have three floors for retail units and two floors for car parking

Green Deal pilot homes reject retrofits

● Homeowners do not see policy as having long-term cost effectiveness

Nearly half of the participants in a Green Deal pilot project rejected plans to retrofit their homes because the work wasn't felt to be cost effective enough in the long term.

A total of 67 out of 126 targeted homes were retrofitted over two phases, between January 2010 and March 2011, during a Pay as You Save pilot project run by retailer B&Q, the London Borough of Sutton and BioRegional, a charity.

The review found that while most participants were generally interested in the financial benefits

that the loan offered – for example, the removal of upfront capital costs, the grant and the energy savings – the majority of homeowners believed the long-term savings were lower than expected.

The review states: 'This was one of the key reasons given by the homeowners initially interested in the pilot, who had an energy audit but then declined the offer – representing nearly half the total number of people involved in the project.'

The review also found that customers are not necessarily driven to retrofit their homes by immediate financial savings they may make, but by other factors, such as increasing comfort and using a professional installation service.

'Homeowners declining the offer of retrofits represented nearly half the total number'

The report concludes that selling home energy retrofits on the basis of cutting bills alone would be misguided.

However, it says that households that took part should see a 26% average reduction in their property's CO₂ emissions.

For more information visit:
www.bioregional.com

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



VELOGRID

Velocity Averaging Sensor



P-Sensor

CMR are the inventors and manufacturers of both the P-Sensor and the Velogrid. The Velogrids are made to measure to fit any ductsize up to 3m x 3m and the P-Sensor has a keyboard to easily enter : duct height - width - density - magnification factor and the scaling in m/s - m³/s - m³/h - l/s. It can even work out the Air Change rate. And the BMS gets three linear volume signal outputs of 0..10V 4..20mA and an addressable Modbus rtu bus.

CMR CONTROLS Ltd

22 Repton Court Repton Close
Basildon Essex SS13 1LN GB
www.cmr-controls.com

Tel +44 (0) 1268 287222
Fax +44 (0) 1268 287099
sales@cmr-controls.com



In Brief

WSP MAKES JOB CUTS

Consultancy WSP, which works on projects in the built and natural environments, slashed 400 posts during the first half of 2011, its half-year results confirm. Redundancies and restructuring cost the company £2m, with most of the multinational's job losses being in the UK. Global turnover increased from £354.4m in the same period last year to £362.2m in the first six months of this year. Profits fell from £17m to £14m. www.wspgroup.com

CARBON FLOOR PRICE CALL

Companies that use high levels of energy should be exempt from the carbon floor price, according to the CBI. The business lobby group says in a report, *Protecting the UK's foundations: a blueprint for energy-intensive industries*, that the carbon floor price is making it increasingly uncompetitive for the such companies to remain in the UK. www.cbi.org.uk

Contractors seek better employment model

● HVCA says blue-chip clients are demanding a more 'integrated' approach in the sector

A new 'framework' for delivering sustainable construction projects is being drawn up for mechanical, electrical and plumbing workers.

The Heating and Ventilating Contractors Association (HVCA) says it wants to galvanise the industry following an 18% fall in construction orders in the first quarter of this year, compared with the same period of 2010.

'Sustainable construction depends on adopting an integrated projects approach'

The shortage of work has led to redundancies over the last two years.

HVCA, which is working with major employers and unions, says it sees the industry moving towards a 'design-manufacture-install' model, as this is what blue-chip construction clients are demanding.

Chief executive Blane Judd said that the renewables market presented 'significant opportunities'.



Shutterstock.com

Trade body calls for a new construction framework

He added: 'Delivering sustainable construction is, however, dependent upon our adopting an integrated project approach – involving the teams, the supply chains and, critically, the workforce.'

'Putting a new framework in place now will ensure that the industry is in excellent shape to respond to an upturn when it does arrive, as well as assisting government in delivering its ongoing carbon reduction commitments. The UK can best implement the provisions in the directive that allow for smaller emitters to opt out.'

For more information visit:
www.hvca.org.uk



The Renewable Solutions Provider

Making a world
of difference

Planning reforms target red tape

● Councils told to produce proposals that reflect local needs

Planning legislation is to be slimmed down and simplified under new government proposals. Draft legislation, which has been released for consultation, will require councils refusing planning permission to demonstrate that the adverse impacts of a proposal 'significantly and demonstrably' outweigh the benefits.

The National Planning Policy Framework streamlines policy from more than 1,000 pages down to just 52.

Planning minister Greg Clark said: 'Clarity in planning has become lost in translation. National planning policy and central government guidance has become so bloated that it now contains more words than the Complete Works of Shakespeare, making it impenetrable to ordinary people.'

'We need a simpler, swifter system that is easier to understand and where you don't need to pay for a lawyer to navigate your way around. That's why we promised reform to make planning easier to understand and easier for everyone to use.'

The Department for Communities and Local Government says that the draft framework will help ensure that planning decisions 'reflect



Chrismeraj/Shutterstock.com

Natural heritage and biodiversity should be protected in local authority planning, say ministers

'We want to see greater clarity on what is seen as sustainable development'

genuine national objectives' – with environmental considerations at the forefront – while allowing local authorities to produce plans reflecting local need.

Biodiversity and 'natural heritage' should be protected, the framework stipulates.

However, the UK Green Building Council has warned that the document needs to contain a clearer commitment to sustainability.

It said: 'We support its intention to simplify the planning process, and applaud its emphasis on the need to achieve 'radical solutions' in greenhouse emissions through both new developments and support for the refurbishment of existing buildings.'

But it added: 'We would like to see greater clarity around what constitutes 'sustainable development' in order to ensure that the highest possible standards of sustainability are reached in each local authority.'

For more information visit:
www.communities.gov.uk



Welcome to a world...

...where renewable technologies are the way we do business.

The future of a sustainable built environment lies in reducing our energy requirements and the use of renewable technologies. At Mitsubishi Electric we will continue to develop market-leading products that meet or exceed Government targets and deliver significant energy savings and financial benefits to customers throughout the UK.

Welcome to Mitsubishi Electric.

 **MITSUBISHI ELECTRIC**
LIVING ENVIRONMENTAL SYSTEMS

Air Conditioning | Commercial Heating
Domestic Heating | Photovoltaics

www.mitsubishielectric.co.uk/aircon

In Brief

SECTOR SEES SECOND-QUARTER GROWTH

Construction and related services increased 0.5% in the second quarter of 2011, compared with negative growth of 3.4% in the first quarter of the year, according to figures from the National Federation of Builders. www.builders.org.uk

PRICE RISES INCREASE FUEL POVERTY, REPORTS DECC

One in five UK households now suffers from fuel poverty, defined as the expenditure of more than 10% of its income on fuel, according to the Department of Energy and Climate Change. Gas and electricity prices are expected to rise again in the next few months. www.decc.gov.uk

BDP defends legal action over design of schools

● Consulting engineer denies responsibility over claims of ventilation problems

BDP has defended its actions in designing elements of the award-winning Westminster Academy school in London, which has suffered ventilation problems allegedly resulting in staff and pupils being made ill.

Education Secretary Michael Gove and the school have launched High Court proceedings against the engineering consultancy, suing it for millions of pounds following various alleged problems including ventilation.

Bob Spittle, BDP's director and chairman of environmental engineering, told the *Journal* that he wasn't able to comment about all issues involved because proceedings are still ongoing, but he did elaborate on the ventilation problem, stating:

- BDP's design brief was to meet the criteria contained in the prevailing 'Building Bulletin' requirements, which at the time was BB87;
- BDP's design has been demonstrated to meet these requirements, once the defective workmanship items were eventually corrected; and



Westminster Academy: at the centre of a legal row

- BDP's proposals were for 'enhanced cooling' to improve the internal comfort conditions – to reduce maximum internal temperatures below the limits set by BB87. These proposals were not adopted, due to value engineering and lack of affordability.

He added: 'At all times BDP have worked hard to assist the academy in resolving the outstanding issues and we still are. We have always been willing to mediate this dispute and continue to do so.'

The legal case is continuing.

For more information visit: www.bdp.com

The Fläkt Woods Technical Site Services Team (TSS) can provide all levels of post-installation attention to air management equipment.

The TSS team has the experience to resolve any problem without unnecessary delay. Wherever possible, we can be on the case the same day, and, if needed, we'll work round the clock to achieve the solution.

Services include

- ✓ Inspection
- ✓ Monitoring
- ✓ Maintenance
- ✓ Repair
- ✓ Rebuild
- ✓ Replacement
- ✓ Upgrade
- ✓ External surveys
- ✓ Project Management

Product Ranges

- ✓ HVAC Systems
- ✓ Air Handling Units (AHU)
- ✓ Chillers
- ✓ Condensers
- ✓ Coils
- ✓ Controls

For more information call **01206 222547** or email service.uk@flaktwoods.com

Technical Site Services

by Fläkt Woods Limited



Fläkt Woods Limited

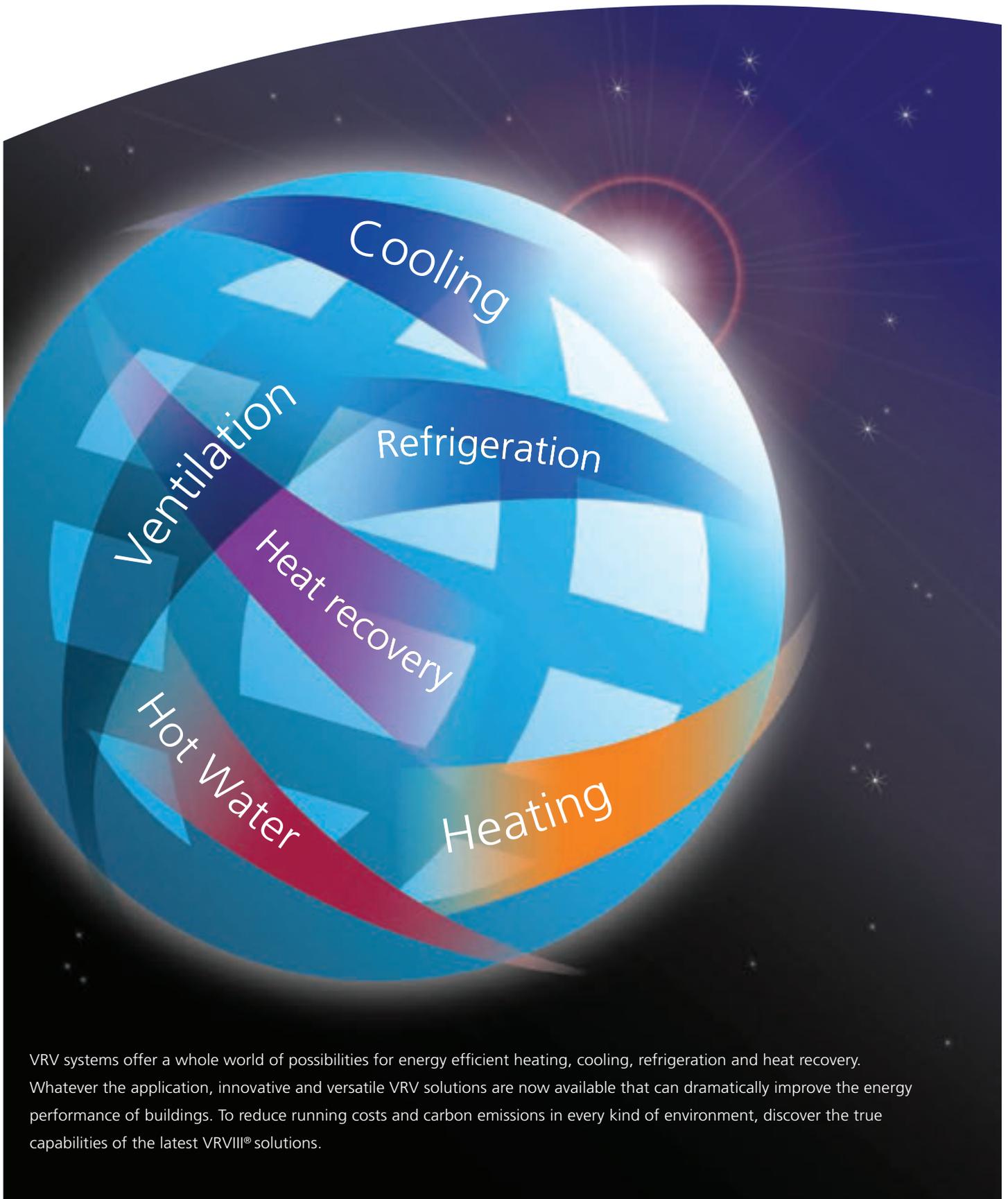
Axial Way, Colchester, Essex, CO4 5ZD

Tel: 01206 222 555 Fax: 01206 222 777

email: marketing.uk@flaktwoods.com website: www.flaktwoods.co.uk

FläktWoods

Discover a world of possibilities



VRV systems offer a whole world of possibilities for energy efficient heating, cooling, refrigeration and heat recovery. Whatever the application, innovative and versatile VRV solutions are now available that can dramatically improve the energy performance of buildings. To reduce running costs and carbon emissions in every kind of environment, discover the true capabilities of the latest VRV^{III}® solutions.

Discover Our World at www.daikinourworld.co.uk

Email vrv@daikin.co.uk or visit www.daikin.co.uk

your comfort. **our world.**

Scotland
Region
0845 641 9330

Northern
Region
0845 641 9340

Midlands
Region
0845 641 9370

Western
Region
0845 641 9320

North
London
0845 641 9360

South
London
0845 641 9355



In Brief

LONDON BUILDING 'BOOM'

Central London is seeing a development boom, with £21bn-worth of building schemes planned by 2020. The rush to build, which is seeing large numbers of foreign buyers invest in the area, is being attributed to a rise in property values. The figures were compiled by building consultancy EC Harris. www.echarris.com

OFFSHORE WIND RISES

The rate of offshore wind farm installations in Europe increased by 4.5% in the first half of 2011 compared with the same period of 2010, according to the European Wind Energy Association. The UK, Germany and Norway have been receiving electricity from 101 new offshore wind farms that opened in the first six months of 2011. www.ewea.org

UK's largest Passivhaus homes scheme planned

● **Project will involve super-insulation and high levels of air tightness throughout**

The popularity of the Passivhaus standard in the UK domestic sector appears to be growing. Building contractor Willmott Dixon has been appointed by the London Borough of Camden to build a 53-home development. It is said to be the UK's largest residential scheme so far to meet the Passivhaus standard.

In addition, competitions are set to be launched to build Passivhaus homes at BRE's Innovation Parks.

The development will meet the standard through a combination of super-insulation to reduce heat loss in walls, roofs and floors, and high levels of air tightness. Work is due for completion in 2013. The commercial element will be designed to meet BREEAM's Very Good rating.

Willmott Dixon Capital Works chief executive John Frankiewicz said: 'As the need to create ever-more energy efficient housing to mitigate against the rise in fuel prices becomes more critical, so will the use of systems like Passivhaus become more common as the standard to deliver affordable energy housing.'



Larch House in Ebbw Vale, Wales, is the UK's first zero carbon Passivhaus, according to BRE

'Camden is making a very imaginative and exciting statement on delivering low carbon housing that others will be watching closely.'

At the UK Passivhaus conference on 24 and 25 October, BRE will be launching competitions for the design of a Passivhaus on its Innovation Parks in Watford and Scotland.

For more information visit: www.passivhaus.org.uk

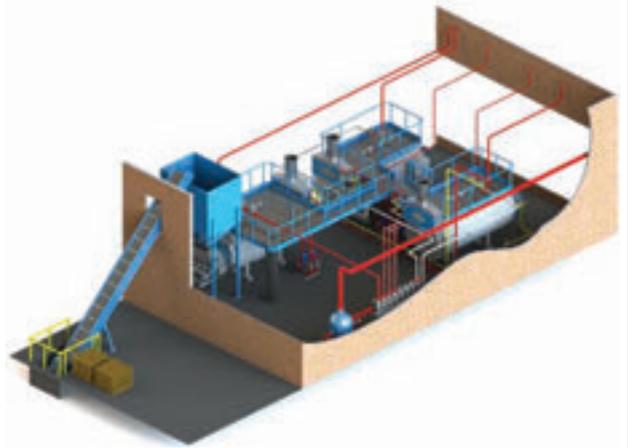
Pre-fabricated Energy Centres or burner retrofits

Biomass Biogas Liquid Biofuels Fossil Fuels

Nowadays there is no single 'off the shelf' solution for clean, cost efficient heat and steam generation.

The choice of fuels as well as of plant can make a significant difference to energy efficiency; fuel costs, fuel storage and supply risks; emissions; plant downtime risks and maintenance.

Dunphy has wide experience in auditing individual site energy and environmental needs and of developing tailored **Energy Centre** or **burner retrofit** specifications which deliver consistently reliable heat and steam services operating to high efficiency and low emission levels.



Dunphy single and multi fuel burners safely and efficiently combust gas, oil, B5 to B100 biodiesel, pure and waste vegetable oils, biomass and organic wastes and liquid biofuels.

Dunphy expertise encompasses the design, manufacture and installation of plant for all types of heat, steam, district heating and waste to energy processes.



DUNPHY

For further information, contact sharon.kuligowski@dunphy.co.uk or telephone her on **01706 649217**

Businesses encouraged to adopt greener practices

● Discussion document focuses on a range of environmental policy 'tools'

Businesses are to be encouraged by the government to adopt greener practices, so that natural resources will be used more efficiently and there will be less reliance on fossil fuels.

By 2020, the UK is expected to be importing 45% to 60% of its oil and 70% of its gas, with prices becoming more volatile as a result, according to a new government document.

Enabling the Transition to a Green Economy: Government and business working together is a cross-department paper that discusses a range of policy tools to include regulatory changes, fiscal measures and voluntary agreements designed to engage the business community in tackling climate change.

Companies will be encouraged to develop greener technologies and products, use UK-based

supply chains and adopt sustainability standards for their procurement.

Though the paper – drawn up by Defra, BIS, and DECC – provides little in the way of concrete policy, it summarises recent and pending government carbon reduction targets and provides a clear mission statement for the future.

Energy and Climate Change Secretary Chris Huhne said: 'British businesses hold the key to making a success of the green economy and the coalition wants to do everything it can to dismantle the barriers to making that happen.'

'In the end game, British business will be better off from the more stable and secure

economy that will come from reducing our dependence on fossil fuels.'

The UK Green Building Council welcomed the document. Chief executive Paul King said:

'All sectors must contribute to the development of a green economy, but arguably none more so than the built environment, which offers almost twice the cost-effective carbon mitigation potential of any other sector, and the

potential to create places for people to live and work in a more sustainable way.'

'British businesses hold the key to making a success of the green economy'
- Chris Huhne

For more information visit:
www.businesslink.gov.uk/bdotg/action



Denis Cristof/Shutterstock.com

Maximum performance

ON-GOING PRODUCT DEVELOPMENT ENSURES HIGHEST INDUSTRY STANDARDS

Duty up to 27m³/s

Variable sizes available with 25mm or 50mm construction

Low energy / high efficiency fans

Low Specific Fan Powers to achieve L2 Building Regulations

Variety of control options to suit unit requirements

RELAUNCH of an old favourite

- ▶ 50 standard case sizes in plantroom or weatherproof construction
- ▶ Detailed drawing supplied for each unit ordered
- ▶ Various construction options available for a range of applications
- ▶ Flat pack installation service



Tel: +44 (0) 8448 15 60 60 Web: www.ves.co.uk





Whatever the application, Heatrae Sadia has the answer

In addition to a range of class leading water heating and drinking water products developed specifically to meet the demands of busy environments such as health clubs, offices, service stations, bars and restaurants, Heatrae Sadia also provide a UK based customer support package.

We help you choose the right product:

- Dedicated Specification Call Centre.
- National field sales team.
- Spec Pro product sizing software.
- NewDesign indemnified in-house design team.

We manufacture in the UK:

- BS EN ISO 9001:2008 registered factory.
- ISO 14001:2004 environmental certified.

We provide technical support to installers:

- A team of helpful and qualified specialists offering support by phone or email.

We offer peace of mind with industry leading product guarantees:

- On-site service support including parts and labour.
- Service call centre open 363 days a year.
- A team of 280 field engineers covering all parts of the UK and Northern Ireland.

HEATRAE SADIA

For more information contact Heatrae Sadia on: 01603 420220,
email: specifier@heatraesadia.com or visit: www.heatraesadia.com



Call for papers

Members are encouraged to provide submissions for technical symposium

A call for papers for the CIBSE/ASHRAE Technical Symposium 2012 is being made to help engineers design systems to meet increasingly challenging performance targets in ever more complex buildings.

The 2012 symposium, which is entitled 'Building systems and services for the 21st century', intends to bring to the fore the latest practice and research, and provide a glimpse of future developments from across the world.

This is the second technical symposium organised by CIBSE and the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), which will take place on 18 and 19 April at Imperial College, London. It will encourage the participation of both young and experienced researchers and industry practitioners to share experiences and develop networks.

This invitation for papers concerns research and development into systems, including:

- 'Passive' building systems to reduce lifetime carbon footprint;
- Utilisation of renewable and sustainable energy systems in the built environment;
- Development, application and evaluation of building information modelling (BIM) for life-cycle building development and operation;
- Evaluation and application of smart meter techniques and technologies;
- Analysis and development of smart grids to improve the effectiveness of building systems;

'It will encourage the participation of both young and experienced researchers and industry practitioners to share experiences and develop networks'

- Innovations in building services systems to enhance the effectiveness of the built environment;
- Targeting and monitoring of resources to enhance building design, construction and operation;
- Environmental assessment and certification as a means of continual monitoring and improvement; and
- Developments and systems underpinning the

aspiration to host the 'world's first truly sustainable Olympic and Paralympic Games'.

Papers are welcomed based on recent and current research and application, as well as the actual or potential impact of that research on the built environment.

All papers will be peer reviewed and published electronically through CIBSE and selected papers may

be developed for publication in *Building Services Engineering Research & Technology*.

Abstracts

To enable your paper to be considered by the Symposium Technical Committee for inclusion, please provide an abstract no later than 3 October 2011. It should include the following:

- Title of the paper;
- Author(s) name(s) and affiliation; and
- Abstract between 100 and 300 words.

The submission needs to be written in English. Abstracts should be sent by email to groups@cibse.org

For more information:
www.cibse.org/events

Improve your appeal to employers

Make employers take more notice of your skills and abilities by achieving Associate membership of CIBSE (ACIBSE) and Incorporated Engineer (IEng) registration with the Engineering Council.

ACIBSE and IEng status not only recognises your proven commitment, skills and experience, but also identifies to employers that you have the competence, expertise and work ethics that they value.

It is a simple process to apply - the next closing date for UK applications is 1 February 2012. You need to complete the relevant application form and an engineering practice report showing how you have met 16 core competence objectives through your career. You will then demonstrate this at a one-hour interview by two senior members. You also need to provide a development plan of your intended Continuing Professional Development and a career history or CV.

You will need a relevant academic qualification for IEng registration, but we can check whether your current qualifications are acceptable and give you advice to achieve this. CIBSE also has a competence route to Associate membership for candidates who may not fully satisfy the academic qualifications.

Contact the CIBSE membership department on membership@cibse.org

Reminder – Annual Lecture 2011

Members are reminded that the 2011 Annual Lecture, to be delivered by Chris Wise, will be held on 10 November 2011 at the Wellcome Collection in London.

Wise co-founded design-led engineering consultancy, Expedition, in 1999, after a successful career with Arup. He has worked with many of

the world's leading architects, including Rogers, Foster and Renzo Piano.

The free lecture will start at 6.30pm, with registration and refreshments from 6pm. An evening reception will follow. Booking is essential, visit www.cibse.org/annuallecture or email wwilliams@cibse.org

Get in the LEED

We are running our first ever LEED training day on 26 September. It is the LEED 201 course on core concepts and strategies, which will allow people to enter themselves for the LEED Green Associate exam. For more information visit www.cibsetraining.co.uk/leed

Diary date

CIBSE Technical Symposium

In association with De Montfort University
● 6-7 September, Leicester
www.cibse.org/events

Learn about CIC Diversity Panel

The new CIBSE representative on the Construction Industry Council (CIC) Diversity Panel has been revealed as Dr Dorte Rich Jørgensen, who works as sustainability manager for Atkins on the Olympic Park site. The panel reports to the CIC executive board.

Andy Ford is working with Dorte and the CIC panel to encourage more women to join the profession. The panel gathers good practice case studies to develop the skill, retention and productivity of built environment and construction professionals.

Examples of case studies so far have focused on recruiting 14 to 19 year olds into the industry, working in construction during



Laura Bennidge

Dr Dorte Rich Jørgensen

a recession, support with CPD and the value of women. The panel has adopted a proposal from CIBSE that it considers an event for professional women in construction to identify common issues in the workplace and how CIBSE and other professional bodies can provide support.

To find out more, email Dorte at dorte-rich.jorgensen@atkinglobal.com or Liz Reading at the CIC, lreading@cic.org.uk

Dorte, who is a CIBSE member, was recently honoured by graduates of Balliol College, Oxford University, in recognition of having led the foundation of the graduate student body, Middle Common Room, in 1990.

Dorte was able to apply her engineering skills to oversee the refurbishment of the bar, which would eventually become the heart of the new common room. Dorte becomes not only the first engineer, but also the first woman to be honoured, and her portrait in Balliol College sits with other esteemed alumni on the college wall. She was also runner-up in the Women of Outstanding Achievement Award by the UKRC (www.theukrc.org)

New National Planning Policy Framework

● Members need to be aware of the changes

Government has published proposals to streamline national planning guidance. The National Planning Policy Framework (NPPF) aims to make the planning process less complex and more accessible. It

reduces more than 1,000 pages of policy documents into one 52-page framework, providing an integrated approach to planning.

The draft, expected to come into force this year, introduces a presumption in favour of 'sustainable development'. This will apply wherever a local authority's development plan is 'absent, silent, indeterminate or where relevant policies are out of date' – thus paving the way for many developers to justify their schemes directly against the framework, setting aside the local plans.

It is estimated that as recently as three months ago more than 80% of councils did not have valid development plans in place. Certain CIBSE members will need to be aware of the new system.

However, some green groups and conservationists have suggested that the positive

message in favour of development could undermine local plans, weaken community input and result in poor and inappropriate development.

The policy reaffirms the coalition's commitment to amend planning law, giving communities powers to ring-fence potential development sites and to identify local green spaces for special consideration

'The policy reaffirms the coalition's commitment to amend planning law, giving communities powers to ring-fence potential development sites'

based on 'natural beauty, historic resonances, recreational value, tranquillity or importance as wildlife habitat'. It devolves decision making to local level, scrapping national targets. But developers are concerned about the growth of multiple standards, extra costs and obstacles to using standardised solutions.

The 12-week consultation period closes on 17 October, coinciding with the passage of the Localism Bill through parliament.

For further information, links to the full draft, and to contribute to the CIBSE response, go to the Consultations section of the Knowledge Bank on the CIBSE website.

For more information:
www.cibse.org

YEN North West Centre launched

On Friday 1 July, Ben Cohen, of Arup; Magda Witt, of Foreman Roberts; and Craig White, of BDP, organised the launch of the CIBSE Young Engineers Network's (YEN) North West Centre in Manchester, kindly sponsored by Baxi Commercial Division and Compeat.

The event, held at the Chill Factor in Manchester, attracted more than 30 young engineers from the region, who celebrated the launch with skiing and

snowboarding on the snowy slopes, followed by food and drinks in the warmth of the Apres bar. It was deemed a huge success, with many enthusiastic young engineers from a variety of backgrounds and disciplines enjoying the evening. The YEN North West committee would like to thank all who attended, the sponsors, and everyone who helped organise it.

The YEN North West Centre aims to expand and is looking

to recruit new members to the committee to help organise future activities, social nights and CPDs. If anyone is interested in attending committee meetings or future events, please contact cibse.yen.nw@gmail.com for more details.

YEN is a network of regional centres that aim to provide a forum and support network for young engineers within CIBSE. Visit www.cibse.org/yen for more information.

DECC seeks candidates for 'head of engineering'

In a move supported by CIBSE, the Department for Energy and Climate Change (DECC) is recruiting for a head of engineering, a senior civil service position.

The creation of this post reflects the importance of having specialist engineering

knowledge at the heart of the policy-making process, and comes as a result of sustained lobbying by the engineering sector, including CIBSE.

The postholder will work closely with the chief scientific adviser to DECC, professor David MacKay, and will oversee the

work of engineers, ensuring they support policy development.

As industry faces the increasing challenge of delivering energy efficiency in buildings, it is vital that high quality candidates are found. Applications can be made at www.decc.gov.uk

New members, Fellows and Associates

FELLOW

Mark Swindlehurst Lancaster, UK

Mark Swindlehurst is director of facilities at Lancaster University. He is currently leading the £350m campus redevelopment programme and has specific interests in sustainability and learning/work space design. He is the deputy chairman of the Association of University Directors of Estates (AUDE) and will become its chairman in 2012.



ASSOCIATE

Paul Dodsworth
Leeds, UK

Jing Fen Yap
Parc Vista, Singapore

Peter Rankin
Leeds, UK

Vladimir Divac
Watford, UK

Adrian Morawski
Bristol, UK

Matthew Kirkham
Leeds, UK

Craig Cuninghame
Sale, UK

Daniel Yates
Manchester, UK

Robert Greaves
Wirral, UK

Richard McQuilliam
Amersham, UK

Martin Tracey
Walsall, UK

Konrad Kisilowski
Bromley, UK

Timothy Bartlett
Wimborne, UK

LICENTIATE

Niall Shortall
Northolt, UK

Roy Kirkcaldy
Leominster, UK

James Chaffer
Liverpool, UK

David Scott
Birmingham, UK

Paul Sutton
Wyndham, UK

MEMBER

Stephen White
London, UK

Patrick Hendry
Brisbane, Australia

Daniel Gilchrist
Downpatrick, UK

Patrick Mohan
Banbridge, UK

Gary Finch
Bury, UK

Michael Whalley
Bath, UK

Jon-Paul Ward
Manchester, UK

Patrick Josep Ferry
Glasgow, UK

Duncan Kerridge
Machynlleth, UK

James Porter
Hailsham, UK

Joseph Sheehan
London, UK

Rodney DeLuca
London, UK

Martin Bell
Inverness, UK

Jeff Fox
Birmingham, UK

Po Fat Brian Wong
Kennedy Town, Hong Kong

James Buddery
Sheffield, UK

John Hurn
Hertfordshire, UK

Mel Barton
Birmingham, UK

James Selby
Poole, UK

David Seymour
Edinburgh, UK

Adam McLoughlin
Glasgow, UK

Michal Koscielniak
Glasgow, UK

Jonathan Pollard
Banbury, UK

Huseyin Memduhogndonlu
London, UK

Jaspreet Sahota
London, UK

Jonathan Goodliffe
Leeds, UK

Evan Anthony Bickmore
Bristol, UK

Christine Wiech
London, UK

Lee Cleeton
Exeter, UK

Antony Cookson
Warrington, UK

Christopher Wilson
Oxford, UK

Richard Budd
Westbury, UK

Benjamin Buckinger
Stevenage, UK

Karen Warner
Glasgow, UK

Krzysztof Bednarz
Manchester, UK

Anna Dec-Kisielewicz
Leicester, UK

David Hayhurst
Blackburn, UK

Marketa Ruzickova
London, UK

Alan Featherstone
London, UK

Matthew Dixon Lowe
New Malden, UK

Mohamad R Kiani
Uckfield, UK

Damien Kane
Glasgow, UK

Man Sze Wong
Hong Kong

Anna Wendt
London, UK

Nadha Dawood
London, UK

Martin Skinner
Oldenburg, Germany

Husein Shobaki
Amman, Jordan

Yick Bun, Tommy Shum
New Territory's, Hong Kong

Paul Beech
Preston, UK

Leon Gadsdon
Leatherhead, UK

Ireneusz Starzyk
London, UK

Bryan Weng Keong Chan
London, UK

John Shipman
Belfast, UK

Andrew Jackson
London, UK

Andrew Williams
Didcot, UK

Ho Kwan Lo
New Territories, Hong Kong

Teodor Vicas
Manchester, UK

Zsolt Bako-Biro
Reading, UK

David Collier
Teddington, UK

Tat Shing Mickey Lau
Tuen Mun, Hong Kong

Chun Tao Chan
Kennedy Town, Hong Kong

Moon Chuen Leung
Shatin, Hong Kong

Shawn Gupta
London, UK

Che Wing Leung
New Territories, Hong Kong

Dominique Vosmaer
London, UK

Yat-hung Chris Chan
Kowloon, Hong Kong

Kin Chun Ho
Kennedy Town, Hong Kong

Ruggiero Guida
London, UK

Keith Ka On Lau
Kowloon, Hong Kong

Georgina Aderinola
Slade Green, UK

Levente Kurucz
Long Harborough, UK

Nelson Enrique Sarquis Sanchez
Egham, UK

Henry Rock-Evans
Bath, UK

Andrew Leiper
Edinburgh, UK

Lanzhu Shao
London, UK

Kenneth Sankam Fonso
Welwyn Garden City, UK

Noel Kendal Spillane
Birmingham, UK

Giuseppe Alessio Rocco
London, UK

Flex to suit every environment



Daikin Altherma Flex Type air-to-water heat pump is a world first renewable heating system – ideal for collective housing, leisure centres, businesses, public service and community buildings.

This highly efficient and versatile hot water and heating solution delivers water flows of up to 80°C and can be combined with solar thermal panels too.

So you can improve the energy performance of buildings, reduce running costs and cut carbon emissions in all kinds of environments.



Housing



Education



Health



Leisure



Community & amenity



Flex your renewable energy capabilities. Call 0845 6419000 or Email flex@daikin.co.uk quoting reference 0003/FX/AD or visit www.daikinheating.co.uk

your comfort. our world.

Scotland Region 0845 641 9330	Northern Region 0845 641 9340	Midlands Region 0845 641 9370	Western Region 0845 641 9320	North London 0845 641 9360	South London 0845 641 9355
----------------------------------	----------------------------------	----------------------------------	---------------------------------	-------------------------------	-------------------------------



HOME ADVANTAGE



We are all missing a golden opportunity if we fail to open up the renewables market to smaller households, argues **Chris Schuetze**

For renewable technologies to have their desired impact, they need to be accessible to everyone. Small households – including dwellings of any kind occupied by just one or two people – constituted 65% of all households in the UK in 2010, and the number of one-person households in England alone is expected to rise by an average 159,000 per year until 2033 (see UK Housing and Planning Statistics 2010). Yet, they cannot participate actively in renewables because of one or a combination of the following reasons.

Small households often lack the space and/or roof access needed for renewables equipment. Or the majority of equipment is not scalable to low-energy demands and performs less efficiently. Or the high upfront cost of renewables equipment and installation, combined with the lower energy demand of small households, results in unfavourable returns on investment.

Why is the market not addressing these issues? Primarily because of a lack of awareness of, and debate about, the problem, and consequently a lack of recognition by investors of the market opportunity. Consequently it seems that, if renewable technologies for small households are not on the radar of investors already, technology solutions looking for funding within this space are deemed as speculative and risky in nature, while products addressing problems in known fields will be considered as investable.

The lack of access to renewables for small households is of course not confined to the UK, otherwise we could just import suitable technologies

from abroad. Small households make up more than 50% of households in the majority of European countries and the USA (see OECD Family Database 2010) and their numbers are increasing worldwide.

A unique opportunity presents itself for the UK to take the lead in this unexplored part of the renewables market – to leverage its esteemed engineering and design expertise, to create more jobs and to export more products and know-how around the world. In addition, innovations that boost the efficiency of small-scale equipment are likely to have similar effects on larger-scale systems or extend their range of applications, thus increasing potential market penetration.

As an industry we can raise these issues when networking with business angels, venture capitalists and government officials. This topic

Making green technologies accessible to small households through innovation and adaptation has the potential to open up a large new market

should be on the radar of the cleantech sector, the investment community and governments.

In addition, if the UK government were to express explicit support for the widening of access to renewable technologies, by including it in the list of criteria of its funding bodies, it would send a clear and significant signal to the wider investment community. Making renewable technologies accessible to small



Small homes are badly catered for by the renewables market.

households through innovation and adaptation has the potential to open up a large new market with existing but unmet needs. It can also make a major contribution to carbon reduction targets, reduce energy bills and help to alleviate fuel poverty.

Such wider accessibility would also create increased awareness of the benefits of domestic-scale renewables and heighten acceptance of large-scale renewable infrastructure projects. It would also open up a range of opportunities for employment across the supply chain.

Tackling the small-household sector will have a positive knock-on effect for the whole cleantech sector. You can agree or disagree, but please carry on the debate so that the sector can continue to innovate and make a contribution to a low carbon future.

CHRIS SCHUETZE is managing director of Helianth Systems Ltd www.helianthsystems.co.uk

Jane McIlroy/Shutterstock.com

Your letters

We can do better with log books

Although the criticism was a little harsh, I do tend to have some sympathies with the letter on the lack of style in building log books (*Journal*, July, page 22). I helped to introduce log books into the Building Regulations and wrote TM31. But to be fair, this was 10 years ago. We tried to introduce 'locked' templates so that they couldn't be bought once, and then copied round the industry for multiple use. This wasn't very successful and they were unlocked in a lite-touch update in 2006. Looking back, this process didn't help the design.

But I certainly don't accept that log books are 'incomprehensible', and there are attempts in the template at a 'full service history' – although, with hindsight, not enough.

The published letter has prompted me to propose a review of TM31 to CIBSE, and any update should clearly involve a graphic

designer (which I am not). But I do feel the letter misses a key issue: the lack of enforcement leading to such small numbers of log books out there is very disappointing and detrimental to good facilities management. My plea is for better building regulations policing and more building log books, leading to improved building management, operation and performance.

Phil Jones
Chairman of the CIBSE Energy Performance Group

Wasted opportunity for Olympic site

Reading the recent article on the services at the London Olympics I was absolutely astounded at what was not there (*Journal*, September, page 16). Where are the geo-thermal systems, solar panels, wind generators, heat pumps and waste heat recovery? There is even a row of cooling towers on the roof to discharge heat into the

atmosphere. All that has been installed are some gas-guzzling boilers with a combined heat and power plant and a biomass boiler paying lip service to a green image. I cannot see the biofuel boiler being used much as there are not many trees in Stratford, biofuel will probably have a carbon footprint a mile wide. There is not even a waste heat incinerator to burn all of the rubbish that the site will generate. A golden opportunity has been totally wasted to show the world what have could be achieved.

Cliff Walker

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

Please send all letters and any other items for possible publication to: bcervi@cibsejournal.com, or write to Bob Cervi, Editor, *CIBSE Journal*, Cambridge Publishers Ltd, 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.

MANUFACTURER'S VIEWPOINT

Radical change is needed if we are to meet the challenge of making existing buildings more energy efficient, writes **Martin Fahey** of Mitsubishi Electric



It has become much more recognised that around 75% of our existing building stock will still be in use for the next 50 years. So to a large degree, the future is already built.

Yet the UK government is committed to reducing buildings emissions – one of the major contributors to greenhouse gases – and is looking for a 34% reduction by 2020 and an 80% cut by 2050 (when compared to 1990 levels).

The logical conclusion, therefore, is that although we have some brilliant architects, designers and specifiers who can give us zero carbon buildings, no realistic economic model will allow enough of them to replace existing buildings in time to meet the carbon emissions targets.

If the nation is to achieve the stated long-term emissions targets, what we need is a coming together of minds to find ways of drastically

reducing emissions from existing buildings.

Radical changes to how we both produce and consume energy are needed – and not just because our national fossil-fuel supplies

are dwindling, along with our energy independence.

'Being green' can be seen as demanding time and space in people's increasingly busy lives. One of the answers, therefore, has to be the increased

use of renewable energy – and the good news is that, when it comes to heating, ventilating, cooling and powering buildings, there already exist scalable and publicly acceptable alternatives

to traditional fossil-based systems, requiring minimum input from the end-user.

Buildings with renewable technology not only provide some level of visible energy independence;

behind the scenes they also consume less primary energy, thereby assisting fuel security.

The added advantage of this approach is that when people use renewable energy, they become more connected with their consumption, and this can help reduce it further.

Overall, public attitudes are evolving

along with the requirement to make energy consumption more visible, and this is creating a change in opinion in favour of renewable technologies. To make the most of this, the industry needs to

demonstrate the environmental and financial returns of these solutions.

Achieving major and lasting reductions in running costs and emissions means that we need to use energy more efficiently; and the first step to meeting this expectation has to be to help operators examine their own buildings to find ways of minimising consumption before trying to simply 'sell' solutions.

We also need to find ways of affecting the way equipment is selected, installed, maintained and controlled, and everyone should adopt a whole-life-cycle view when applying a solution – and this is where those involved in building services have such an important role to play.

We need a coming together of minds to drastically reduce emissions from existing buildings

SPONSORED BY



CLEANING UP



Britain's new anti-bribery laws will have major implications for firms in the sector, writes **Hywel Davies**

Many trends start in the US and cross the Atlantic. The Bribery Act 2010, which came into force on 1 July 2011, is the UK's tough new anti-bribery and corruption law, and mirrors the US Foreign Corrupt Practices Act (FCPA). The Bribery Act is widely considered to be a powerful piece of legislation, with significant powers to enable the authorities to act against companies found to have breached its requirements. In the US, juries have passed many guilty verdicts against individuals prosecuted for bribery.

The Act addresses four key crimes:

- Bribing: offering, promising or giving an of advantage;
- Receiving a bribe: requesting, receiving or agreeing to receive an advantage;
- Bribing a foreign public official; and
- The corporate offence of failing to prevent bribery.

It is the new offence of failure to prevent bribery which has attracted most headlines. This offence makes organisations criminally responsible for bribes made or offered on their behalf by 'associated persons', whether they know about them or not. To have a defence, the organisation must put in place 'adequate procedures' to prevent bribery.

There is government guidance on what these procedures need to cover, published by the Ministry of Justice. The six principles described in the guidance are:

Proportionate procedures: These should clearly set out the corporate policies, and should cover the company's approach to charitable and political donations, as well as to corporate hospitality. To amount to a bribe, such hospitality must be intended to induce a person to perform a function improperly. The

policy should address all employees and all people and entities over which the organisation has control.

Top-level commitment: This requires the establishment of arrangements across the organisation that make it clear to all that bribery is never acceptable, including a code of conduct.

Risk assessment: This is probably the key element of the procedures. Organisations need to assess the different bribery-related risks to which they are exposed. It is worth noting that the construction industry

Companies that can show they have 'adequate procedures' to prevent bribery will have an absolute defence against liability under the new law

is deemed to be a high-risk area. This is particularly the case where public contracts, permits or licences are involved. The guidance says that the risk assessment should be carried out 'regularly and comprehensively'. For those operating overseas, the other key risk will be the nature of the overseas work. There are organisations that provide guidance on relative risks in international trade and contracting.

Due diligence: There is a need to understand the nature and extent of your business relationships, and the risks that might arise from them. Do business partners have adequate procedures in relation to the Bribery Act, or are they developing them as a priority? Have they asked you

due diligence questions about the relationship? Do you have any joint ventures working outside the UK, and how are they covered by the respective JV partners' policies?

Communication and implementation: It's all very well having all these, but if they are on the Company Secretary's computer, or the corporate intranet, but nobody really knows what they say, or how the Board thinks they should be implemented, then they are unlikely to be deemed adequate. More importantly, the risk of the policy being breached is much greater if staff are ignorant of it. So there needs to be a plan to communicate and roll out the policies, and there needs to be action to ensure that new staff know about the policy, know what it says, and understand what happens if it is not complied with.

Monitoring and review: This refers particularly to the need to implement financial monitoring and internal audit procedures, in order to detect any unusual transactions or patterns. This is good accountancy practice, but is particularly relevant when seeking to observe any transactions that could be deemed unusual.

In conclusion, companies that can demonstrate they have such 'adequate procedures' to prevent bribery will have an absolute defence against liability under the new law. Similarly, senior officers of those organisations will also be shielded from successful prosecution (unless they are themselves individually implicated in any corrupt behaviour). This is likely to be a priority for many firms in our industry.

● **HYWEL DAVIES** is technical director of CIBSE

The Wisdom of TermoDeck

Free
night
cooling
saves energy



There is much wisdom in using TermoDeck.

TermoDeck is a proven system that captures and reuses energy, with the building's thermal mass acting as a store. It circulates cooled air using hollowcore slabs to maintain a comfortable temperature throughout the day, cutting emissions, costs and construction time. That's why buildings built with TermoDeck can achieve exceptional BREEAM ratings.

Contact us now for more pearls of wisdom.

www.termodeck.co.uk | termodeck@tarmac.co.uk | 0115 823 2744

Featured building: The Nottingham Geospatial Building, The University of Nottingham | Maber Architects | D3 Mechanical & Electrical Consultants

"The university's commitment to sustainability meant air conditioning was simply not an option. The energy savings delivered by TermoDeck played a crucial part in the sustainability strategy of the design."

Nick Keightley - Director, Maber Architects

TermoDeck

heats, cools and ventilates

ENERGY

CANNONBRIDGEHOUSE

Cannon Bridge House in the City of London was fitted out as a high-specification commercial and office building when it was built in 1989

When a landmark 1980s office block in the City of London underwent an efficiency health check, the consultants found much that was positive – but they also identified many tweaks that could improve performance further. In the fifth CIBSE-sponsored case study, **John Field** and **Alexandros Balaskas** outline their findings

MEASURES

Cannon Bridge House, a striking building in the City of London, was constructed in 1989 and fitted out as a high-specification commercial and office building.

Last year CIBSE commissioned Power Efficiency, an energy management consultancy, to conduct an assessment of installed technologies and the energy consumed, using the CIBSE TM22 *Energy assessment and reporting methodology* and comparing performance against benchmarks (see Figure 1).

The assessment was one of a number of CIBSE-sponsored investigations into real-life building performance, which have been published as a series of case studies in the *Journal* (see ‘Get the full report’ on page 26).

In assessing the energy efficiency of Cannon Bridge House, the consultants identified a range of improvement measures that could enhance the building’s performance. The seven-storey, multi-tenanted structure is arranged around a central atrium, with each floor divided into east and west wings. Two key energy efficiency features of the building are a variable air-volume air-conditioning system capable of using free cooling from ambient air, and a lighting system with presence detectors.

The following describe energy-saving measures which, if implemented, could reduce energy consumption and carbon

emissions further. The estimated payback for these measures, where applicable, are detailed in Figure 2.

Reinforce existing energy management practices

The first area to look at should be energy management: this will deliver cost savings relatively quickly and easily. It is rarely cost-effective to invest in other energy efficiency measures if energy management systems are not in place. Key changes and recommendations for Cannon Bridge House are as follows.

Appoint an energy manager: The organisation has indicated that it intends to invest further in energy saving measures. To ensure that such investment produces the maximum benefit, it is important that energy saving policy and its implementation is properly managed. Formalisation of responsibility for this area is essential, and one of the building management team should also be designated as the energy manager.

Form a ‘green team’: The first task of an energy manager could be to form an energy working group, including tenant representatives. The group could further devolve responsibility for energy management to individual areas, with clear consumption targets and monitoring, and adjustment for usage patterns and weather-related degree-day information. It would

These recommendations will, hopefully, provide engineering professionals and low carbon building assessors with insights that will help them to provide effective energy efficiency solutions in future



An overview of the plant at Cannon Bridge House

➤ need to meet on a regular basis and identify opportunities to reduce energy consumption and monitor progress.

Monitor energy usage: Energy use is currently recorded and readings are used to check the supplier invoices and make a brief comparison with previous monthly and yearly figures. But additional analysis of the regular readings will show any abnormal use. Action can then be taken to correct faults or prevent further waste. This analysis should be based on operation hours, usage patterns and weather-related degree information. Remote reading outputs from the tenant and the existing supplier meters could be linked to either a central PC or be available from the supplier web interface, which assists with this analysis.

However, the results must be publicised so that good and bad behaviours are evident, which often creates a more committed workforce. The central PC could be programmed to provide reports of consumption, together with operating temperatures and times.

Once parameters for building performance have been determined, the site performance can be targeted.

Any fluctuations above expected performance can be checked to determine any relevant reasons, such as failure of controls, longer operating hours, and so on. It is estimated that this activity would deliver savings of up to 5% of the annual consumption.

Regular reviews and action plans: Regular

reviews of energy-saving measures should not only cover both management and technical opportunities, but also identify further opportunities for energy saving. The reviews should be completed both during working group meetings and site tours covering working areas and plant rooms. The latter areas should be visited to identify potential problems with equipment and control systems.

The findings of the reviews – and any recommendations arising – should be incorporated into an action plan to ensure that energy-saving measures are implemented. The action plan should be regularly updated as the reviews are conducted, and the results of the improved monitoring and targeting incorporated to identify achievements to date.

Tenant awareness and monitoring programme

Improve awareness among tenants: A series of presentations is recommended in which tenants are made aware of simple energy-saving procedures covering use of lighting and heating.

Implement monitoring and targeting programme: Once the tenants are aware of the impact they have on the overall energy consumption, the building performance can be publicised and targeted savings identified. Any fluctuations above expected performance can be checked to determine any relevant reasons, such as failure of controls, longer operating hours and so on.

Publicise achievements: Actions taken by the organisation to reduce energy consumption should be publicised via internal newsletters and noticeboards to assist in improving the levels of awareness at the site. A Carbon Footprint certificate could be displayed in reception, along with the Energy Performance Certificate to reinforce the energy saving potential.

Install/commission variable speed drives on the main ventilation fans

The existing air handling units (AHU) in the main plant room provide heating and cooling to the building office floors, using the incoming fresh air mixed with return air from the occupied space. There does not appear to be properly commissioned variable speed drives (VSDs) on these units; the VSDs could be used to reduce air flows at times of low load. It is estimated that the current annual fan usage is around 3,355,000 kWh. An average 25% reduction in flow rate would give a saving of 838,750 kWh.

Figure 1: Annual energy performance of Cannon Bridge House compared with benchmarks in CIBSE TM46 Energy benchmarks (available at www.cibse.org/bookshop)

	Metered energy at CB House		Benchmarks	
	Actual	Adjusted	Good practice	Typical
Electricity kWh/sq m	509	509	118	208
Non-electricity kWh/sq m	138	138	91	171
Emissions kg CO ₂ /sq m	300	300	81	145

Installation of VSDs on refrigeration pumps

The refrigeration pumps run when scheduled 'on' throughout the year, even during periods of low demand. Installing VSDs on refrigeration pumps would ensure that the mass flow of water is reduced when the load is low, reducing the power requirement considerably while still providing sufficient cooling as the flow temperature would be unaffected. This could yield a significant 20% cut in electricity use.

Fit PIR sensor controls to toilet lighting

Passive infrared (PIR) sensor controls would ensure that lights in toilet areas used infrequently are not left on continuously, and also provide a constant reminder that energy saving is now critical to business success. Each toilet is fitted with 18W lamps that are in use for about 85 hours per week. It is estimated that 30% of the energy used for toilet lighting is wasted.

Evaluate benefits of turning off escalators

The use of escalators represents a main source of energy consumption when they are used continuously in periods where low occupancy occurs in a building. A possible reduction in operating hours throughout the day may lead to significant energy and

carbon savings. The escalator consumption is calculated to be 238,000 kWh throughout the year, considering an operation time from 6am to 11pm, with a peak in energy use between 9am and 6pm. If the operation is reduced to core hours only, the potential savings are calculated to be 56,000 kWh per year.

Voltage power optimisation (VOP):
A feasibility study into using VOP is recommended. VOP is the managed reduction of voltage supplied to the site to reduce energy use, power demand and reactive power demand. The potential savings are strictly associated with the current site voltage and the scope for reduction. Consequently, assuming 4% potential savings was available, this could produce an estimated overall saving of £37,600 per year.

Conclusion

Implemented measures and proposed energy performance improvement measures have an assessed annual cost saving of £219,100 per year, with an overall payback period of 0.9 years (see Figure 1).

The assessed energy cost savings are 30% and carbon emission savings are 32% for electricity, and 8% for gas.

The findings and recommendations outlined here will, hopefully, provide engineering professionals and low carbon building assessors with insights that will help >



KEY FINDINGS USING TM22

- Refrigeration represents 8% of the total energy consumption and is 12% worse (higher) than the typical benchmark
- The fans' operation represents 32% of the electrical energy use and is 11% worse (higher) than the typical benchmark
- The pumps' operation represents 4% of the electrical energy use and is almost four times higher than the typical benchmark
- Office equipment represents 11% of energy consumption and is nearly twice as high (worse) than the typical benchmark

Figure 2: Recommended measures, costs and payback periods

Measure	Electricity savings estimate (kWh/yr)	Gas savings estimate (kWh/yr)	Carbon dioxide saving (t _e CO ₂ /yr)	Cost saving (£/yr)	Guide price (£)	Simple payback period (Years)
Shorter term payback measures						
Reinforce existing energy management practices	523,400	141,850	307	51,400	3,000	0.1
Implement monitoring and targeting with development of tenant awareness	209,360		112	18,800	5,000	0.3
Building management system scheduling and control review	314,040	85,100	184	30,800	35,000	1.1
Install variable speed drives on the main extract fans	838,750		450	75,500	55,000	0.7
Evaluate benefits of turning off escalators	56,000		30	5,000	1,000	0.2
Voltage optimisation	418,000		224	37,600	80,000	2.1
Sub total	2,359,550	226,950	1,309	219,100	179,000	0.8
Medium term payback measures						
Install variable speed drives on refrigeration pumps	80,000		43	7,200	25,000	3.5
Fit PIR controls on toilet lighting	4,800		3	400	1,500	3.8
Sub total	84,800	0	46	7,600	26,500	3.5
Total	2,444,350	226,950	1,355	226,700	205,500	0.9



Compressor fans on the roof of Cannon Bridge House

► them to provide effective energy efficiency solutions in future. For CIBSE, the lessons learnt will provide key insights for the wider engineering community involved in the built environment. **CJ**

Get the full report

For the full survey report, go to the digital version of the September 2011 *CIBSE Journal* edition at www.cibsejournal.com Previous survey reports can be found with February 2011, October 2010, June 2010, February 2011 and May 2011 digital editions of the *Journal*, at the same website.

Special offer on Knowledge Series

CIBSE is offering a discount on publications from the Knowledge Series relevant to this article: *Managing your building services* (KSo2); *Understanding controls* (KSo4); and *Making buildings work* (KSo5). These can be purchased together for £25 (members) or £50 (non-members), a 60% saving from the list price, by quoting the discount code ECS Set – visit www.cibse.org/bookshop

CIBSE TM22 and TM46

CIBSE TM22 *Energy assessment and reporting methodology* and CIBSE TM46 *Energy benchmarks* are also both available at www.cibse.org/bookshop

● **JOHN FIELD** and **ALEXANDROS BALASKAS**
work for Power Efficiency www.powerefficiency.co.uk



Building services Systems in place

Heating and hot water: Heating is provided by three low pressure hot water (LPHW) De Dietrich gas boilers located in the basement, which were installed in the original fit-out and are connected in parallel. Primary water is circulated through the low-loss headers and is then pumped to heating circuits in the building.

Chilled water system: Cooling is provided by four Hitachi chillers located in the basement of the building. The chillers were replaced in 2008. The cooling output of 960 kW is modulated by unloading the refrigerant compressor. Each chiller has a dedicated 45 kW primary pump linking to the evaporator units, and there is a 30 kW secondary pump providing chilled water to the various cooling circuits. The

chilled water system operates under the requirements of the building management system and has a scheduled operating time of 17 hours per day.

Air conditioning and ventilation: These are provided by means of a variable air volume (VAV) system using Carrier Moduline terminal units. The incoming air is ducted from the air handling units to the VAV system to temper the internal environment of the building. The main plant supplies both the west and east wing of the building. In addition, there are several more air handling units (AHU) supplying ancillary areas such as toilets, kitchens and lift lobbies. The ventilation operates under the BMS requirements and is activated mostly from 6am and disabled at 11pm. Air conditioning for

the atrium level and level two west of Cannon Bridge House is provided using a fan coil and recirculation system.

LIGHTING

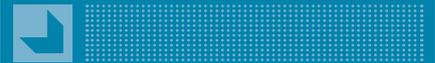
Open plan offices: Provided by ceiling-mounted PLL lamps with three tubes per fitting, each rated at 36W. The lighting on floors one to six operates on a PIR system.

Conference/meeting rooms: Provided with ceiling-mounted tubes, rated at 50W.

Circulation areas: Provided with ceiling-mounted tubes, rated at 30W.

Toilets: A mixture of ceiling-mounted fittings and wall-mounted compact fluorescent lamps, rated at 26W and 18W respectively.

Lift lobbies: Provided with ceiling-mounted twin fittings compact fluorescent lamps, rated at 36W.



RECOMMENDATIONS
PROJECTED PAYBACK FROM IMPROVEMENTS

● Reinforce existing energy management*

Assessed cost savings: £51,400 per year
Assessed CO₂ savings: 307 teCO₂ per year
Energy savings: 523,400 kWh electricity and 141,850 kWh gas
Budget cost: £3,000
Simple payback period: immediate

● Implement monitoring and targeting with development of tenant awareness

Assessed cost savings: £18,800 per year
Assessed CO₂ savings: 112 teCO₂ per year
Energy savings: 209,360 kWh electricity
Budget cost: £5,000
Simple payback period: 0.3 of a year

● Building management system scheduling and control review

Assessed cost savings: £30,800 per year
Assessed CO₂ savings: 184 te CO₂ per year
Energy savings: 314,040 kWh electricity and 85,100 kWh gas per year.
Budget cost: £35,000
Simple payback period: 1.1 years

● Install/commission variable speed drives on the main ventilation fans

Assessed cost savings: £75,500 per year
Assessed CO₂ savings: 450 teCO₂ per year
Energy savings: 838,750 kWh electricity
Budget cost: £55,000
Simple payback period: 0.7 of a year

● Evaluate benefits of turning off escalators

Assessed cost savings: £5,000 per year
Assessed CO₂ savings: 30 teCO₂ per year
Energy savings: 56,000 kWh electricity
Budget cost: £1,000
Simple payback period: immediate

● Fit PIR controls on the toilet lighting

Assessed cost savings: £400 per year
Assessed CO₂ savings: 3 teCO₂ per year
Energy savings: 4,800 kWh electricity
Budget cost: £1,500
Simple payback period: 3.8 years

● Installation of voltage power optimisation

Assessed cost savings: £37,600 per year
Assessed CO₂ savings: 224 te CO₂ per year
Annual Energy savings: 418,000 kWh of electricity
Budget cost: £80,000
Simple payback period: 2.1 years

● Useful energy management publications

CTVo22: *Energy management strategy – a management overview*
CTVo23: *Energy management practical – a management overview*
CTVo27: *Metering technology overview*
FEB021: *Simple measurements for energy and water efficiency in buildings*
All the above are obtainable from the Carbon Trust Order Line on 0800 085 2005, or by visiting www.carbontrust.co.uk/publications
*ISO 50001 is the international standard for energy management. www.bsigroup.com

So much power. So little space.

Eurocondense three.
Scaling new heights.



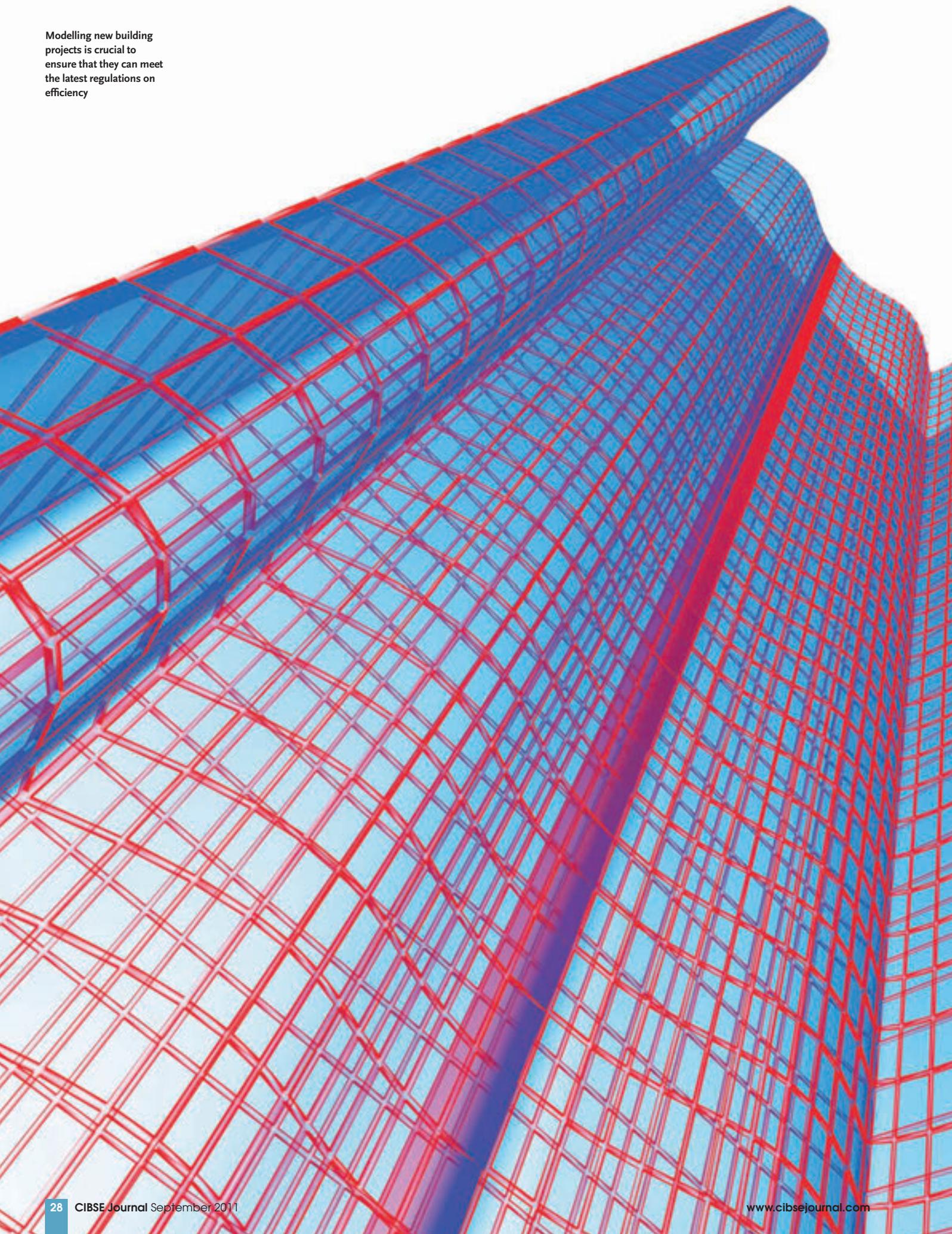
*Introducing the NEW "Smaller Footprint"
condensing boiler from Potterton Commercial.*

Established values.
Leading edge technology.

Baxi Commercial Division
0845 070 1055

POTTERTON
COMMERCIAL
www.pottertoncommercial.co.uk

Modelling new building projects is crucial to ensure that they can meet the latest regulations on efficiency



MODEL PERFORMER?

Last year saw the arrival of an updated version of the SBEM design tool, which aims to predict building performance. But, asks **Geoff Russell-Smith**, has this new version kept pace with the stiffer requirements of the latest Building Regulations?

The 2006 Building Regulations heralded a step change in approach, by their requirement for consultant engineers to look at the energy consumption of the whole building rather than the individual components and elements. Simplified Building Energy Model (SBEM) software was introduced in 2006 as a design tool for non-domestic new buildings. SBEM's aim was to enable designers to create a model that would predict the building's performance – and therefore demonstrate compliance with the regulations.

However, the Building Regulations and Approved Documents (ADs) are moving on: we now have the 2010 version (and more changes will follow in coming years). Likewise, the modelling software has been revised, and the new SBEM 2010 is in use. So, how different is SBEM 2010 from its 2006 version? In other words, how do the changes reflect the new demands in the latest Building Regulations?

One way of answering these questions is to apply SBEM 2010 to a building that was designed using the 2006 version. This will not only show how the building fares under both versions but, more crucially, how the building could be upgraded to meet the more stringent requirements of the Building Regulations 2010.

In addition, the limitations of SBEM – which, after all, is a simplified tool rather than a full design tool – can be highlighted in such an exercise.

SBEM comparison case study

A two-storey office building in Birmingham, known as the Business Innovation Office, was used as a real-life case study to compare these two SBEM versions: 2006 v3.4a and 2010 v4.1c. The building has rooms on either side of a central 6.5m circulation space, and a total floor area of 1,391 sq m. There are 19 lettable rooms, varying in size from 22 sq m to 112 sq m, to be occupied by small businesses. The innovation centre also has a number of shared meeting facilities and support areas.

The main axis of the building is east-west. The brief is for operative temperatures not to exceed 24C.

For the 2006 SBEM analysis, the building envelope was characterised as in Figure 1; that is, with relatively low U-values and double-glazed, argon-filled windows and lighting provided by T5 lights (16 mm diameter – triphosphor coated fluorescent tube, high-frequency ballast). Some features, such as photoelectric light sensors, were selected, but no renewable technology was used.

The result showed a predicted energy usage of 89.74 kWh/sq m yr and Building Emission Rate (BER) of 33.66 kg CO₂/sq m yr. (See Figure 2 for full set of results.)

The benefits from the investment in a well-insulated fabric are apparent in the low heating energy requirement of 15.44 kWh/sq m yr, and a relatively low lighting energy use of 22.49 kWh/sq m yr.

Despite the relatively energy conscious ➤

Insulation – wall U value	0.25 W/sq m K
Insulation – floor U value	0.22 W/sq m K
Insulation – roof U value	0.16 W/sq m K
Window type – 4-20-4 Argon filled	1.96 W/sq m K
Air permeability	5 cu m/sq m hr
Power factor	<0.9
Lighting	T5
Lighting design	No
Lux	No
Lighting controls	No
Photo electrics	Yes
HVAC System	Fan Coil
Heating System	LTHW Boiler
Heat Source	Natural gas

Figure 1: Selected design parameters

design, the building would only just comply with AD Part L 2006. However, for the building to perform as predicted by SBEM 2006, it would require exemplary occupant behaviour and all systems to be operated and controlled as designed.

Remodelling in SBEM 2010

Since 2006, SBEM has evolved to adopt CEN modelling standards. Partly due to this, when the same building was modelled using the 2010 SBEM (v4.1c), the BER increased by 2.04 kgCO₂/sq m yr. However, this adverse effect only highlighted the more stringent 2010 requirements, as the Target Emission Rate (TER) had fallen from 34.69 to 17.99 kgCO₂/sq m yr in the four years since SBEM 2006.

Clearly, lighting was an issue, and so the rating was re-run after a full lighting design was carried out. This improved the BER significantly to 28.66 kgCO₂/sq m yr, still well short of the TER.

In a final effort to comply, 125 sq m of photovoltaic (PV) solar panels were added, and this contributed to a further fall of 5 kgCO₂/sq m yr to 23.39 kgCO₂/sq m yr – but still not low enough.

The decision was made to adopt chilled ceilings and a variable-speed mechanical ventilation system, with heat recovery as well

as a night cooling strategy to cool exposed concrete soffits. The night cooling was set to run for 100 hours per month, and the building retained the lighting design and PV panels described earlier.

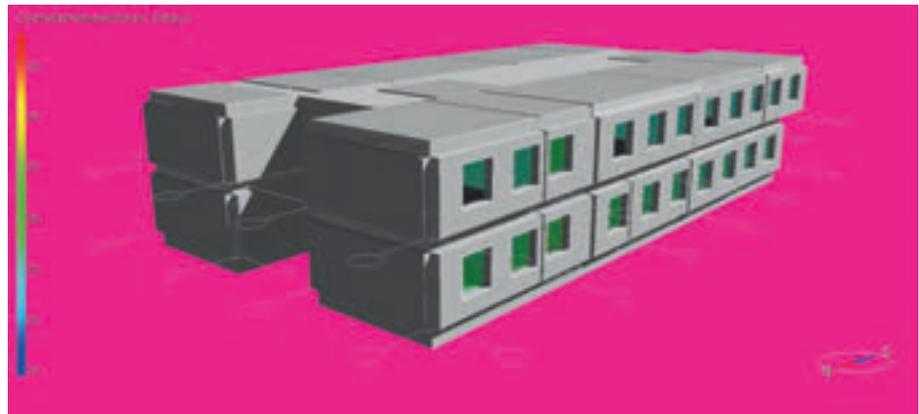
The SBEM output from the amended building design is better than the required TER, with a Building Emission Rate of 17.47 kgCO₂/sq m yr.

Importantly, it would also be up to the design team to demonstrate that, by changing from a fan coil type system to one based on exposed concrete ceilings, displacement ventilation and night ventilation, the client’s comfort expectations can still be achieved.

Changes between 2006 and 2010 SBEM

The most obvious change was the drastic reduction in the target emissions. Prior to the announcement of the 2010 revisions to the Building Regulations, the targets were described as being aggregated by sector, and a figure of 25% reduction across the board was proposed. As this example shows, the actual reduction for this particular building type was very much more severe, providing a challenge to the designers.

The carbon reduction on a particular building design is not, in fact, governed by the selection of building type in SBEM (B1 Office



A computer image of the Business Innovation Office, Birmingham, which is used to compare two SBEM versions

	TER	BER		Heating	Cooling	Lighting	Hot Water	Auxiliary	Total
	kgCO ₂ /sq m yr			kWh/sq m yr					
SBEM 2006	34.69	33.66	Actual	15.44	28.92	22.49	3.01	19.88	89.74
			Notional	63.28	44.1	33.64	4.68	4.69	150.39
SBEM 2010 unmodified building	17.99	35.7	Actual	10.76	8.20	32.16	3.06	23.39	77.583
			Notional	20.48	6.25	17.06	2.82	2.55	49.16
SBEM 2010 with building systems modified	17.99	17.47	Actual	14.16	5.17	19.02	3.06	13.2	54.61
			Notional	20.48	6.25	17.06	2.82	2.55	49.16

Figure 2: Consolidated output from SBEM

The FLEET



Hamworthy

Heating *at work.*

The most versatile boiler ever

An advanced condensing boiler design which sets new standards for delivering heat from small spaces, the FLEET range comprises wall hung, floor standing horizontal and vertical models.

Transforming commercial boiler solutions, each FLEET model features our new heat exchanger, which comes with a 5 year warranty.



FLEET Vertical

26 models
80-1050kW



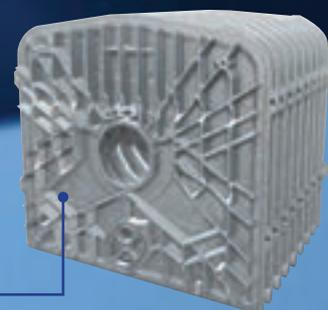
FLEET Wall hung

8 models
40-150kW



FLEET Horizontal

13 models
40-350kW



Hamworthy's
innovative
NEW heat
exchanger!



Check out the impressive performance of the FLEET.
Talk to Hamworthy for all your commercial boiler needs.

Tel: **0844 225 1588** Email: fleet@hamworthy-heating.com

Visit: www.fleetboilers.com

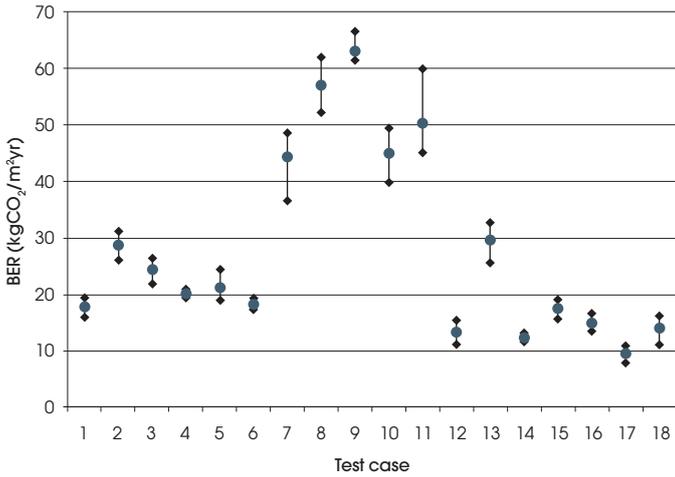


Figure 3: Average BER and spread of BER calculated for test case buildings using iSBEM and three leading commercial modelling tools (Source: AECOM)

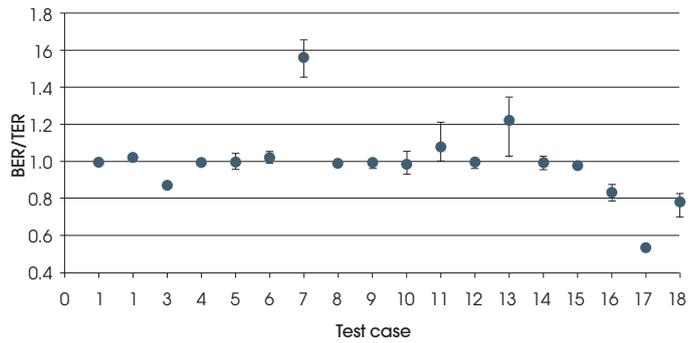


Figure 4: Average BER/TER ratio and spread of BER/TER ratio calculated for test case buildings using iSBEM and three leading commercial modelling tools (Source: AECOM)

The test cases in Figures 3 and 4 relate to:

- 1 Office: naturally ventilated (NV);
- 2 Office: fan coil units;
- 3 Office: chilled beams;
- 4 Office: NV + split air conditioning units;
- 5 Office: mechanically ventilated + split air conditioning units;
- 6 Warehouse: heated only;
- 7 Warehouse: air conditioned;
- 8 Hotel: heated only;
- 9 Hotel: air conditioned;
- 10 Retail: heated only;
- 11 Retail: air conditioned;
- 12 School: heated only;
- 13 School: air conditioned;
- 14 Office: NV + biomass;
- 15 Office: NV + solar water heating;
- 16 Office: NV + combined heat and power;
- 17 Office: NV + wind turbine;
- 18 Office: NV + photovoltaic solar panels.

and building workshop in this example) but by the actual design of the building against the notional and associated values contained in the databases used by all compliance-checking software. So, some building types will be required to achieve a bigger improvement than 25%, while others will need to achieve less.

The latest SBEM has many more options that allow building systems to be more closely represented in the SBEM software. Some of these include variable speed pumps, fan power, variable speed heat recovery and night ventilation. Generally, the latest version has improved calculation methods that will reduce both the actual and notional buildings emission rates.

Dynamic simulation tools

SBEM has never been intended as a design software tool. The fact that the ‘S’ stands for ‘simplified’ suggests the aim of the tool is to demonstrate compliance, rather than to optimise the detailed building design. Accredited dynamic simulation tools should offer more accurate and sophisticated capabilities to refine designs.

SBEM is not designed to show the merits of particular proprietary systems or techniques within a design. For example, for night cooling, SBEM uses the methods as outlined in BS EN13790 *Energy performance of buildings – calculation of energy use for space heating and cooling*. This standard does not show the benefits of techniques such as active thermal mass, and additional reductions in energy use are likely to be gained, for example, by channelling air through structural components such as hollowcore concrete slabs to gain additional heating and cooling storage.

The actual predicted value is a hypothetical calculation, because operation is unlikely to fully match the modelled standardised assumptions.

Consistency of analyses

Concerns about consistency have prompted a number of comparative studies of software models including SBEM.

Test cases have recently been evaluated considering the BER, the ratios of BER/TER and BER/SER (standard emission rate used for the generation of Energy Performance Certificate ratings) in a range of buildings, and show reasonable levels of consistency between the current 2010 approved calculation engines (including SBEM and dynamic simulation models) but with some notable exceptions that merit further investigation. Examples are shown in Figures 3 and 4.

However, no matter how consistent the software becomes, output accuracy will be reliant upon the skill of the user in representing the building design in the model, with the success of accreditation schemes being crucial here.

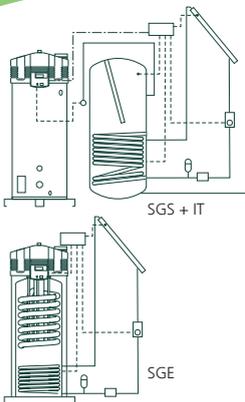
It could also be argued that for compliance there is a diminishing return in improving the accuracy of software predictions as, once built, the occupant behaviour will affect the operational efficiency of the building. This energy use will of course be evidenced and recorded through the Display Energy Certificates in many buildings. CJ

● **GEOFF RUSSELL-SMITH** is a general manager at Tarmac Building Products. The author thanks Jose Ortiz of BRE for his help with this article

Generally, the latest version has improved calculation methods that will reduce both the actual and notional buildings emission rates

**More contribution
from this,**

**so less
from this**



A.O. Smith high-efficiency solar systems: SGE & SGS

Thanks to the single intelligent control system incorporated in our SGE & SGS water heaters, we can guarantee the **highest level of solar efficiency, up to 40% extra** when compared with a standard solar system. This is achieved by saving as much solar energy as possible in the systems stored water and using the fossil fuel burner only when absolutely necessary.

For full information on these intelligent solar systems please see the "ReNEWables" page of our web site, alternatively call our technical department who are available to answer any questions on sustainable hot water applications. **0870-AOSMITH (2676484) or www.aosmith.co.uk**. We are always happy to assist you in finding the perfect hotwater solution!



AO Smith

Innovation has a name.

WELL-LIT SPACE



Zhelebov Vadim/shutterstock.com

Significant changes have been made to a key lighting standard to bring it up to date. But, asks **Jill Entwistle**, do the revisions go far enough?

This summer saw the first update of the European standard on indoor workplace lighting since 2002. Thinking has changed considerably in this area, so how does the new standard, BS EN 12464-1: 2011 *Lighting of Indoor Work Places*, reflect these different perspectives?

The overall aim of the revised version is to encourage designers to consider all light sources, including natural light, rather than just electric lighting. Significantly, it now recognises the importance of daylight

for energy reduction. It also includes the requirement for ceiling and wall illuminance to increase the brightness of a room.

Specific changes include the introduction of cylindrical illuminance and modelling as key elements. Daylight is also emphasised, as is the use of lighting controls and the recommendation to use LENI (lighting energy numerical indicator), which is designed to measure lighting energy use on a system basis rather than the simplistic and often self-defeating watts per square ➤

SANICOM

Heavy duty macerator pump for high usage environments
Part of the Saniflo Professional Range

NEW

New powerful 1300 watt motor

Pumps water up to
10m vertically –
100m horizontally

2 side entries

1 top entry

Disposes of water
circa 35°C

SANICOM
PROFESSIONAL RANGE

NEW

Improved
performance

SANIBEST
PROFESSIONAL RANGE

SANISPEED
PROFESSIONAL RANGE

SANICUBIC
PROFESSIONAL RANGE



SANICONDENS BEST
PROFESSIONAL RANGE

check out the website for details: www.saniflo.co.uk

SANIFLO

The UK's market leader for over 30 years

Saniflo Ltd. Howard House, The Runway, South Ruislip, Middx. HA4 6SE
Tel: 020 8842 0033 Fax: 020 8842 1671 e-mail: sales@saniflo.co.uk



Alexey Furosov/shutterstock.com

The new standard encourages designers to consider all light sources



BS EN 12464-1: 2011 KEY CHANGES

The importance of daylight is taken into account: the same requirements for lighting apply whether illumination comes from artificial lighting, daylight or a combination of the two

Specification of a minimum illuminance on walls and ceilings

Specification of cylindrical illuminance and detailed information on modelling

Uniformity of illuminance is assigned to tasks and activities

Definition of an illuminance grid is in accordance with EN 12464-2

New luminance limits are set for luminaires used with display screen equipment (DSE); the description of display screens is according to ISO 9214-307

metre method. Iain Macrae, president-elect of the Society of Light and Lighting (SLL), and his colleague at Thorn Lighting, Peter Thorns, worked on the standard indirectly, supporting Lou Bedocs on the BSI committee. Macrae says BS EN 12464-1: 2011 has made the ‘next sensible step’.

In other words, it is as radical as it can afford to be without having a deterrent effect.

‘It’s good to have a standard that not only says you should introduce daylight but should have a lighting control strategy through LENI,’ says Macrae. ‘It’s good that it has introduced some measures that will make people think about the quality of the lighting as well as the energy without forcing them to go too far.’

An underlying conservatism remains in issues such as the untouched recommendation for 500 lux on the working plane in an office, for example, despite the general consensus that this arbitrary figure is increasingly irrelevant and wasteful. But that stipulation is now qualified, adds Macrae.

‘It does raise the whole argument of

where that 500 lux came from. We still have an argument to face as an industry about whether you light for a 20 year-old person with perfect eyesight or a 70-year-old with diminishing eyesight.

‘I think that’s tackled reasonably well. The standard says you can adjust the

lighting to the task. It allows you as a designer to justify reducing lux levels. It won’t allow the contractor who has no idea to do that. It does open the doors for designers to let rip a little bit.’

The updated standard does nudge the whole business away from the contractor and towards the lighting expert,

argues Macrae. ‘It still allows designers the flexibility, whereas the contractors will see the 500 lux and not want to move from it. It does still say cylindrical is probably more important, and that you should be looking at task – I think it’s more powerful in that respect. Look at the task, look at the immediate surround and look at the balance of the surround to distance and get all that correct. It’s pretty positive in pushing towards people who understand

“The requirement for light on the walls and ceiling has been set at a very low level. In the UK we are already used to providing levels that are much higher than this –
Peter Raynham”

**FIREGUARD
LED7** ™

WARRANTY
10 YEAR

The **NEW 7W LED**
downlight from JCC



where **fire** safety
& **energy** saving meet

For more information please visit:

fireguard-led.co.uk

JCC™

50W
HALOGEN
EQUIVALENT

Tel: 01243 838999 • Email: sales@jcc-lighting.co.uk

Denis Babenko/shutterstock.com



The requirement in the new standard for lighting levels on walls and ceilings has been set too low, some experts complain

It's good that it has introduced some measures that will make people think about the quality of the lighting as well as the energy without forcing them to go too far – *Peter Macrae*

lighting design, rather than towards contractors who understand the basic numbers.'

The next step, says Macrae, has to involve more practical guidance. 'It's starting to move in the right direction. What we need to do now is a little bit like what we've done with LG5 [SLL Lighting Guide 5: *Lighting for Education*]: that is, given practical examples.'

Mike Simpson, technical design director of Philips Lighting and former president of both CIBSE and the SLL, agrees that the emphasis on daylight is welcome. 'I was involved in the withdrawal of the Category 1/2/3 system back in 2001 as it had become a recipe for poor quality lighting,' he says.

'We introduced a requirement to put light on the walls and ceilings by means of the ratios to working plane illuminance. This was supposed to move us to a design requirement rather than a product one. However, we still have people claiming LG7

luminaire compliance. I think the move to specific wall and ceilings illuminances will now take that idea on a stage further and back to an installation performance requirement.'

Simpson adds: 'I think every designer should read the first four chapters at least once before being let loose on the schedule.'

Peter Raynham is SLL president, chairman of the Light and Lighting Committee at the BSI and leader of the UK delegation to the European Standards committee for lighting. He believes BS EN 12464-1: 2011 is a significant improvement.

'The only rider to this is that the requirement for light on the walls and ceiling has been set at a very low level [50 lux and 30 lux respectively]. Although this recommendation is a big step forward for most of Europe, in the UK we are already used to providing levels that are much higher than this.'

Raynham points out that the SLL is currently working on a new version of the SLL Code for Lighting, which will adopt the recommendations of the new standard and provide a commentary on how best to implement it in real lighting projects.

Peter Le Manquais, technical director of Wila Lighting, who is presenting an SLL Masterclass on BS EN 12464-1: 2011, welcomes the relaxation of luminaire limits for display screens in the standard: 'In the UK we have had 1,500 cd/sq m for some time when the conditions are right, such as a good screen and Windows-style software, but my German colleagues have kept soldiering on with 1,000 cd/sq m in terms of new luminaire design within our organisation.

'Having the possibility now to go up to 3000 cd/sq m makes a lot of sense with modern equipment.'

He adds: 'At last the work on dynamic lighting is recognised. BS EN 12464-1: 2011 acknowledges that there may be something in circadian lighting, and with daylight and/or dedicated artificial lighting solutions that vary lighting conditions over a period of time by higher illuminance, luminance distribution and a wider range of colour temperature, [circadian lighting] can stimulate people and enhance their wellbeing.' CJ

● A critical analysis of BS EN 12464-1 2011 appears in the September/October issue of the SLL Newsletter.



Aura TOUCH infra-red flush actuation plate



Linum floor drainage with 'Azure Blue' glass cover



Aura TOUCH infra-red flush actuation plate with WC cistern and frame

Who says beauty is only skin deep



Linum floor drainage with 'Elegance' grid

With over 40 years experience in the manufacture and design of sanitary pipework systems, Marley is extending its solutions offer with a range of sanitary systems.

Hidden behind a wall or under the floor, confidence in performance is vital. Marley introduce a new range of concealed cisterns, sanitary frames and shower drainage from Europe, the performance of which has been proven over time. Aesthetics have not been ignored, with an extensive range of flush actuation plates, including real wood and glass options and a selection of design styles for shower channel grids and covers.

Innovation & Expertise



FIND OUT MORE



marley.co.uk

KX6 VRF... applied



Curve Theatre, Leicester

Two auditoria with 1,200 seats, studios, rehearsal suites, dressing rooms and dining facilities all climate controlled simply, effectively, efficiently.

Ford Showroom, Swindon

600m² showroom, offices, meeting rooms and a 900m² service centre and canteen in need of cooling, but little plant space. Solution; KX6 micro single fan outdoor units.



Icon Hotel, Luton

43 guest bedrooms, reception, bars, restaurants and fitness suite zones simultaneously receive heating or cooling as required, with simplified guest controls for ultimate comfort.



evolution

amp air conditioning limited

Tel: 01707 378670 Fax: 01707 378699, sales@ampair.co.uk, www.ampair.co.uk

HRP Limited

Tel: 01359 270888 Fax: 01359 271132, headoffice@hrpltd.co.uk, www.hrponline.co.uk

3D Air Sales

Tel: 01753 495720 Fax: 01753 495721, sales@3dair.co.uk, www.3dair.co.uk

Scotland Tel: 0141 777 5007, Ireland Tel: 00 353 (0) 1463 8604



IN THE FLOW

Energy losses in air conditioning systems can be reduced by applying Variable Refrigerant Flow climate control systems. **John Durbin** explains how the process works



Daikin UK

Moving energy from one location to another in a climate control system will result in some energy loss – depending on the distances involved, the medium used to carry the energy and the mass flow. This will be compounded by the motive force and the pipe, duct or wire (or however the energy source is contained).

Variable refrigerant flow (VRF) air conditioning, as the technology is now

generally known, helps to resolve this problem. (Daikin first developed the process around 30 years ago, under the name variable refrigerant volume, VRV, which it still uses.)

The original thinking behind VRV/VRF involved the realisation that, if the refrigerant carrying the heat to and from the indoor units (evaporator/condenser) was the same refrigerant that passed through the compressor, a significant energy saving

VRF technology helps to resolve the problem of energy loss from air conditioning systems



Dailin UK

In a VRV/VRF system, the heat pump varies the refrigerant volume to match current requirements

VRV/VRF systems can be specified successfully for buildings of up to 10,000 sq m, offering precise control of multiple zones

➤ would result. What's more, using a latent change refrigerant (gas to liquid and back to gas) with a high-energy carrying capacity, means that the volume flow rate is tiny when compared with air or water, so the transportation loss is far less.

In the early days, restrictions in the length of pipework and control of the system posed problems but, by using the compressor as the 'pump' and incorporating clever oil return technology, actual pipe lengths between indoor and outdoor units can now reach up to 150 metres. With flow and return pipes and terminal units installed in parallel, the exact quantity of refrigerant needed for cooling the heating function is supplied by the outdoor unit. Energy use is kept down by modulating the refrigerant volume to meet the exact need of all the indoor units combined.

The easiest way to do that is to vary the flow of refrigerant by controlling the speed of the compressor. The most efficient speed control is by an inverter: thus the VRV/VRF air conditioning system was developed.

The system's main benefit is that the heat pump varies the refrigerant volume within the air conditioning system to match

precisely the building's requirements at any moment. This means that each area is able to continually maintain its desired temperature while minimising energy consumption

The original systems showed a 25% to 30% saving in energy compared with a chiller system. The heating was by a reverse cycle heat pump and showed even greater savings over a direct electric heater battery, and similar savings when compared to a four pipe heating and cooling water system. But technology rarely stands still, and the addition of heat recovery to these systems resulted in a further 5% to 10% energy saving. Today, heat recovery incorporated within a well designed and fully integrated climate control system can dramatically reduce energy consumption.

As heat is removed from spaces requiring cooling, it can very quickly be redistributed to areas requiring heat. Using three pipes enables VRV/VRF systems to do this efficiently, resulting in the ability to transfer the heat elsewhere for space heating or to supply hot water for use in sanitary applications and air curtains. The net result of this process means that the total energy output of a system can be high whilst the ➤

4.74 COP
high efficiency

AQUAREA
HIGH CONNECTIVITY
FOR WELL-INSULATED
HOMES

100%
capacity at -15°C

AQUAREA T-CAP
FOR HOUSES
LOCATED IN COLD AREAS

output water
65°C

HIGH TEMP HEAT PUMP
FOR HOUSES WITH
HIGH TEMPERATURE
RADIATORS



THE LARGEST LINE-UP THE BEST EFFICIENCY A SOLUTION FOR EVERY REQUIREMENT

AQUAREA
engineered for high performance

Panasonic offers the largest line-up of heat pumps available on the market today, to meet all your customers' requirements.

3 different line-ups, from 7 to 16kW, on Mono-bloc and Bi-bloc, Singlephase and Three-phase:

- a high connectivity heat pump, with efficiency of 4.74!
- a high capacity heat pump, which keeps the same nominal capacity, even at -15°C, ideal for insulated homes in extremely cold regions
- a high temperature heat pump which provides water at +65°C, ideal for existing installations with high temperature radiators.

Panasonic – delivering the best efficiency and reliability for your customers.

4.74 COP
high efficiency

AQUAREA
HIGH CONNECTIVITY

100%
capacity
at -15°C

AQUAREA T-CAP

output
water
65°C

HIGH TEMP
HEAT PUMP



heating and cooling systems

eco
ideas

high
efficiency
heating

INVERTER+

environmentally
friendly
refrigerant

R410A

down to
-20°C in
heating mode

OUTDOOR
TEMPERATURE

boiler
connection

RETROFIT

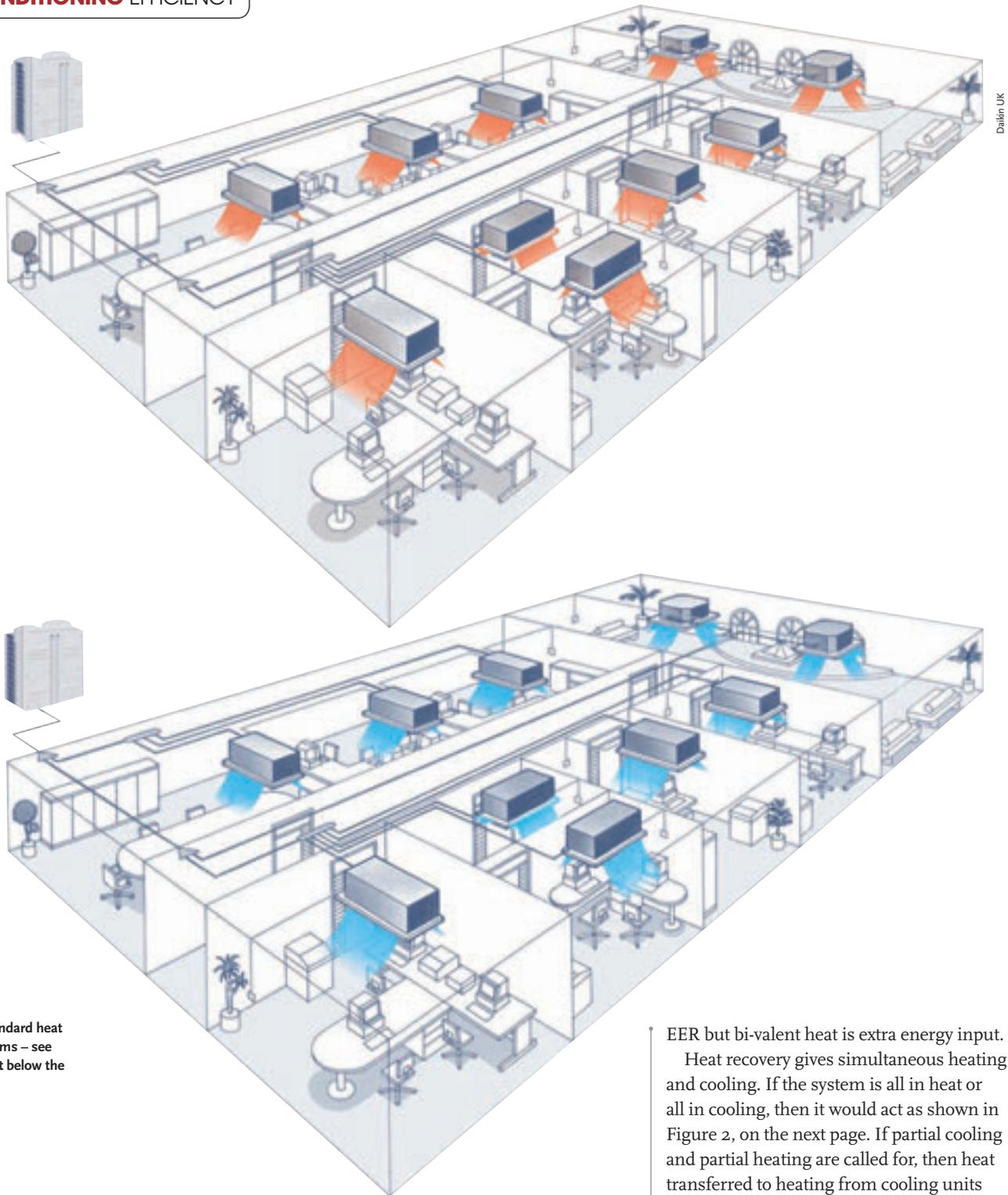
solar
panels
connection

SOLAR KIT

domestic
hot
water

DHW

energysaving highconnectivity



Daikin UK

Figure 1: Standard heat or cool systems – see the main text below the diagram

- compressors are under partial load. An example is shown in Figure 1.
 - Here the system is either all heat or all cool. Heat is generated by a heat pump from the outdoor unit (ECA CoP >3.7:1). If heating is a priority (top diagram), units needing cooling are on fan only. This produces a good coefficient of performance (CoP) as the system is running in partial load.
 - If cooling is the priority (bottom) then all heat is thrown outside (ECA EER >3.3). Units requiring heat need a bi-valent system. Part load for cooling gives good

EER but bi-valent heat is extra energy input. Heat recovery gives simultaneous heating and cooling. If the system is all in heat or all in cooling, then it would act as shown in Figure 2, on the next page. If partial cooling and partial heating are called for, then heat transferred to heating from cooling units with the compressor working as a pump saves input energy.

The exact percentage depends on when this is available for cross over. The EER and CoP are much enhanced as the system is cooling in partial load and heating receiving hot gas with no extra work to be done by the compressor (eg, 5% saving CoP = >3.9 EER = >3.5).

VRV/VRF systems can be specified successfully for buildings of up to 10,000 sq m, offering precise control of multiple zones as the refrigerant is being controlled by the expansion device in each indoor unit, which enables each indoor unit to react quickly to changes in conditions. In ➤

CLIMAVENETA



vision



experience



and cutting edge
technology

That's why we are Europe's No.1 manufacturer of energy efficient HVAC products.

And now we have our own subsidiary in the UK to offer a total package of products to meet every possible application.

- Total solutions from 2kW to 2,400kW
- Europe's leading manufacturer of Turbocor magnetic centrifugal chillers
- Inverter air conditioning with i-Accurate close control, i-Focs screw chillers and i-Whisper rooftop units
- Integra units giving simultaneous chilled and hot water for 4-pipe systems
- Free cooling chillers from 40kW to 1,250kW including non-glycol options
- Nationwide after sales coverage for all your service and maintenance requirements
- Tailor made solutions for every customer, application and type of building



Plus all the support and back up you would expect from Europe's No.1 HVAC manufacturer.

www.climaveneta.co.uk
response@climaveneta.co.uk
Freephone 0800 801 819

Climaveneta UK Ltd.
Highlands Road,
Shirley, Solihull
West Midlands B90 4NL

 **CLIMAVENETA**
There are many reasons



Tailor-made AHUs up to 20m³/s.

“Introducing our biggest fans.”

SUPERMARKETS



HEALTHCARE



OFFICES AND MORE



It’s true that Nuaire’s new XBOXER range has some massive fans. Especially now that we offer the flexibility to combine modules to build tailor-made AHUs up to 20m³/s.

The range can also be tailored to meet specific needs, for example when a humidifier or components in a particular finish are required. But we still have even bigger fans. In the form of our customers.

Because the XBOXER range is built around our customers’ needs not our flights of fancy. Covering all the most common functions in ten of the most common sizes, our pre-configured range offers include Ecosmart, the innovative energy-efficient control, horizontal, vertical and twin-fan options with duty range of up to 8m³/s. Making XBOXER the most flexible range available. With the biggest fans.

Nuaire. The air of true innovators.



For more details call Andrew on **02920 858 443**
email AHU@nuaire.co.uk or visit www.nuaire.co.uk/xboxer
Quote reference code **CIBSE0911**



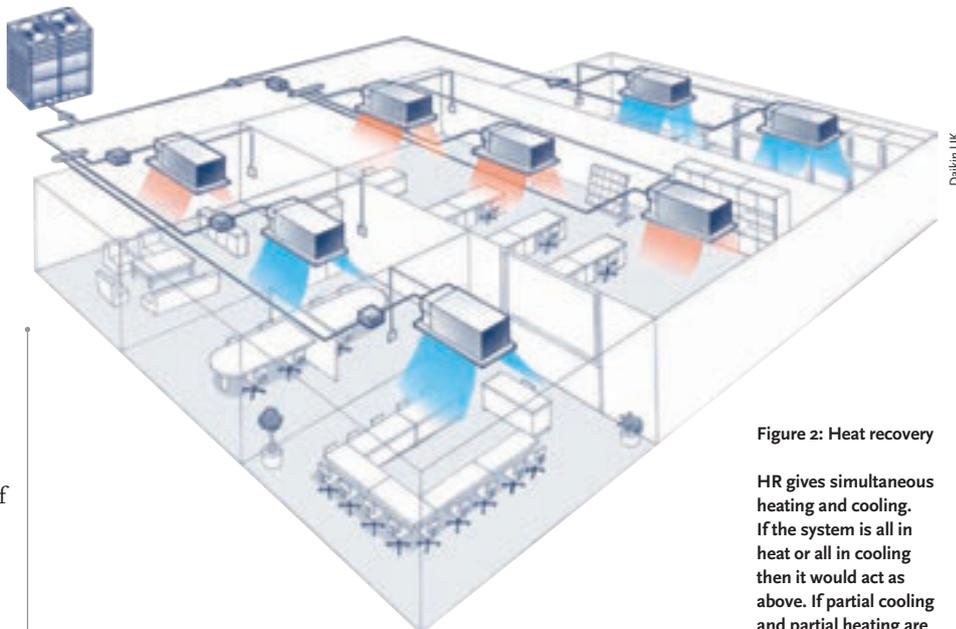


Figure 2: Heat recovery

HR gives simultaneous heating and cooling. If the system is all in heat or all in cooling then it would act as above. If partial cooling and partial heating are called for, then heat transferred to heating from cooling units with the compressor working as a pump saves input energy

➤ addition, matched control systems can schedule individual areas or zones for on/off, restrict end user control to prevent over cooling/heating and therefore reduce energy consumption. It can even control third party equipment – along with a host of other useful and energy efficient solutions.

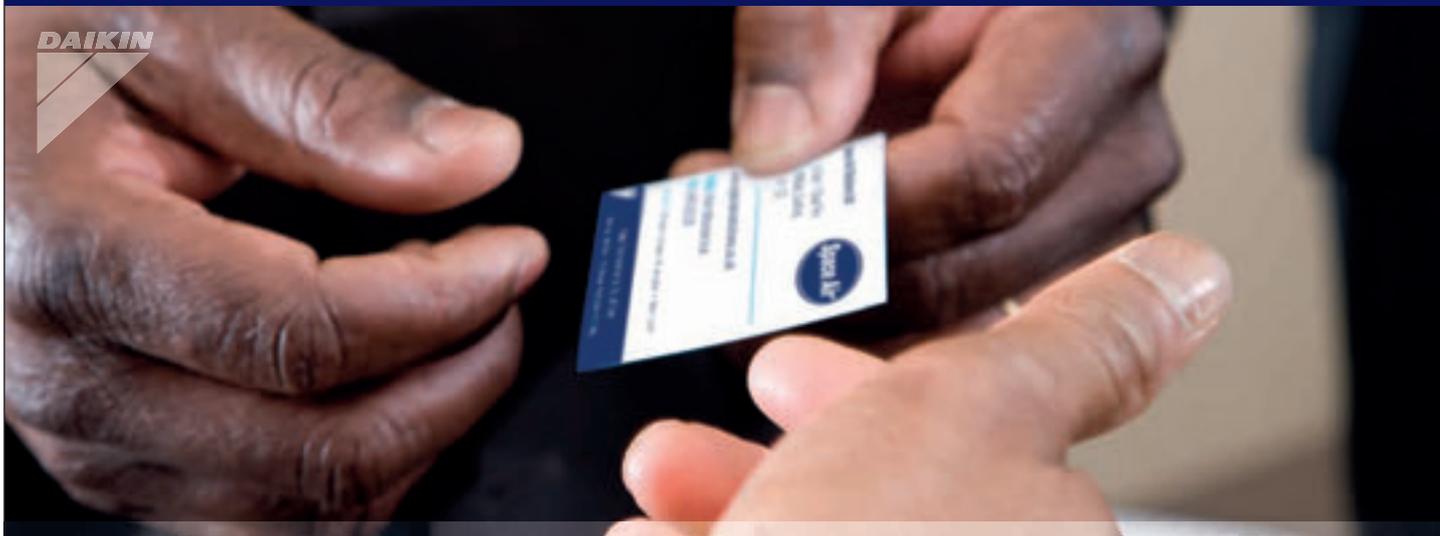
Such controllers provide a fully integrated system with zone control time clock, weather compensation, morning start logic, evening off logic etc. Manufacturers' network systems are capable of entire control management and trouble shooting features, leading to continuous optimisation regardless of changes. For example a building of 10,000 sq m would have approximately 150 to 200 indoor units. An iManager and a proprietary matched controller can look after 64 groups of 16 (1,024) indoor units. VRV/VRF systems also take up as

little as a third of the central plant space required by traditional air conditioning systems, so they are an attractive solution for major refurbishment projects in which the aim is to maximise the rentable floor space of a building. For example, a 130 kW air cooled chiller can typically take up in excess of 5 sq m, whereas a 135 kW VRV/VRF system will take up around 3 sq m and doesn't have a requirement for additional

■ HEATING

■ COOLING

■ HEAT RECOVERY VENTILATION



Air Conditioning / Heat Pump Specialists Celebrating 30 years as a Daikin Distributor

Space Airconditioning plc supports the entire range of energy efficient Daikin solutions.



Chillers, Split, VRV, Rooftops,
R22 replacement, Spare parts and more!



Call: 01483 504 883

NOBODY KNOWS DAIKIN BETTER

www.spaceair.co.uk

High-Performance Green Buildings

Find out
What's new in
Hevacomp

sustainability design architecture geometry components design sustainability architecture



Image courtesy Hamilton Associates



Image courtesy HKR Architects



Image courtesy Foster+Partners

Software for Building Energy Design, Analysis and Simulation

Successfully creating high-performance buildings demands the accurate prediction of energy consumption, CO₂ emissions, operating costs, and occupant comfort.

Bentley's comprehensive suite of industry-leading energy design, simulation and analysis applications, including **Bentley Hevacomp** and **Bentley Tas**, provides today's professionals with these capabilities and more, facilitating the productive delivery of sustainable 'green' buildings.

These applications are used by leading firms worldwide to effectively simulate and analyze building energy performance – optimizing the balance of function, comfort, and energy and carbon impact and helping building teams sustain our environment.

www.bentley.com/CIBSE

© 2011 Bentley Systems, Incorporated. Bentley, and the "B" Bentley logo are either registered or unregistered trademarks or service marks of Bentley Systems, Incorporated or one of its direct or indirect wholly owned subsidiaries. Tas copyright EDSSL. Used with Permission. Other brands and product names are trademarks of their respective owners.

**Already a Hevacomp user?
Improve your productivity
with Training:**

www.bentley.com/UK-Green-Training



For more
information:

**0808 101 9247 (UK only)
+353 1 436 4600 (Europe)**

Press 1 for energy modelling and
building services software

1-800-BENTLEY (US)



► pumps, expansion vessels or buffer tanks, along with smaller fan coils that give more capacity to reduce the used indoor space.

Another great advantage is the modular nature of the system, making it appropriate for phased refurbishment projects. As the system can be retrofitted floor by floor, thus avoiding the fullscale relocation of a building's occupants, it can help improve the energy efficiency of older buildings of various types, such as hospitals, schools, leisure centres or offices.

The evolution of VRV/VRF technology now means that it can be designed to operate in balanced mode, resulting in improved CoP – even reaching up to 10 and more (based on published data of a manufacturer's system in mixed mode at nominal conditions).

Whilst in this mixed mode, the proportion of recovered heat cannot be treated as renewable, but can be classed as recovered energy that would otherwise have been 'wasted', whilst prime energy would have been needed for the heating requirement.

Looking at this in more detail, we can see that a system on 50% cool 50% heat

operating at 15C DB and 13.7C WB had a cooling duty of 14 kW and heating duty of 13.7 kW, whilst the total power input was 2.75 kW. If these were required to be two separate machines, then the power input would have been greater for both heating and cooling.

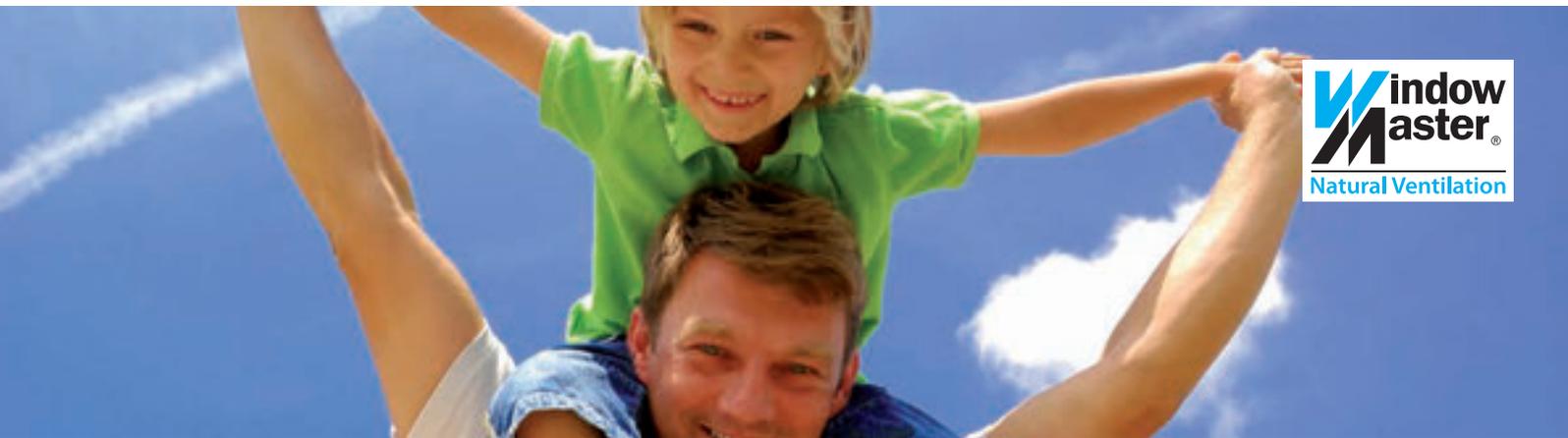
However, in mixed mode the unit is providing a mixed duty of 27.7 kW for a power input of 2.75 kW; This could be taken as a CoP of 10.07.

In addition, there are water-cooled systems and even geothermal heating-only options. Heat recovery options are evolving all the time so that energy-efficient hot water can be generated, as well as hot air for air curtains.

VRV/VRF systems can also be used in conjunction with ventilation. By extracting waste air from a room via the heat exchange process, recovered heat energy can be transferred to the fresh air supply being delivered to that room. The net result is a further reduction in the cooling/heating load on the air conditioning system. **CJ**

● **JOHN DURBIN** is engineering department manager at Daikin UK. www.daikin.co.uk

6 VRV/VRF systems take up as little as a third of the central plant space required by traditional air conditioning systems



NATURAL VENTILATION

HYBRID VENTILATION

SMOKE VENTILATION

WindowMaster offers many different solutions for the automation of the facades and rooflights, depending on the requirements of your project:

NV Advance™

The advanced indoor climate control solution for natural and hybrid ventilation in larger buildings with many zones.

NV Comfort™ *New!*

The cost effective indoor climate control solution for natural and hybrid ventilation in smaller projects.

MotorLink™

The new standard in communication between BMS systems and electrical window actuators.

For additional information or documentation please visit our website www.WindowMaster.com or telephone us on **+44 1536 510990**

High Efficiency 2013

The ErP Directive is coming in 2013.
The products for it are already here.

From 2013, the ErP Directive will turn the heating pump market on its head. The change to high efficiency is already paying for itself. Info: www.wilo.co.uk/he

Uncontrolled pumps turn out to be real energy-wasters, using billions in extra electricity every year. It's a good thing then that more than 90% of these power-guzzlers will soon become scrap. The EU are making sure of this with the ErP Directive for energy efficiency, which is gradually coming into power for glandless pumps from 2013 and it is already effective for glanded pumps in 2011. Better yet, you can start today to reduce your footprint on the environment and relieve household budgets. With Wilo high-efficiency pumps.

More info about high efficiency at www.wilo.co.uk/he

**ErP
READY
2015**

APPLIES TO
EUROPEAN
DIRECTIVE
FOR ENERGY
RELATED
PRODUCTS

**ErP
READY
2017**

APPLIES TO
EUROPEAN
DIRECTIVE
FOR ENERGY
RELATED
PRODUCTS



WILO
Pumpen Intelligenz.

MIDTHERM
Engineering Limited.

OUR PRODUCT RANGE INCLUDES:

- ⇒ **WINDVENT NVIPS**
balanced or passive stack ventilators
- ⇒ **WINDVENT SV**
solar-powered ventilation
- ⇒ **WINDVENT VL**
combined natural ventilation and day lighting
- ⇒ **LITE-PIPE**
natural day lighting
- ⇒ **X-STREAM**
light-commercial ventilators
- ⇒ **INTELLIGENT CONTROLS**
standalone and auto intelligent systems

Phone: 01384 455811 Email: sales@mideng.net Web: www.naturallydriven.co.uk

Comfort zone?

In the drive for energy efficient buildings, the needs of occupiers can be left behind. But new guidelines offer practical ways of taking a wider approach, writes **Tim Dwyer**

Users of buildings are not always as comfortable as they could be, as designers sometimes forget their needs when aiming to cut carbon



The quest to provide highly energy efficient buildings has to be carefully balanced with their primary purpose: that of providing a safe and healthy environment for occupants. But this is a thorny and challenging task – and one that technical guidelines have failed fully to grasp. A new document from the American Society of Heating, Refrigerating and Air conditioning Engineers (ASHRAE) has pushed the boundaries by trying to adopt a more holistic approach to understanding the relationships between building efficiency and user comfort.

The document, *ASHRAE Guideline 10 – 2011: Interactions Affecting the Achievement of Acceptable Indoor Environments*, has been produced by a group of ‘indoor environment activists’ at ASHRAE, led by Hal Levin, a research architect with the Building Ecology Research Group in the US.

In contrast to the current flagship ASHRAE Standards 55 and 62, which address thermal comfort and ventilation/indoor air quality (IAQ) respectively but separately, the *Guideline 10* document focuses on interactions among factors that determine indoor environmental quality (IEQ), such as air quality, thermal conditions, acoustics and illumination.

Guideline 10 attempts to describe the interactions relevant for achieving acceptable indoor environments. It aims to provide designers and operators with the understanding to integrate all of the current ASHRAE documents that deal with indoor environments, such as: *ASHRAE Standards 55: Thermal Environmental Conditions* ➤

6 If designers and operators do not have the information to understand the operation in a holistic way, how do they stand any chance in moving towards truly sustainable solutions?

➤ for *Human Occupancy*; 62: *Ventilation for Acceptable Indoor Air Quality*; and the *Indoor Air Quality Guide: Best Practices for Design, Construction, and Commissioning*.

The authoring committee for the guideline has included Ole Fanger, one of the earliest pioneers of comfort research, and Michael Humphries, emeritus professor at Oxford Brookes University and author of *CIBSE Guide A* section on comfort. The material in *Guideline 10* is applicable to any such assessment, whether it be based on *CIBSE Guide A* or BS EN ISO 7730/CR 1752 or, in fact, any 'comfort' guide, code or standard.

To a lesser extent, *Guideline 10* also addresses mechanical energy (including noise and vibration) and electromagnetic radiation (including environmental lighting and ultraviolet and infrared radiation) as additional sources of interactions affecting the acceptability of the indoor environment, as well as limitations that exist in the ability to achieve acceptability.

Guideline 10 provides an idiom to try to identify the relationship between the occupant and their environment, in an attempt to understand the complex interactions and combined effects on the acceptability of the environment to the occupants. Using terminology drawn from the medical world, the guideline describes a range of interaction, including:

- **Independent** – such as the independence of ventilation and lighting levels;

- **Additive** – such as the combination of radiant temperature and dry bulb temperature on thermal comfort;
- **Synergistic** – for example, the combined increase of humidity and temperature can be greater than the effect of each acting individually;
- **Antagonistic** – such as how lowering humidity may increase the perception of odours;
- **Prophylactic** – such as using ventilation to reduce the opportunity for mould accumulation;
- **Cumulative** – such as the effect of long term excessive noise; and
- **Unintended** – for example, the increase in ventilation rate for better air quality may adversely affect air movement patterns.

The operation and maintenance of buildings can similarly introduce environmental 'stressors', or simply fail to remove those that occur or accumulate over time. And these stressors may introduce further interactions. Designers must consider operations and maintenance in the selection and specification of building features, and the parameters to be adjusted by the environmental control systems and features of a building. For example, the benefits of building thermal mass (used to reduce peak cooling loads) might be decoupled from the space that they are meant to influence through the inappropriate – but equally important addition of – surface acoustic treatment.

Guideline 10 does not actually make recommendations or provide explicit guidance for many of the issues, as Levin and his committee firmly believe that the state of the science and its application are not yet sufficiently advanced to inform such guidance. However, in some cases they have indicated what appear to be the implications of the available information, which is clearly referenced.

Levin says the guideline will need to regularly change to incorporate contemporary knowledge and good practice. But he's clear that a more holistic approach is needed: 'Air quality and thermal comfort are intimately co-dependent. Yet current ASHRAE standards treat them in different standards that each define their mutual inter-dependence as being out of each other's scope.'

'If designers and operators do not have the information to understand the operation in a holistic way, how do they stand any chance in moving towards truly sustainable solutions?' **CJ**

- www.ashrae.org www.cibse.org



Ventilation Multivariate interaction

To provide an acceptable indoor environment, it is necessary that not only each aspect of the environment be at a satisfactory level, but also that the adverse impact of interactions between these aspects is limited.

Four factors – indoor air quality (IAQ), thermal environment, sound, and light – are widely regarded as the principal categories for classifying or characterising the acceptability of an indoor environment. Each of these factors includes several separate aspects. For example, within the lighting factor are included the issues of luminance and illuminance levels, colour temperature, colour rendering ability, gradients or luminance ratios, discomfort glare and disability glare.

The number of possible

interactions among the four factors and their several aspects is therefore very large. *Guideline 10* provides a framework based on the limited available knowledge for considering these interactions, and draws attention to the ones that are currently considered to be the most important.

The guideline includes a narrative on how each of the four main factors may interact, based on an extensive review of current research. For example, the thermal environment will be linked with the lighting design and equipment, since LEDs operate more effectively at lower temperatures, whereas fluorescent lamps will operate most efficiently in a specific range of temperatures and so perform less well if either too cool or excessively warm.

Correspondingly, the cooling load (and temperature) of the space will be directly affected by the choice of lamp and luminaire, and these can also influence the thermal environment by altering radiant temperatures and patterns of air movement. In the trial of consequential relationships, the movement of air across the luminaire may carry off plasticisers from (undersized) overheating cables, so affecting the occupants' perception of air quality, a perception that is shown as likely to be linked to the air temperature.

This is certainly a convoluted path, but a path of interactions that may also be redirected by any – and all – of the many different attributes that contribute to the four factors of IAQ, thermal environment, sound, and light.

Vibration Isolation



Goodwood House, 86 Holmethorpe Avenue,
Reidhill, Surrey, RH12NL

Neoprene Turret Mounts	Inertia Bases
Neoprene Hangers	Noise & Vibration
Spring Mounts	Surveys
Spring Hangers	Ex Stock Delivery
Flexible Connectors	Selection Service
Floating Floors	Special Design Service

Eurovib Acoustics Products Ltd

Telephone (01737) 779577

Fax (01737) 779537

sales@eurovib.co.uk

www.eurovib.co.uk

Teekay
the pipe coupling



Say goodbye to flanging, threading,
pipe grooving and welding with:



Axilock-S

Join plain end pipe with Teekay Axilock-S
Seals and locks the pipes together
Two Pipes... Two Screws... Two Minutes



tel: +44 (0)1494 679500

www.teekaycouplings.com

WATER HEATERS | BOILERS
RENEWABLE PACKAGES

Cleaner Greener

EcoKnight - the latest addition to Lochinvar's
range of High Efficiency Condensing Boilers.

If you'd expect anyone to design an efficient
boiler that is both green and clean it would
be Lochinvar. Our EcoKnight has operating
efficiencies of up to 110% net and NOx
emissions lower than 53 mg/kWhr.

And of course, we also offer
high efficiency Condensing
Water Heaters and
Renewable packages.



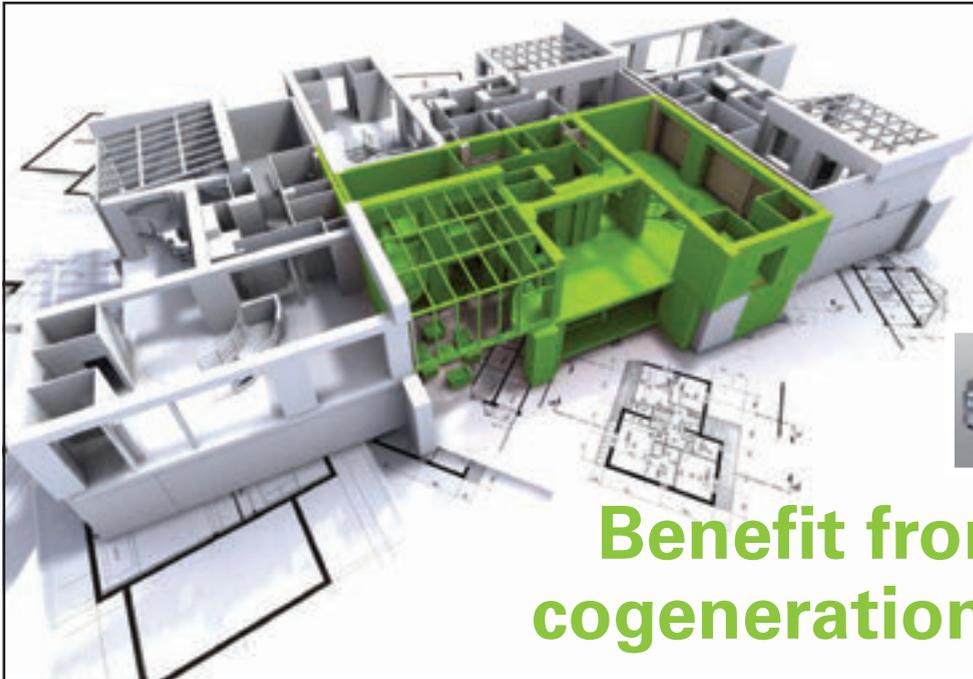
For details, call us on
01295 269981

email info@lochinvar.ltd.uk or visit
www.lochinvar.ltd.uk



Lochinvar[®]
High Efficiency Water Heaters and Boilers

Lochinvar Ltd 7 Lombard Way The MXL Centre Banbury Oxon OX16 4TJ



Benefit from ENER-G's cogeneration know-how

With over 25 years experience in Combined Heat and Power (CHP) systems, ENER-G has the technical knowledge to assist with all aspects of design and installation of cogeneration units.

Through collaboration with our specialised teams we can size, specify, design and deliver the right generation system for any building project. With the widest range of systems on the market and alternative fuels such as biodiesel and pure plant oil (PPO), we will have the CHP solution for you.

Contact us for more information:

ENER-G Combined Power Ltd

Tel: 0161 745 7450

E-mail: chp@energ.co.uk

www.energ.co.uk

GE
Measurement & Control Solutions

CO₂ based Ventilation Control

Can you ignore the importance?

Good ventilation in buildings is essential if a comfortable, healthy and productive environment is to be maintained.

Correct ventilation has a positive effect on occupant health and performance and significantly improves building energy efficiency.



Telaire Ventostat 8000 series

The Telaire Ventostat 8000 series comprises an extensive range of wall-mount CO₂, temperature and humidity transmitters with display options.

- Saves Energy
- Meets Building Regulations
- Provides a Healthy Environment
- Lifetime Warranty on CO₂ Calibration

Contact us at telaire.custcare@ge.com
Visit us at www.telaire.com



imagination at work

DISJOINTED APPROACH?



Safety is always compromised if design and installation teams fail to work together on fire and smoke ventilation projects, says **Peter Rogers**

The productivity and profitability problems created by poor communication and lack of teamwork throughout the supply chain are well publicised, but the serious implications for safety are less well highlighted – particularly in the area of fire and smoke protection.

It is often difficult for the building services engineer designing and specifying a fire protection scheme to envisage many of the problems that contractors encounter when they come to install the system on site. This situation is exacerbated if the process of design, installation and operation is disjointed.

However, tougher fire regulations, such as the Regulatory Reform Fire Safety Order (RRO), in force since 2006, are making it more difficult for companies to compete and secure work if they are unable

to work as part of a properly integrated team. The CDM (Construction Design and Management) regulations also emphasise the need for teamwork to ensure an installed system remains fit for purpose throughout its operating life. But even well-qualified engineers may be unaware of their exact responsibilities around the specifics of fire and smoke safety.

Risk

Ventilation ductwork is a key area of potential fire risk, but too many systems have failed to meet fire safety guidelines in the past, often because of problems at the design stage and failure to use

Ventilation ductwork is a key area of potential fire risk



Darryl Brooks/www.shutterstock.com

Ductwork contractors feel they have been hindered because of incomplete or inaccurate technical data

Clear lines of communication are critical if damper and fire barrier installers are going to be able to provide sufficient levels of fire protection in ductwork

fully competent design and installation companies. Other issues of concern include poor or completely absent maintenance, and/or inadequate communication between the different parties involved at installation.

Fire and smoke dampers have particularly suffered in this regard, despite the key role they play in reducing injury and property damage in a fire. Test standards for dampers have been in place for many years, but there has been no nationally recognised criteria covering their integration into the building structure. In the past, it was left to various members of the project team to make their own decisions about how dampers should be installed; those decisions were often based on individual preference or opinion rather than recognised best practice.

While detailed technical guidance has been available for years, there was no complementary guidance to help installers interpret the detail at the 'sharp end' on site. There has also been a growing recognition that everyone in the supply chain should be working to an agreed industry methodology and should know for which parts of the project they are responsible.

Ductwork contractors, in particular, feel they have been hindered because of incomplete or inaccurate technical data, yet they are usually the 'last man in' and as such must carry the can when things go wrong. They are expected to work to other people's designs, having had no input into the testing and specification of the chosen solution. Also, some damper systems will perform brilliantly in laboratory conditions, but do not come up to the mark in 'real life' situations.

Therefore, the guidance produced by the HVCA's Ductwork Group: Guide to

Good Practice: Installation of Fire and Smoke Dampers (DW/145) received an enthusiastic reception when it appeared last year. It was produced in collaboration with the Association of Smoke and Fire Protection (ASFP) and CIBSE, but its recommendations have still not been widely adopted.

This was the subject of detailed discussion at a recent webinar (www.hvca.org.uk/education/webinar.html) jointly hosted by the HVCA and the CIBSE/ASHRAE Group, and supported by damper supplier Ruskin Air Management.

The discussion highlighted the fact that the lack of a standard approach to projects from design through to installation meant there was also no set way of unravelling problems when they occurred. To achieve an installation that complies with fire regulations, a planned sequence of installation must be followed, and a CDM co-ordinator appointed, to ensure good communications through the project.

Compromised

With dampers, late problems are big problems – because of the difficulty of getting to them or positioning them if the ductwork design is already compromised. Issues that emerged during research for DW/145 included the importance of only installing dampers that have been tested in site conditions. The guidance explains that all fire dampers should be tested according to BS EN 1366-2 and classified to BS EN 13501-3 as required by the Building Regulations. Air tightness/leakage should be evaluated according to Section 10 of BS EN 1366-2.

The dampers should also be tested in 'real' conditions to show how they perform in different types of wall or ceiling installations, and when subjected to

different pressures through the ventilation system.

In addition, during research for the guidance, HVCA members discovered that more than 60% of fire dampers are sold without expansion frames. This is a frightening statistic as they must be able to expand during a fire or they will fail. Damper manufacturers and suppliers are responsible for providing dimensionally detailed guidance on how the damper assembly is to be installed, including any requirements for damper unit expansion.

The manufacturer should also cooperate to ensure its specified approach is practical on site, and this might require input from a specialist Fire Safety Engineer.

Fire strategy drawings produced by the design team must clearly indicate not only fire and smoke compartmentation, but also the type and classification of the fire barrier and its construction. Where a single team member has been allocated

the responsibility for sealing all building service penetrations on a project, including those for fire damper assemblies, they must use the penetration seal system specified by the damper manufacturer.

Service penetrations are sometimes created long before contractors are on site, and so are often either inconveniently positioned or simply impractical for the installation, especially if multi-service openings are envisaged. Penetrations must have 'as tested' arrangements of damper assemblies complete with penetration seals, and be free of all other services.

Damper penetrations in dry lining partitions must be framed and designed to ensure the continuing stability of the partition as a whole. How the damper and ductwork is supported is another area of contention, but testing by the BRE has shown that 'clamped' damper assemblies will continue to function and remain in situ, providing that the ductwork and its connection to the damper assembly are designed to break away in the event of a fire.

Access

It is very important to make sure the damper fits perfectly into the ductwork and does not allow fire/smoke leakage around its edges and seals. System designers must also take future damper maintenance

tests into account, which means allowing for practical access around and into the ductwork.

Issues such as this must be flagged up and tackled as early in the process as possible because, once ductwork and other services are installed, it is very difficult for the damper arrangement to be modified. DW/145 provides checklists for the design, installation and handover, and if a potential problem is identified during the design process, then the CDM coordinator is in a better position to resolve it.

The new guidance is focused on the practicalities of damper installation, and highlights the responsibilities of all team members – including designers, builders, manufacturers and local authorities, as well as mechanical services, ductwork and other specialist contractors.

It also looks at how all team members can meet their responsibilities by making

sure they understand all aspects of the process, from design to handover, and that they do not solely concentrate on their own area of expertise. Working in isolation from the rest of the process will, almost inevitably, result in a non-compliant installation.

Clear lines of communication between all parties in the professional chain are absolutely critical if damper and fire barrier installers are going to be able to provide sufficient levels of fire protection in ductwork.

Insurance companies are taking greater interest in this area and will see lack of coordination in the project chain as compromising fire safety. They may choose to withhold cover as a result, or dispute liability after a fire.

As with many aspects of building services design, the exercise of producing this new piece of guidance has shown that often it is not the skills or technical knowledge that is lacking; instead it is the process that is at fault.

By working together more effectively, we can ensure each profession in the supply chain can meet and surpass its own responsibilities. **CJ**

● **PETER ROGERS** is chairman of the HVCA's Ductwork Group, and the DW/145 guidance is available at www.hvca.org.uk



GUIDANCE BEST PRACTICE TIPS FOR SMOKE/FIRE DAMPERS

Follow a planned installation sequence

Appoint a CDM coordinator to ensure good supply chain communication

Fire strategy drawings must show fire and smoke compartmentation; type and classification of fire barrier; and its construction

Only use the penetration seal system specified by the damper manufacturer

Design in access points for ongoing maintenance and testing

Dampers must be tested to BS EN 1366-2 and classified to BS EN 13501-3

Air tightness/leakage evaluated to Section 10 of BS EN 1366-2.

Dampers should also be tested in 'real' (not just lab) conditions

All dampers must be supplied with expansion frames

All penetrations must be framed to ensure stability

Clamp damper assemblies wherever possible

Use DW/145 check lists

Source: HVCA Guidance DW/145. www.hvca.org.uk



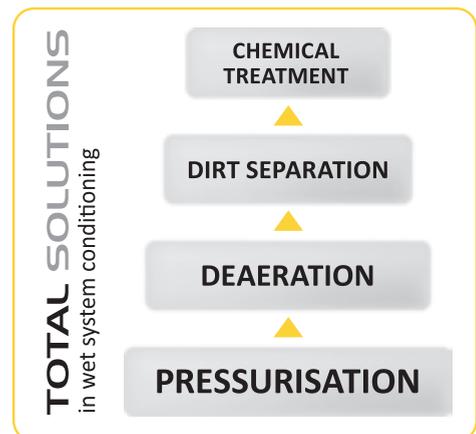
Don't let a Weak Link Affect Your Wet Systems Performance.

Benefit from state-of-the-art pressurisation, deaeration, dirt separation and chemical treatments with Spirotech's new

TOTAL SOLUTIONS

Spirotech are again leading the way in wet system conditioning by being the first supplier to offer all aspects of wet system treatments under-one-roof. We call this new offering 'Total Solutions' and it allows us to ensure that all treatments are working seamlessly and to the same high standards synonymous with the Spirotech name. Additional benefits include rapid detection of any underlying problems within a wet system, which can then be quickly resolved without supplier disputes.

A well designed wet systems should always start with pressurisation and then lead to deaeration, dirt separation and chemical treatments. Proper integration of each of these stages, reduces the requirement for the next and therefore results in a cost-effective system which also delivers optimum performance.



40 years of experience
and full system knowledge



Professional development



The CIBSE Journal CPD Programme

Members of the Chartered Institution of Building Services Engineers (CIBSE) and other professional bodies are required to maintain their professional competence throughout their careers.

Continuing professional development (CPD) means the systematic maintenance, improvement and broadening of your knowledge and skills, and is therefore a long-term commitment to enhancing your competence. CPD is a requirement of both CIBSE and the Register of the Engineering Council (UK).

CIBSE Journal is pleased to offer this module in its CPD programme. The programme is free and can be used by any reader. This module will help you to meet CIBSE's requirement for CPD. It will equally assist members of other institutions, who should record CPD activities in accordance with their institution's guidance.

Simply study the module and complete the questionnaire on the final page, following the instructions for its submission. Modules will be available online at www.cibsejournal.com/cpd while the information they contain remains current.

You can also complete the questionnaire online, and receive your results by return email.

Maintaining effective operational pressures in water distribution systems

Last month's CPD article considered the pressure characteristics associated with air flow in ducts. This article will build on similar principles to illustrate that pressure, and particularly static pressure, is an essential consideration when designing and operating closed water distribution systems, and will look at some of the considerations when selecting and operating expansion vessels for sealed systems

Inappropriate design or lack of care in operation when assessing the pressurisation of closed water distribution systems can lead to consequential problems from the accumulation of air in the system. If not properly removed this can cause serious difficulties with water circulation as well as increasing corrosion in ferrous pipework systems and so build up particles ('magnetite') within the pipework system. This can lead to the unnecessary use of chemicals to 'treat' the water.

Building up the pressure

The flow of water in a pipe system can be related to the 'Bernoulli Equation' (just as with air flow in the August CPD article) and this can be expressed in terms of the 'static head' at any point in a piped system. And when referring to the flow of liquids the term 'head' is frequently used in place of 'static head'. To evaluate the 'head' of water that corresponds to a particular pressure, the head = $P/\rho g$, where P is the pressure in Pascals, ρ is the density of the liquid, and g

is the acceleration due to gravity, 9.81 m/s^2 (The head is a 'gauge' pressure, ie relative to atmospheric pressure).

So considering 2 points in a closed pipework system using the Bernoulli Equation with the water flowing from point A to point B:-

Static head A + Velocity Head A + Potential Head A =

Static head B + Velocity Head B + Potential Head B + frictional losses A to B

$P_A/\rho g + c_A^2/2g + z_A = P_B/\rho g + c_B^2/2g + z_B +$ (frictional loss)

Where c = water velocity (m/s), z = height of pipe above datum (m)

When undertaking pipe sizing and pressure loss calculations (for example to select a circulation pump or to assess the system pressure profile) the pressure drop as the water flows through the system may be evaluated using standard tables and charts. (CIBSE Guide C 2007 provides pressure drop data in a simple spreadsheet unlike previous editions that had numerous printed

tables). Typical design pressure drops in water systems for commercial and domestic piped systems are in the order of 300Pa/m pipework (or 0.03m head loss per metre) and water velocities range from less than 1 m/s (for small domestic systems) to 3 m/s for pipework 50mm or greater in diameter¹. (Note: these are based on traditional accepted norms for noise, pressure drop and economic pipe size, although certainly not hard absolute rules).

Additionally there will be pressure drops in fittings and components. When analysing the pressure in a water system the velocity head is often ignored as its changes are comparatively small compared to the changes that take place in both static head and potential head.

The pressure's on

Considering a simplified system all on one level (ie height 'z' is constant) the potential head will be constant and, until the water flows, the system static pressure is the same throughout (at around atmospheric pressure, ▶

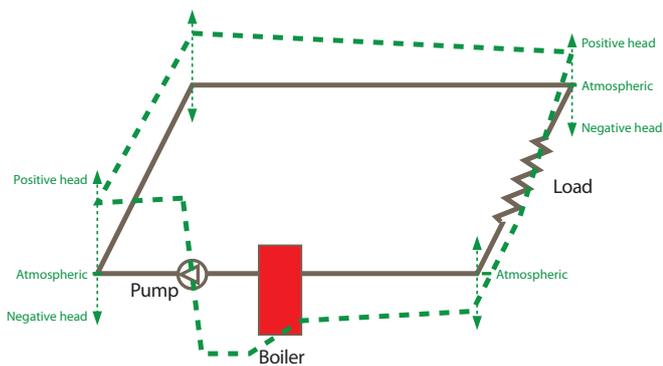


Figure 1 - Static pressure (or head) around a system all on one level (height 'z' is the same all round).

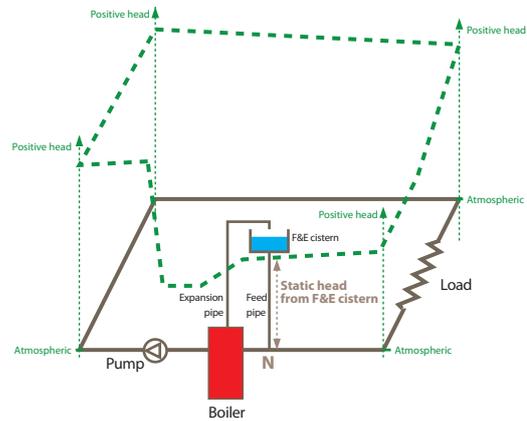


Figure 2: Simplified system with feed and expansion cistern

or zero metres head). When the circulating pump is switched on and water flows there will be losses in static head (due to friction) around the system related to the water flow rate and temperature and the pipe size and its roughness. The pump will be selected to provide the design flowrate against the accumulated system pressure losses. Figure 1 shows a simplified system with the pump in operation. The resulting static pressure is shown diagrammatically in Figure 1 by the dotted green line – positive static pressure (relative to atmospheric) is above the grey pipe line and negative below the grey line.

Expanding the subject

But the simplified system in Figure 1 is missing a key element. The density of water reduces and hence its specific volume rises as temperature rises and unless there was a provision to absorb the additional volume there could be serious consequences. For example, if water is heated from 4°C to 80°C the density falls from 1000 kg/m³ to 971.8 kg/m³, and so the specific volume rises from 0.001 m³/kg to 0.001029 m³/kg – an increase in the water volume of 2.9%. So, if the system in Figure 1 was 100 metres of 50mm nominal diameter medium steel pipe this expansion would add about 6.6 litres to the volume of the water contained in this pipe. Traditionally an open tank (or cistern) provided an opportunity for the water to expand and then return into the system when the system was cooler (the cistern would also supply make up water when, for example, it leaked from the system).

As shown in Figure 2 the cistern also has an important role in pressurising the system – providing a head equal to the height of the tank above point N, known as the 'Neutral Point'. When the system is at rest the static head will be the same throughout the whole system. For example, if the tank was 6m above point N, the static pressure, $\rho g z =$

$1000 \times 9.81 \times 6 = 59 \text{ kPa}$ or approximately 0.6bar. The static head at point N will remain practically constant irrespective of pump size or speed and there will be only small changes with water temperature.

By appropriately pressurising the system (by having point N close to the pump suction) all of the pipework will remain at a positive pressure whilst the system is operating (as shown by the position of the dotted pressure lines in Figure 2). Positive pressure is beneficial as it prevents drawing air into the system (through micro gaps in fittings); it reduces the opportunity for dissolved air to be released from the water and collecting as free air within the pipework; and it allows the system to operate with less chance of the water locally vaporising or 'caviting'.

The position for point N can be altered by connecting the cistern at an alternative point (such as in Figure 3) however if this is on the downstream side of the pump (closer to the pump discharge than the suction) it will not provide the same benefits as part of the system will have a static pressure below atmospheric pressure.

This is likely to manifest itself in more free air in the system, potentially causing:

- air locks;
- problems with commissioning systems (such as unreliable pressure readings);
- production of 'sludge' from corrosion;
- reduced heat transfer from heat emitters because of a reduction in water content and obstructed waterways;
- vaporisation and 'cavitation' in boiler, pump and valves; and
- increased system noise.

A temptation in an installed system may be to increase the pump speed or put in a larger pump to overcome the accumulation of air but this is likely to make the situation even worse. The neutral point pressure will be the same but the extremes of negative pressure will be even greater as more water

is pumped around the system causing high pressure losses. And, of course, if automatic air valves are installed at any sub atmospheric points in an attempt to relieve the problem they could potentially draw air into the system. The resulting accumulation of 'sludge' may also prompt the use of chemicals that would otherwise be unnecessary.

Although cistern based 'open vented' systems are a convenient way of illustrating the concept of pressurisation, they are rarely used in modern systems. Closed expansion vessels (frequently in combination with a pressurisation set) are used to provide the same opportunity for expansion but in a more compact form. As shown in Figure 4 these do not include an open vent, and as a sealed system a safety valve is required.

Designing for expansion

The proper calculation methods for the sizing of expansion vessels are in BS EN12828 2003 *Heating systems in buildings — design for water-based heating systems* and for commercial systems reiterated in CIBSE AM14 *Non-domestic hot water heating systems*. These vessels are selected to satisfy the thermal expansion of the water in the systems. However, there are specific requirements that must be followed to meet the standard.

In addition to the water volume resulting from thermal expansion, the expansion vessel should have a minimal water reserve to compensate for possible water losses in the system. So expansion vessels with a capacity less than 15 litres should accommodate at least 20% of this volume as a water reserve. Expansion vessels with a capacity greater than 15 litres should accommodate a water reserve of at least 0.5% of the total water content of the system, however they should have a capacity of no less than 3 litres.

The vessel will be selected based on the

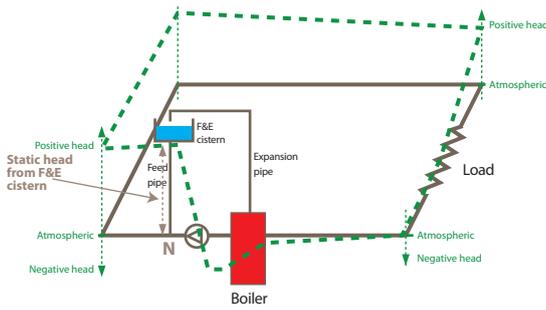


Figure 3 - Moving the Neutral Point to an inappropriate position

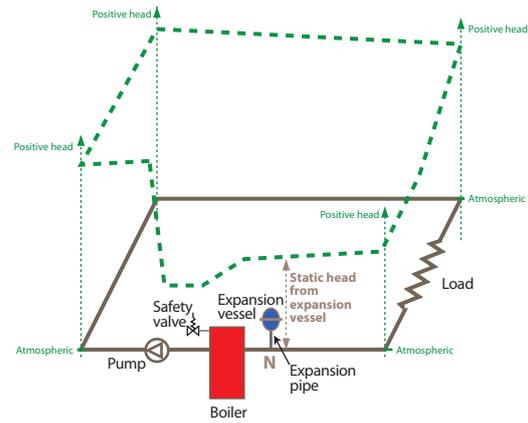


Figure 4 - Appropriate location for expansion vessel

need to maintain a minimum static pressure at any point in the pipework as well as being able to accept the expanding water.

The minimum pressure for the expansion vessel would be determined by the static head at the point that the vessel is connected to the system, plus the vapour pressure of the water at the operating temperature (for example 47.3kPa @80°C) plus a safety margin.

This is to ensure that the pressure at the highest point in the system will be high enough to prevent water vaporisation and air being released from water. The absolute maximum pressure for a system is related to the weakest point (for example, radiators or boiler); however, the normal working maximum is determined from the operating temperature allowing for some overshoot due to control hysteresis and fault conditions.

In the case of a heating system this may be determined by a “limit stat” set at 5K over normal maximum working temperature. (For chilled water systems in the UK the maximum working temperature may only be 30°C: the maximum ambient temperature when the system is out of use). When determining the required capacity of the expansion vessel the minimum and maximum pressures are used to calculate the ‘acceptance factor’ that is then applied to select an appropriate size from manufacturers’ data.

Calculations to determine the appropriate expansion vessel for heating systems must be undertaken in accordance with BS EN12828 2003, with a worked example being available in CIBSE AM14 (2010).

The actual cold fill pressure should be determined in accordance with the standard for the actual vessel selected so that there is always adequate water reserve in the vessel. Commonly used fixed gas vessels (membrane or bag type) are subject to degradation of the rubber (organic

diaphragm. So the vessels lose their ‘pre-set gas pressure’ at varying rates and any calculation method must reflect this operational reality. In cases where a chemical inhibitor (or antifreeze) is added to the water, care should be taken to ensure compatibility with the diaphragm, and other sealed system components.

In the case of chilled water systems the cold fill pressures should also be adjusted to take into account the fact that the system water volume will contract upon start-up and not expand. It is critical to maintain the water reserve as a vessel with no reserve has no ‘hydraulic back pressure’ and the system can effectively act as though no vessel is installed.

The expansion pipe, that connects the vessel to the system, is crucial to correct system operation. It must be able to absorb the rate at which the system expands/ contracts and provide hydraulic stability to the system as valves open/close and pumps stop/start etc, thus avoiding sharp pressure fluctuations. It is sized according to the maximum thermal load that can be delivered into the system. It should be independent of any other function and the connection

should always be located on the suction side of the pump and as such becomes the neutral point on the system. Also by placing it before the boiler the temperature is at its lowest so causing least thermal strain on the diaphragm that separates the system water from the inert gas or air that pressurises the vessel.

Different manufacturers are likely to have different tolerances according to the design and construction of their particular vessels, so it may not be possible to simply swap vessels from one company with the same nominal size of another, without comparing the working range. An appropriate confirming calculation should be recorded to ensure that the supplied vessel is appropriately sized.

Expansion vessels in operation

The expansion vessel should be considered critical to system operation. Too often it is thought of as a commodity item and ignored as a vital piece of equipment that requires regular programmed maintenance.

When installed on old systems that have the requirement for regular water make up the incoming refill water will introduce increased levels of dissolved air. Devices such as Vacuum Deaerators (as in Figure 5) may be employed to provide pressurised make up water but with the benefit of removing all dissolved air from the water before it gets into the system. This reduces the potential for continued oxygen-based corrosion.

By designing systems with appropriate pressurisation the free air in a system can be maintained at a minimum so reducing corrosion (and resulting ‘sludge’), and can reduce the need for chemical treatment whilst improving the life cycle effectiveness of the system.

With thanks to Martin Wilkinson of Spirotech for technical input.

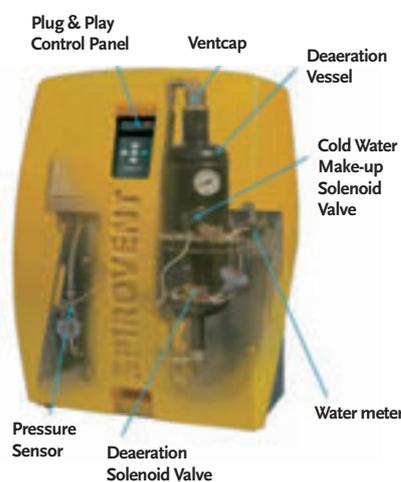


Figure 5 - Combined water make up unit and deaerator

1 CIBSE Guide C 2007, Table 4.6

Module 32

September 2011



1. What would be the approximate velocity head for water flowing at a suitable velocity for a 50mm pipe?

- A 0.459 m
- B 0.459 bar
- C 4.59kPa
- D 3m/s
- E 0.03m

2. If a F&E tank is 10m above point N what would be the static pressure at point N if the feed pipe was full of water at about 20°C?

- A 9.81bar
- B 98kPa
- C 10m
- D 9.81m
- E 10Pa

3. Which of these is least likely to be due to free air in the system?

- A air locks
- B increased heat transfer from heat transfer surfaces
- C problems with commissioning systems
- D accumulation of 'sludge' in system
- E increased system noise

4. What is the minimum allowable capacity for expansion vessels for closed heating systems?

- A 1 litre
- B 2 litres
- C 3 litres
- D 4 litres
- E 5 litres

5. Where would be the most appropriate place for the attachment of the expansion pipe from the system to the expansion vessel?

- A On the boiler by the safety device
- B At the highest point in the system
- C Just before the water returns to the boiler
- D Immediately after the pump
- E Nearest the biggest load

Name (please print)

Job title

Organisation

Address

.....

.....

Postcode

Email

Are you a member of:

CIBSE

If so, please state your membership number

(if available)

Other institution

(please state)

To help us develop future CPD modules, please indicate your primary job activity:

Building services engineer

Mechanical engineer

Electrical engineer

Commissioning engineer

Energy manager

Facilities manager

Other (please give details)

If you do NOT wish to receive information about Spirotech, the sponsor of this CPD module, please tick here:

By entering your details above, you agree that CIBSE may contact you from time to time with information about CPD and other training or professional development programmes, and about membership of CIBSE if you are not currently a member.

Please go to www.cibsejournal.com/cpd to complete this questionnaire online. You will receive notification by email of successful completion, which can then be used to validate your CPD records in accordance with your institution's guidance.

Alternatively, you can fill in this page and post it to:

E Palmer, CIBSE, 222 Balham High Road, London, SW12 9BS

Why Vaillant?

Because our heating and renewable systems make commercial sense.



Commercial boilers, solar technology, heat pumps and intelligent controls from Vaillant.

For over 135 years Vaillant has set the benchmark for quality and reliability. Today our commercial heating solutions offer wall hung and floor standing boilers which integrate seamlessly with our innovative solar thermal technology. By combining these with our class-leading controls, which offer weather compensation and multi-zone functionality, we deliver flexible, highly efficient commercial heating and hot water solutions across new build and refurbishment projects.

To find out more about our comprehensive range of commercial products and services, visit www.vaillant.co.uk or call us on 01773 596013.

■ Heating ■ Hot Water ■ Renewables

Because  **Vaillant** thinks ahead.

ACR
 THE
SHOW
 13-15 MARCH 2012
 HALL 19, NEC BIRMINGHAM

THE EVENT DEDICATED TO THE
 AIR CONDITIONING AND
 REFRIGERATION INDUSTRY

AN OPPORTUNITY OF
MAMMOTH
 PROPORTIONS

www.acrshow.co.uk



Official Magazine
ACR News
 Supported By
HVA
HVCA
IOR
ATA

To discuss how to get involved call Iona Spencer on 0208 651 7113 or alternatively email iona.spencer@fav-house.com

CIBSE Online Bookshop
 New publications list now available!

Download our new CIBSE Bookshop Brochure 2011 which will provide you with a full listing of our publications to ensure that you are on the right track. The publications range from those with a technical focus to those with a more practical application, and cover a wide variety of specialisms from lighting to ventilation, water systems to building designs and much more.

The brochure features **NEW titles from CIBSE and other leading publishers.**

CIBSE Members
 can take advantage of discounted publication prices!



To download or request a physical copy:
www.cibse.org/bookshop
 020 8772 3618





Remeha brings 'fairytale' Norman castle into the 21st century

The installation of a series of five Remeha Commercial Quinta boilers has brought state-of-the-art, high performance, energy-efficient, 21st century heating into Berkeley Castle in Gloucestershire. As part of a general refurbishment of the fairytale Norman fortress, the Berkeley family was keen to introduce more efficient heating with minimum impact on the environment. The exceptional output of the Quinta 115s has brought warmth to

every corner of the castle's many rooms. 'The family is delighted,' said consultant Steve Underwood, of Keyplan Engineering Ltd. 'Even radiators that have not been known to work previously are now giving out welcome heat.' The compact design and easy flueing of the Quinta 115s made them particularly appropriate for installation at this listed building, fitting in neatly and unobtrusively into the existing spaces.

● For more information visit www.remeha.co.uk or call 0118 9783434



BACnet natural ventilation control from TITAN Products now available

The CCM-204-NV provides energy-efficient control in buildings by monitoring the natural ventilation on demand and improving the environmental conditions through the control of temperature and CO2 levels. The CCM-204-NV can control two separate zones and, when used in conjunction with TITAN Products' temperature sensors, CO2 sensors, rain detectors and window controllers, the CCM-204-NV can create an extremely flexible multi-zone natural ventilation system. This advanced application-specific controller with automatic seasonal adjustment will increase ventilation as CO2 and temperature levels increase.

● For more information call 0161 406 6480 or visit www.titanproducts.com



Celebrating two decades of CableCalc level P with a free version of new twin and earth calculations

To celebrate 20 years of CableCalc, Castline Systems has released a new, free version of its popular CableCalc programme, which will calculate single phase radial and ring circuits wired in twin and earth cable. It even 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.

● For more information call 01293 871751 or visit www.castlinesystems.com



Fire audit praises Static Systems Group

Fire systems recently designed and installed by Static Systems Group at Walsall Manor Hospital – under its LPS1014 accreditation – have won praise from the assigned BRE (British Research Establishment) auditor, Robert Denton. The Walsall Manor fire alarm systems contract was part of a £174m PFI contract awarded to Skanska, involving a major new-build programme and extensive refurbishment of existing buildings.

● For more information call 01902 895 551 or visit www.staticsystems.co.uk

Visitors find themselves in hot water at Basildon Sporting Village

Visitors to the recently opened Everyone Active Basildon Sporting Village, Essex, are benefiting from green and sustainable hot water thanks to 30 sq m of Solartron® R2.5 panels, two 3,000 litre Abundance buffer storage vessels, two 350kW plate heat exchangers and a 1,775 litre Inox-Maxi pre-heat single coil cylinder – all supplied by MHS Boilers, part of Elco Heating Solutions.

● For more information visit www.mhsboilers.com



Marc Diaz and Andrew Powles seal the deal

May the force be with you – United Refrigeration partners Panasonic

United Refrigeration has signed a distribution agreement with Panasonic. The decision to join forces is a timely one as Panasonic has an active product development programme that is due to enter an important phase. In the next year, a number of air conditioning and heating products will be launched in the UK market, all of them available exclusively through Panasonic's approved distributors.

● For more information email uk.airconditioning@eu.panasonic.com or call 01334 853390



WindowMaster's helps Network Rail energise workforce in Milton Keynes

WindowMaster has won its largest-ever UK order for a natural ventilation and smoke control solution. It has supplied window actuators, locking motors and automated controls for the natural ventilation of Network Rail's new National Centre in Milton Keynes. Network Rail's 37,000 m² sq new offices have been designed by architects GMW to be at the forefront of sustainable building technologies.

● For more information visit www.windowmaster.co.uk

Badaguish utilises the great outdoors for efficient biomass heating

Badaguish Outdoor Centre, a skills and activities centre a few miles from Aviemore in The Cairngorms National Park, has specified a BioWIN wood pellet cascade boiler system from Windhager UK to provide heating and hot water for new buildings on the site. Recommended and installed by Glendevon Energy, the 52kW system provides wood pellet heating to three distribution points across two buildings.

The new scheme also incorporates a solar domestic hot water system and 1,000 litre buffer tank to capture solar input.

● For more information, visit www.windhager.co.uk or call 01249 446616



Packing a punch for energy efficiency – packaged intelligent pump solutions reduces carbon footprint

Armstrong has launched a series of pre-designed packaged pump solutions that offer specifiers lowest first-installed cost, reduced footprint and the opportunity for outstanding energy efficiency performance. Pumps, pipework, controls and motive power are fully integrated, and the packages are manufactured off-site, for fast, efficient installation. The new 8000 series of fully integrated pumping modules are complete fluid management systems, with a choice of four levels of control.

● For more information call 08444 145145 or visit www.armstrongintegrated.com



Power search reaches new high

Kingspan Insulation has installed one of the UK's largest roof-top photovoltaic arrays at its manufacturing facility in Pembridge. Roof space of up to 5,583 sq m is now covered by the Kingspan Roof PowerPanel System, which is supplied by fellow company Kingspan Insulated Panels. This initiative is the latest in a long line of actions to reduce energy use by the company.

● For more information visit www.kingspaninsulation.co.uk or call 01544 387384



Continually counting on heat loss

Castline Systems HeatCalc produces heat loss calculations for the design of heating systems, using the methods described in *CIBSE Guide A3: Thermal Properties of Building Structures*. HeatCalc performs calculations based on continuous heating, with U values supplied for outside walls, windows, floors and ceilings. With support for up to eight-sided rooms, it will design and evaluate energy loss for an entire property or building, with information output represented by user-friendly graphs and reports.

● For more information call 01293 871751 or visit www.castlinesystems.com

First class results pay dividends at community college in Hampshire

Leading plastic pipework system Friatherm from Durapipe UK, has been specified for a boiler refurbishment at Hurst Community College in Tadley, Hampshire. Friatherm is a high performing pipework system that is a reliable, alternative solution to copper for hot- and cold-water applications.

Its corrosion-resistant properties mean it is ideal for applications such as heating, and provides a safe alternative to copper.

For more information visit www.durapipe.co.uk or call 01543 279909



Continued trust in Nuair as it retains prestigious environmental standard

Nuair, the market leader in the design and manufacture of commercial and domestic energy efficient ventilation systems, has been awarded the Carbon Trust Standard for a further two years. The first ventilation manufacturer in the UK ever to be awarded the standard back in 2010, Nuair has now been recognised for its continued commitment to improving its environmental credentials by retaining the accreditation. Nuair's environmental manager Mark Bird, said: 'To have retained the Carbon Trust Standard again is a clear acknowledgement that Nuair is committed to reducing the direct impact of climate change.'

● For more information, contact 029 2085 8200 or visit www.nuair.co.uk



Supermarket introduces new exchange system for energy return

Sainsbury's has taken a major step to reduce its carbon impact with renewable energy based on a geo-exchange system supplied by Greenfield Energy in partnership with Armstrong Integrated. At the heart of the renewable solution is the Geoscart™ ground source heat exchange system designed and supplied by Greenfield Energy, a UK-based company specialising in the delivery of sustainable renewable energy. Greenfield Energy partnered with Armstrong Integrated for the manufacture and delivery of the key Geoscart surface system.

● For more information call 08444 145145 or visit www.armstrongintegrated.com



Knowledge is power?

Grundfos Pumps has introduced an online solution to help building services engineers improve their skills on a range of subjects. The current list of modules covers a diverse range of topics: life cycle cost; mixing loops; air conditioning; water disinfection; and wastewater. New focus areas are added regularly. All this is on the Grundfos Thinking Building Universe site.

● For more information call 01525 850000 or email uk-sales@grundfos.com



Smaller, but perfectly-formed – new Samurai chillers helps UK expansion

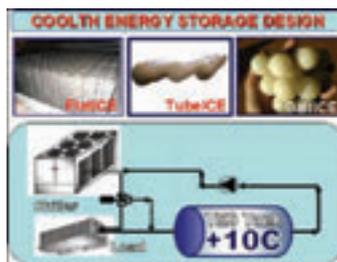
Hitachi Europe has expanded its UK direct sales operation to include the world-class Samurai range of chillers. The latest Samurai AG2 chiller unit from Hitachi Europe has been carefully designed to be smaller than previous units, for high cooling capacity in less space. It also boasts a number of key improvements for easier servicing and maintenance. Not only that, but the single cycle units are compatible with hydraulic modules. Hitachi offers training in the installation and use of the chillers at its Aircademy centre in Maidenhead, Berkshire.

● For more information call 01628 58394 or visit www.hitachiaircon.com/tomorrow

Thermal energy storage heats up with PCM

Phase Change Materials (PCM) store and release thermal energy during the process of melting and freezing, and the latest range of PCM solutions between -100°C and +85°C offer new application opportunities. For example, the excess capacity of existing +7°C water chillers can be stored in +10°C PCM containers overnight, using lower ambient and lower electricity costs. This efficient and lower-cost stored energy tops up the day peak loads, saving considerable running costs, doubling the existing system capacity, or halving the chiller capacity for new design.

● For more information call 01733 245511 or visit www.pcmproducts.net



Air apparent: manufacturer launches new air-to-water heat pump

Vaillant, one of Europe's leading heating technology manufacturers, has added to its renewables portfolio with the launch of its new geoTHERM air range of air-to-water heat pumps (AWHP), suitable for a wide range of applications in new build and refurbishment properties. The three models – 7kW, 12kW and 15kW – provide maximum comfort and efficiency, combined with simple installation, smooth operation and advanced diagnostics.

● For more information visit www.vaillant.co.uk

Close to maximum efficiency for award-winning conservation scheme

Titon's HRV1 Q Plus whole-house ventilation units and CME1 Q Plus continuous mechanical extract units have been installed in Kingston Mills, a conservation project in Bradford on Avon. The project recently received a Royal Town Planning Institute award in the Local Regeneration and Renewal category. Titon's ultra-efficient HRV1 Q Plus ventilation units with heat recovery have efficiencies of up to 91%.

● For more information visit www.titon.co.uk



Solar system test reports made simple

A new dedicated software programme for the solar PV industry helps system installers produce all electrical test documentation for client handover packs quickly and easily. The new Seaward SolarCert Elements software is designed to help solar PV installers create comprehensive folders of system information, including: customised test certification and inspection reports; installation layout diagrams; photographs; and any other information relevant to PV installation, such as datasheets.

● For more information visit www.seaward.co.uk



Climate control ensures a good reception for hotel guests

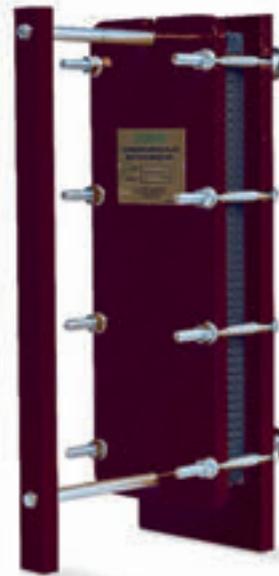
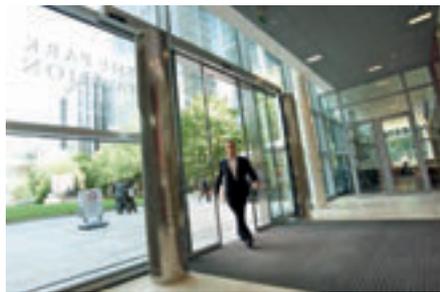
The latest climate control technology from Mitsubishi Heavy Industries (MHI) has been installed at a new boutique hotel extension to the Red Lion Bar and Bistro in Derbyshire. A VRF heat-recovery solution with discreet ducted indoor units provides heating and cooling as required, while a twin-split system keeps the hotel reception at a comfortable temperature. The systems achieve energy savings of up to 38%.

● For more information, visit www.mitsubishiaircon.co.uk or call 0207 842 8100

Designer air curtains at Canary Wharf

JS Air Curtains has designed and supplied eight vertical air curtain systems for The Park Pavilion complex in Canary Wharf. The six 3m and two 2.5m air curtains were supplied in brushed stainless steel and are positioned vertically at the sides of the entrance to The Park Pavilion complex and three of the interior doorways. As well as keeping the cold out in the winter, they can also keep the temperature cool through air conditioning during the summer.

● For more information call Mike Verney on 01903 858656 or email him on info@jscurtains.com



The bare facts about the advantages of plate heat exchangers

Among a choice of high-performance plate heat exchangers that extends to seven ranges and more than 200 different units, Stokvis Energy Systems offers the option of bare plate models. The latest Stokvis Econoplate Bare Plate Series is ideal for situations where the specifier wants to take advantage of the manufacturer's reputation for build quality and performance, but is seeking to utilise minimum control and other ancillary equipment.

● For more information, visit www.stokvisboilers.com or call 08707 707747



New wireless course for building services engineers

Recently approved CIBSE-accredited continuing professional development (CPD) trainer, Sontay, the market-leading manufacturer and distributor of field control devices, has introduced a new course for building services engineers. The Wireless Temperature Sensing Systems course will cover a range of topics: including how wired systems are installed into buildings; the evolution of wireless technology; and early wireless sensing systems.

● For more information email sales@sontay.com or call 0845 345 7253

Biomass boilers give biggest carbon savings

The latest *Ethical Consumer* magazine's Buyer's Guide has found biomass to give homeowners the biggest carbon savings when compared with ground source heat pumps and solar hot water. Simon Holden, from Euroheat,



said: 'The reason biomass is so effective when it comes to cutting carbon is that the boiler's fuel – wood – absorbs CO₂ over its lifetime and, while this is released during burning, no more is emitted than if it was left to rot.'

● For more information visit www.euroheat.co.uk



Insight provided through videos

HCP, a division of SAS International, is pleased to unveil its new online videos detailing its range of Radiant, Trench and Perimeter Heating Solutions. Radiant heating offers water-based, energy-efficient, space-heating solutions. Trench heating is ideal for combating the cold down draughts and condensation often associated with highly glazed buildings. Perimeter Heating systems provide continuous heating along walls and walkways.

● For more information visit www.hcp-sasint.co.uk/videos



Nuclear bunker converted into sustainable, energy-efficient home

A former ROC 9 Group control bunker built into a wooded hillside in Yeovil, Somerset, has been converted into a sustainable, energy-efficient five-bedroom home with the help of leading specialists in heat recovery ventilation and air source heat pumps, Total Home Environment. Homeowner Brian Lemmy commented: 'The company performed with great honesty when it came to customer service and were superb in resolving the [ventilation] issue. I am delighted with the results.'

For more information call 0845 2600123 or visit www.totalhome.co.uk



Gold award for green building is a cool result for Czech Republic bank

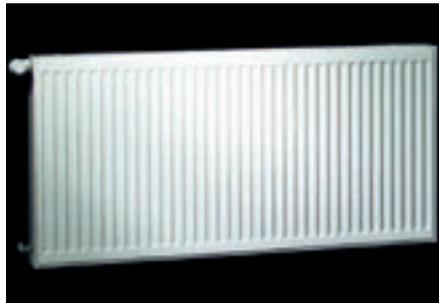
The headquarters of CSOB (Československá Obchodní Banka) has been awarded the Gold Prize LEED Green Building Award for outstanding energy efficiency, thanks to TA Hydronics. TA Hydronics' TBV-C, STAD, STAP and STAF balancing and control products were used. With a total cooling capacity of 5MW and a heating capacity of 3MW, the system is able to meet the needs of the building while using energy as efficiently as possible.

● For more information visit www.tahydronics.com

Radiators take starring role in new home improvement show

Seven Purmo Compact radiators have been installed at a house in Swinton, Manchester, as part of the new series of Channel 4's home improvement programme, *Help, My House Is Falling Down*, broadcast on 23 June 2011. Commenting on the project, Chris Edwards, sales and marketing director for Purmo UK, said: 'We were delighted to be able to supply radiators to help heat the home featured in the programme.'

● For more information call 0845 070 1090 or visit www.purmo.com



High-pressure humidifier is launched

JS Humidifiers is launching the Condaif FF2 high-pressure spray humidifier, capable of delivering up to 1,080kg/h of moisture to a duct or air handling unit (AHU). This is ideal for AHUs that have multiple humidification and adiabatic cooling elements, as a single pump station can feed nozzles grids in up to four different ducts. Even at maximum output, the low-energy humidifier only consumes 3.2kW of power while delivering a potential 745kW of adiabatic cooling.

● For more information call David Marshall-George on 01903 850200 or email dmarshallgeorge@jshumidifiers.com

New Lincoln Academy takes option on manual window automation system

SE Controls has been specified to provide manual automation for high-level windows across a new National Academies Framework design-and-build project in Lincolnshire. The system will be used at three new multi-million-pound sites – The Priory Witham Academy, The Priory City of Lincoln Academy and The Priory Academy LSST – comprising a total of six buildings, and believed to be the largest academies scheme in the country.

● For more information visit www.secontrols.com or call 01543 443060



A revolution in low carbon cooling

A new standard in low carbon cooling, the Cosaf exclusive range of evaporative coolers can offer a whole new dimension to the building process. Delivering unprecedented energy savings, Cosaf's evaporative cooling systems are the leading choice for consultants looking for a revolutionary method of direct or indirect cooling. Many local authorities, public sector organisations, educational establishments and major corporations are now looking to evaporative coolers to meet their environmental policies and are already benefiting from the improvements in performance and reductions in running costs.

● For more information call 01942 680080 or visit www.cosaf.co.uk



Protection for elite trunking range gets industry seal of approval

Marco, the UK's largest manufacturer of Steel Wire Cable Tray, and uPVC cable management company, has introduced a protective seal covering across its Elite range to prevent damage or marking during installation. The innovative seal is included at no additional cost across the company's entire Elite Trunking range, and has so far been well received throughout the industry.

● For more information visit www.marcoableman.co.uk



A Stirling service for customers

Staff and visitors to Stirling Council's Customer First – One-Stop Shop at Port Street are benefiting from warm and comfortable heating, thanks to 20 Monoplan radiators supplied by MHS Radiators. The installation was part of a major refurbishment of the building. MHS Radiators also supplied bespoke welded feet for several Monoplan models, which is available in single, double or treble panel versions.

● For more information call 01268 546700 or visit www.mhsradiators.com

PRODUCTS & SERVICES

Telephone: 020 7880 6206 Email: darren.hale@redactive.co.uk

Classroom ventilation units

Aircraft Air Handling's 260mm-high classroom ventilation units are silenced to nr25. The plate recuperator is 60% efficient, with an air volume 0-500 litres. Heating: LPHW/ELECTRIC. Cooling: CW/DX. Larger air volumes and bespoke units are available.

● For more information visit www.aircraftairhandling.com



Public Health Design Software

This new public health design software will simplify the design process. It incorporates five applications in one product, involving popular topics, such as pipe sizing water supply systems, with integrated LU conversion, head loss, and industry standard tabulation, assessment of tail end hot/cold and blended water design flow (based on probability), sanitary design flow, eaves gutter-sizing, and storage capacities for harvesting systems. Priced at £95 + VAT, it is supplied as a binder, enclosing CD and user guide. The product will appeal to professionals and trainees.

● For more information visit www.phoffice.co.uk/design-software.php

Recycled materials gives hot water system good eco-credentials at low cost

Dimplex's new EC-EauTM range of heat pump hot water cylinders offers mains pressure hot water with eco-credentials, low running costs, reliable hot water and fantastic flow rates, for a range of domestic and light commercial installations. Manufactured from a high proportion by volume of recycled materials, the heat pump cylinders offer the same efficiencies as the rest of the EC-Eau range.

● For more information visit www.dimplex.co.uk or call 0845 601 5111



DIRECTORY Your guide to building services suppliers

Telephone: 020 7880 6206 Email: cibsedirectory@redactive.co.uk

Air Conditioning



For total solutions in air-conditioning

E: info@clivet-uk.co.uk
 W: www.clivet.com
 T: 01489 572238
 W: www.versatemp.co.uk

Air Handling



Manufacturer of high quality bespoke AHUs and fan coils.
 Specialists in refurbishment and site assembly projects.
 Expedient delivery service available.

Aircraft Air Handling Ltd
 Unit 20, Moorfield Ind Est,
 Cotes Heath, Stafford, ST21 6QY
 Tel: 01782 791545 Fax: 01782 791283
 Email: info@aircraftairhandling.com
 Web: www.aircraftairhandling.com

CAD Services



- Building Services Work Undertaken
- 2D Draughting
- 3D Autocad MEP
- Record Drawings
- Excellent Rates & Turnaround Service
- MEP BIM Services

Contact Stephen:-
 T: 020 7043 7491
 F: 020 7043 7493
 E: cad@cadeuro.co.uk
 W: www.cadeuro.co.uk

LST Radiators



Range of models to suit all budgets and applications

- Easy installation – ready assembled
- BSRIA tested outputs and surface temperatures
- SteriTouch® antimicrobial surfaces as standard
- Energy efficient copper aluminium emitters
- Attractive yet functional design

Call 01787 274135 www.autron.co.uk



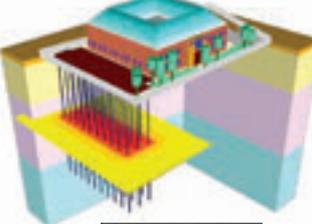
Energy Efficiency



Ground Source Heat Pump Installations

Meeting Renewables Targets

Tel: 02392 450889
 Fax: 02392 471319
www.groenholland.co.uk




Certificate Number MCS 1201 Heat Pumps

Pump Packages



Leaders in fluid pumping equipment and controls

- Water Pressure Booster Sets
- Sealed System Pressurisation Units
- Tank Level & Temperature Controls
 - Energy Efficient
- Bespoke Design Service

To discuss your project please contact Jim Rusbridge
Head Office: 01206 215121
 email: info@aquatechpressmain.co.uk
www.aquatechpressmain.co.uk

Refurbishment



Energy Efficient Refurbishment solutions for increasing the performance and reliability of existing Air Handling Units of any manufacture.

- Replacement, Refurb or Retrofit
- Site Survey, Design, Manufacture
- Basic to High Spec Installations
- In-depth Technical Support from survey to final commissioning

For more information, call Steve Peck on 01206 505909 or e-mail tech@imofa.co.uk
www.imofa.co.uk
 AHU Designers & Manufacturers

SENIOR BUILDING SERVICES ENGINEERS (2 POSTS)

**£48,198 TO £50,658 PLUS £3,466 LOCATION ALLOWANCE
LONDON, SW6**

Custody facilities to forensic laboratories. Firearms ranges to helicopter bases. Vehicle pounds to stables. Commercial offices to warehouses. The Metropolitan Police Service can offer you a unique estate on which to test and expand your engineering and FM experience.

As London prepares to host the Olympic Games, we're rationalising our estate portfolio, making this a pivotal time to join our multi-disciplinary team. You'll carry out design, development, maintenance and improvement works across our estate, constantly reviewing system and maintenance failures to initiate robust corrective action plans. Working with a wide range of stakeholders, consultants and service providers, you'll be given the scope to challenge solutions, drive cost savings from contracts and promote best practice.

Holding an engineering, property or FM qualification, you'll need in-depth experience of engineering systems and a detailed understanding of statutory maintenance regimes, strategy and processes. Familiarity with relevant legislation,

compliance, best practice and risk mitigation is expected. As well as an analytical approach to large, multi-functional supply chain projects, you'll need the ability to manage stakeholders and articulate client briefs.

In return, we offer a range of benefits that includes choice of pension scheme, interest-free season ticket loan, generous holidays and access to an active sports and social club.

To apply, please visit our website to download a role specific information pack and application form. If you have any further queries please contact our Recruitment Helpline, Mon-Fri, 9am-5pm, on 0845 727 2212, quoting reference number IRC36760.

Completed applications must be returned by Monday 12 September 2011.

www.metpolicecareers.co.uk

THE METROPOLITAN POLICE SERVICE IS AN EQUAL OPPORTUNITIES EMPLOYER.



**METROPOLITAN
POLICE**



Visit www.bsvconsultants.co.uk to find out about our Building Services recruitment.



Mechanical Contracts Engineer

Ref: 12100 Essex £25,000 - £30,000

As an established building services contractor our client is currently looking to expand its team by recruiting for a Junior Mechanical Contracts Engineer to provide mechanical support for the company's projects.

Contact Darren Warmington for further information.

Electrical Design Engineer

Ref 12113 Bristol £25,000 - £30,000

One of the UK's leading International M&E Building Services Consulting Engineers is now looking to recruit a talented Electrical Design Engineer to join this well established team.

Contact Darren Warmington for further information.

3D CAD Technicians

Ref 12149 Northamptonshire £18 - £22 per hour

With an annual turnover in excess of £100m, our client is a privately owned Mechanical & Electrical Design and build contractor established as a leading player in the building services market providing a range of engineering design, installation and maintenance services to the construction industry. They now have a need for 3D AutoCAD Technicians with a sound working knowledge of both services coordination and MEP usage. Based in their Northamptonshire Office the CAD technicians will be expected to develop the knowledge and skills attained during previous work experience within the construction industry.

Contact Darren Warmington for further information.

Please contact us on 01483 768600 for further information on these roles or email: darrenw@bsvconsultants.co.uk

www.bsvconsultants.co.uk



Specialists in Building Services Recruitment

Overseas Opportunities - M&E Engineers!! | Worldwide | £Neg! | ref: 5846

We have several clients who are now recruiting experienced intermediate, senior and associate level candidates for long term contract and permanent positions based overseas. All our clients are UK consultants, locations include Saudi, Qatar, Dubai, India and Australia.

Senior Electrical Design Engineer | Berkshire | to £45K++ | ref: 9662

We are looking for an Electrical Design Engineer who can produce full detailed design, suitable for installation, and be confident in representing the company at client meetings and on site. Excellent opportunity for progression!

Mechanical Design Engineer | London | £NEG! | ref: 7596

An established consultancy, with key clients within the retail sector, is looking to expand a newly opened London office with a Senior Mechanical Engineer. You will be proactive and have the ability to take over key accounts for the practice. Opportunities to become a Junior Partner within 5 years!

Mechanical & Electrical Engineers – Data Centre | London | £High! | ref: 4589

We are looking for senior Mechanical and Electrical Design Engineers for a number of key clients within the London region. You will have significant experience within mission critical projects and data centres. Long term contract or permanent opportunities!

Mechanical Design Engineer | South Coast | £High! | ref: 6846

We are looking for an experienced Mechanical Engineer to work on a variety of projects. Ideally Chartered, or working towards, you will be confident with clients as well as running projects and carrying out design. Good career opportunity.

For more information or a confidential discussion please contact Mark Butter

t: 02392 603030

e: mark.butter@blueprintrecruit.com www.blueprintrecruit.com
E3 & E5 Heritage Business Park, Heritage Way, Gosport, Hampshire PO12 4BG

Lead Electrical Engineer

£60k +benefits, London

Our client has been established over 60 years with offices throughout the UK. They operate across building services and have specialist groups including the rail division which has worked on network rail and London underground projects including depots, tickets halls, platform lengthening and station upgrades. We are currently recruiting a senior or principal electrical engineer who has previously worked on rail related projects and been responsible for the design of electrical systems such as lighting, power distribution, and generators. BAR675/JA

Associate Mechanical Design Eng.

£55-60k +benefits, Surrey

We require an associate mechanical design engineer from a building services background with a strong commercial acumen that has previously been responsible for leading projects and building services design teams. The successful candidate will have worked as a mechanical associate or principal mechanical design engineer in a building services design consultancy. The ideal candidate will have the ability to demonstrate strong design skills coupled with excellent interpersonal and client interaction skills. BAR647/JA

Electrical Director

55000 Dirham's PCM, Dubai UAE

This position represents an amazing opportunity to join a world leading MEP design team in the UAE undertaking a key role in the delivery of ever more imaginative landmark development projects. A major International engineering consultancy requires a Director to head up their team of electrical engineers. You should be able to demonstrate a commitment to low energy design, be degree qualified, and possess substantial post graduate experience having worked at a similar level. You must be a leader of people, and a technical authority. BAR681/PA

Senior Mechanical Engineers

£43k+ DOE, Winchester

Our client is involved in innovative Building Services solutions and is the preferred choice with clients seeking low energy designs within the hotel, commercial, retail and banking sectors. All applicants should possess the ability to demonstrate a strong interest in and experience in the execution of sustainable solutions and quality engineering, and will be responsible and accountable for the overall design, technical delivery, quality and management of projects within defined budget and timescales. Preferred applicants will be suitably qualified. BAR545/PA

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

Discover your future at www.b-a-r.com

b-a-r beebey anderson recruitment



Thinking of your future



Technical Consultant

Southern England

Colt is a leading, independent provider of HVAC and climate control systems including smoke control, performance louvre and solar shading.

We seek a Technical Consultant with building services-related qualifications and relevant experience to work with our existing customer base to provide solutions to improve the internal environment of their buildings.

The closing date for applications is 21 September.

Please visit <http://jobs.cibsejournal.com> or www.coltinfo.co.uk for further information.



Senior Engineer – Cambridge Office



Since 1966, Max Fordham LLP has worked with the world's leading architects to create beautifully engineered buildings. Our building services engineers bring an understanding of the whole building, from early stage design concept to the detail of delivery. We work on internationally important landmark buildings like Tate Modern, Rome's MAXXI and Royal Festival Hall and also on smaller buildings that are just as important.

We are proud of our highly successful Cambridge Office, which is now ready for growth. We are looking for a senior-level M&E engineer with around 10 years' design experience to join our able and talented group of engineers in Cambridge. This is an exciting career building opportunity for an experienced project leader who cares about the work that they do.

The right person is likely to be chartered, with knowledge of both mechanical and electrical system design and site-work experience. A key element of this role will be contributing to the process of collaborative working; from developing a well thought-out brief to delivering a building or project that exceeds the client's expectations.

If you can match your high quality engineering and interpersonal skills to those of the team, and are keen to be integral to our success, then we want to hear from you. Please visit our website for details of this and our other available opportunities at www.maxfordham.com

Max Fordham LLP is committed to the principle of equal opportunity in employment.

MAX FORDHAM



Houses of Parliament

It's not easy maintaining a World Heritage site, particularly when the facilities demanded by a modern Parliament need to sit alongside centuries of history. But if you pride yourself on the quality of your work, and you relish the idea of applying your know-how in a Grade 1 Listed Building, you'll find it's one of the most satisfying jobs there is.

The Parliamentary Estates Directorate acts on behalf of the owners of the Parliamentary Estate and deals with all property operations and management, to ensure the estate is maintained and managed to agreed standards.

The Projects Team is split into two distinct areas; The Design Authority which is responsible for the technical and construction standards for the Estate, and the Delivery Team, which is responsible for leading and delivering all types of construction and M&E projects to meet the needs of the two Houses.

Excellent benefits include: 28 days annual leave (pro rata); interest-free season ticket loan; child care voucher scheme; discounted membership of the in-house gym and wide variety of catering outlets.

For more information and to apply, please visit:

www.houseofcommons-careers.org.uk

Or write to: Campaign Management, Hays Public Services, 23 Lower Belgrave Street, Ebury Gate, London, SW1W 0NT. Alternatively please email: HouseOfCommons@hays.com.

If you have any technical queries or questions please call 020 7259 8744.

Please also kindly note CVs are not accepted, to apply you must complete an application form unique to the job reference number.

Due to the number of posts, interviews are likely to be held in December 2011. **Closing date: 30 September 2011.**



We are looking to recruit:

Design Authority

Lead Electrical Engineer
(£46,071 – £61,255)
311040

Lead Mechanical Engineer
(£46,071 – £61,255)
311041

Lead Communications Engineer
(£46,071 – £61,255)
311042

Construction Manager
(£34,643 – £42,401)
311043

Delivery Team

Senior Project Leader Mechanical and Electrical
(£46,071 – £61,255)
311044

Project Leader (job share)
(£34,643 – £42,401 pro-rata)
311045

Valuing diversity, equality and fairness

CIBSE JOURNAL CIBSE JOBS



To advertise your jobs with *CIBSE Journal* contact:
020 7880 6243 | cibsejobs@redactive.co.uk

The home of building services vacancies in print and online



Visit jobs.cibsejournal.com to find your next career move

Events & Training

NATIONAL EVENTS AND CONFERENCES

CIBSE Technical Symposium
06-07 September, Leicester

Two-day event showcasing research and technical developments. The symposium will include papers that are relevant for the full range www.cibse.org/events

Energy Event
13-14 September, NEC Birmingham

Leading business exhibition and conference, focusing on energy procurement, management and efficiency. Free to attend www.theenergyevent.com

Low Carbon Retrofit
15 September, London

The Energy Performance Group present a one-day conference identifying some of the key challenges and opportunities facing industry, and highlighting current best practice in delivering low carbon retrofits in buildings www.cibse.org

AECB Annual Conference and AGM
16-17 September 2011, Nottingham

The sustainable building association looks at topical issues facing the industry, including ventilation and retrofitting conference@aecb.net

HBF Planning Conference
22 September, Milton Keynes

What will the draft National Planning Policy mean for your existing plans and land holdings? Plus your current land options and planning strategies? Early booking discount applies until 15 July www.house-builder.co.uk

Energy Solutions 2011
11-12 October, London

Energy Solutions, an energy management and procurement event, will bring together energy management and

procurement professionals from across the UK www.energysolutionsexpo.co.uk

Professional Lighting Design Convention 2011
19-22 October, Madrid, Spain

PLDC is a three-day conference offering around 65 papers from internationally renowned speakers and young professionals. The conference is accompanied by a manufacturers' exhibition, offering industry partners a platform to present their companies to delegates and broaden their business contacts www.pld-c.com

SOCIETY OF LIGHT AND LIGHTING

LEDs – a CRI for help
11 October 2011

Details to be confirmed www.sil.org.uk

CIBSE GROUPS AND REGIONS

Chlorine dioxide as a method of disinfection within water systems and suitable generation systems
6 September, Bristol

A Society of Public Health Engineers event steve.vaughan@aecom.com

Pinholing in copper domestic water systems
15 September, Bristol

A Society of Public Health Engineers event www.cibse.org/events

Society of Façade Engineering technical meeting
21 September, London

Film on glass, and film in glass www.cibse.org/sfe

Underfloor Heating
21 September, Manchester

Society of Public Health Engineers event www.cibse.org/events

Symposium on lift and escalator technologies
29 September 2011, Northampton

A joint meeting organised by the School of Science

and Technology at the University of Northampton and The CIBSE Lifts Group www.cibseliftsgroup.org/events

High-rise draining design
04 October 2011, London

Presentation by Peter White steve.vaughan@aecom.com

The natural ventilation of UK school classrooms
04 October 2011

This seminar aims to answer three key questions, including whether there is still a case for naturally ventilating schools. Tickets £10 natventinschools.eventbrite.com/

Society of Façade Engineering – evening technical meeting
18 October 2011, London

Jonathan Lowy will be speaking on 'the use of zinc in building facades and roofs' sfe@cibse.org

Society of Façade Engineering – technical visit
15 November 2011, London

Details TBC sfe@cibse.org

CIBSE/OTHER TRAINING

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

Display Energy Certificate Training
20-21 September, London

Air conditioning Inspection Training
26th September, London

CPD TRAINING

Visit www.cibsetraining.co.uk, call 020 8772 3660 or email eventbookings@cibse.org

ELECTRICAL SERVICES

Electrical Services Explained (three days)
27-29 September 2011, Birmingham

The AECB Annual Conference

16-17 September



This month, the sustainable building association's 2011 annual conference will be debating the hottest topics affecting the construction industry.

Natural ventilation, retrofitting and government measures to boost renewable and low carbon energy use, such as Feed-in Tariffs and the Renewable Heat Incentive, will all be discussed during the two-day event.

Speakers include prof Brian Ford, professor of bioclimatic architecture and head of the School of the Built Environment at the University of Nottingham,

who will give an insight into 'Natural ventilation in domestic buildings', and Adam Dadeby of Passivhaus Homes Ltd, and Gil Schalom of Gil Schalom Design, who will both talk about 'Renovation to Passivhaus Standard'.

Plus, an AECB discussion paper will be launched, entitled *Less is more – energy security after oil*.

The conference is being held at the University of Nottingham's Jubilee Campus. For more information and to book your place, email conference@aecb.net

ENERGY EFFICIENCY AND SUSTAINABILITY

Low Carbon Buildings and Energy Infrastructure for Local Authorities
27 September 2011, London

2010 Part L Building Regulations
29 September 2011, Birmingham

2010 Part L Building Regulations
29 September 2011, London

2010 Part L Building Regulations
04 October 2011, Manchester

Low and zero carbon energy technologies
04 October 2011, London

Introduction to Building Services
04 October 2011, London

FACILITIES MANAGEMENT

Preparing FM and maintenance contracts
28 September 2011, London

MECHANICAL SERVICES

Design of Ductwork Systems
20 September 2011, London

Mechanical Services Explained
21-23 September 2011, Belfast

Mechanical Services Explained
28-30 September 2011, Birmingham

PUBLIC HEALTH AND WATER

Sanitary and rainwater design using BS EN 12056:2000
15 September 2011, London

Send your event details to cbailey@cibsejournal.com

Imtech

HEADLINE SPONSOR

CIBSE BUILDING PERFORMANCE AWARDS 2012

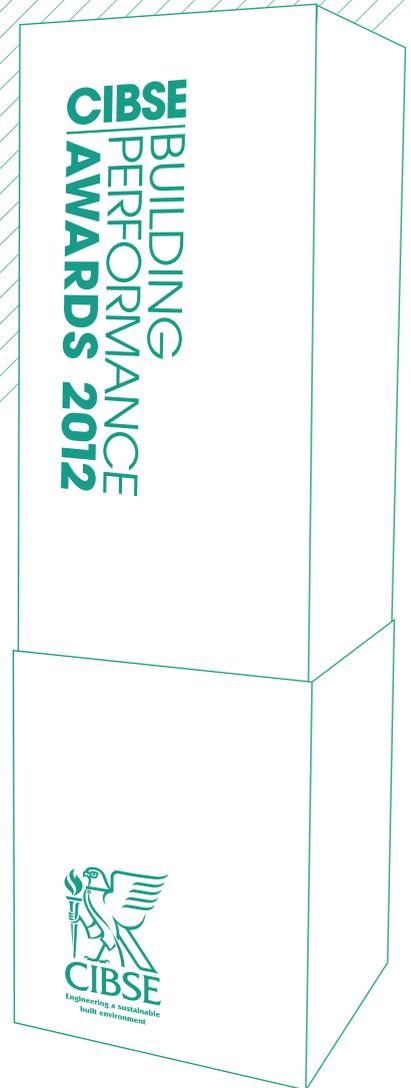
RECOGNISING EXCELLENCE
IN MAKING BUILDINGS WORK

Wednesday 8 February
Grosvenor House, London

SIX WEEKS REMAINING
UNTIL ENTRIES CLOSE

» With energy efficiency, sustainability and carbon now mainstream, the CIBSE Building Performance Awards reward excellence in the design, construction, commissioning and operation of buildings of all types, and the development of people, products and processes in the sector.

The Awards as a whole focus on actual, measured performance, not design intent or performance specifications. Judged by a panel of distinguished industry leaders, winners of these awards will know that their work has been acknowledged by the top professionals in Building Services Engineering and has truly excelled.



Enter now at:

www.cibseawards.org

where you will also find handy hints on preparing your entry

RECOMMEND AN
OUTSTANDING
PROJECT OR
PRODUCT AT
www.cibseawards.org

SPONSORED BY:



For sponsorship enquiries please contact jim.folley@redactive.co.uk or 020 7324 2786

CMR

in complete control

CMR Controls manufactures low air pressure and air volume measurement sensors and control systems for standard air conditioning, clean rooms, sterile laboratories, containment facilities, and fume cupboard extract systems.

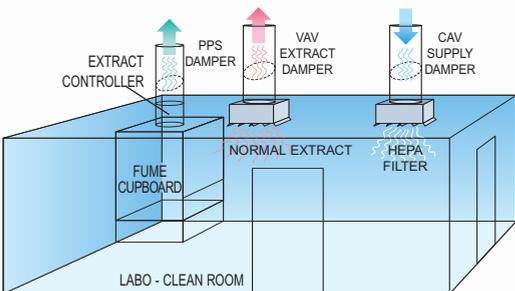


DPM PRESSURE SENSOR

Panel Mount Pressure or Velocity Transducers with remote alarms, analogue and digital interfaces. Traceable calibration certificates supplied as standard.

AIR MANAGEMENT SYSTEM

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.



PRECISION COMPONENTS FOR VENTILATION AND PROCESS CONTROL

CMR CONTROLS

A Division of C. M. RICHTER (EUROPE) LTD

22 Repton Court, Repton Close,
Basildon, Essex SS13 1LN. GB
Website: <http://www.cmr.co.uk>

Tel: +44 (0)1268 287222
Fax: +44 (0)1268 287099
E-mail: sales@cmr.co.uk



DPC CONTROLLER

Fast and accurate controls to drive high speed dampers or invertors. Full PID stand alone controls with BMS interface.



CAV AND VAV DAMPERS

Accurate air flow measurement with the unique CMR Venturi built into the airtight shut-off damper to control room pressure or constant volume.



Metal Damper

PPS EXTRACT DAMPER

Poly-propelene control and shut off valve incorporating the CMR Venturi Nozzle. This is essential when dealing with corrosive extract air especially from fume cupboard systems.



PPS Damper