

CIBSE

JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

June 2012

HONEST ENGINEERING
CIBSE PRESIDENT CALLS
FOR LESS GREENWASH

LOW CARBON REFURB
A 1960s DWELLING
IS TRANSFORMED

LIGHTING FOCUS
COLOUR RENDERING
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Championing best practice

Can we ever achieve a low carbon future? This is not intended as a flippant or cynical question. Regular readers of the *Journal* will be well aware of the importance of a building's performance in the goal of cutting the nation's CO₂ emissions. There are two sides to the performance coin – the engineering side, which is open to testing, recalibration and renewal; and the behavioural side, which is far less predictable and controllable. The huge challenges presented by both sides, and their complex interrelationships, place a large question mark over whether we can meet those tough carbon targets.

But, thankfully, around the country there are beacons of low energy good practice that light the way forward. The CIBSE Carbon Champion of the Year (see page 24) is a great example of how both sides of the coin can be tackled together. Bradford University is not only creating low carbon buildings that appear to be performing well (subject to

current and future energy monitoring results), the institution is also working to instill the idea of sustainable living into its students, hopefully for the long term. It's 'Ecoversity' strategy includes a sustainable module for each course and a new eco-learning centre; and it extends to areas such as university transport and embodied carbon.

Perhaps this strategy offers some lessons when it comes to the challenge of persuading and

educating users of low carbon homes and offices to make them work as efficiently as possible. Without appropriate usage, technology by itself will not significantly reduce the carbon footprint of Britain's building stock. Perhaps we need a 'learning module' for all new occupants of low carbon buildings. And how about an ongoing national advertising campaign along the lines of the old 'clunk-click every trip' TV advert?

This, of course, is focused on the long term. Right now we need to promote tried-and-tested engineering solutions. As David Fisk argues in his CIBSE presidential inaugural speech (page 12), building services engineers have an opportunity to reassert 'normal engineering', which is about measuring and learning from the performance of real buildings, and delivering real low carbon solutions devoid of technologies that are little more than green bling. This ability to obtain firm knowledge about what works, in both engineering and behavioural terms, should give us good grounds for optimism that, despite the challenges, we can significantly cut our buildings' carbon footprint.

Bob Cervi, Editor

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Nearly all RHI applications are rejected

During the first four months of the Renewable Heat Incentive (RHI), 95% of all applications were rejected, according to figures released by energy regulator Ofgem.

There were a total of 376 applications, but only 20 were approved to receive RHI payments. Most were turned down because of problems with 'supporting information'.

Of those that were successful, 80% were for biomass projects and these generated 98% of the total heat capacity created by the scheme.

The Department for Energy and Climate Change has delayed the launch of the domestic version of the scheme until next year and has, instead, announced a second phase of the Renewable Heat Premium Payment (RHPP) scheme for domestic users.

Ofgem said that most of the problems with the rejected applications related to confusion over the data to be delivered by the heat meters monitoring the installations.

Currently, metering on a RHI project can be classed as either 'simple' or 'complex'. The latter means that the user only receives payment for the heat they use so those systems need multiple meters. www.ofgem.gov.uk

Green Deal under review amid worries it may fail

● The Cabinet Office consults industry experts on the government's flagship policy

Industry concern over the government's flagship Green Deal has continued amid reports that the policy could be overhauled. Prime Minister David Cameron is said to have held discussions with ministers about the policy, after the Cabinet Office consulted industry experts.

One of those involved in the consultation, Andrew Warren of the Association for the Conservation of Energy (ACE), was reported as saying that the government's 'impact assessment' on aspects of policy has shown it to be heading for a 'train crash'.

'There is not a single building engineer working today who meets the Green Deal competence criteria'

The ACE is also concerned that the Green Deal, aimed at encouraging householders to insulate homes and save energy, may not help those in fuel poverty, who will be unwilling to take out loans under the scheme.

The government's latest fuel poverty statistics, published last month, show that households in fuel poverty are expected to rise to 3.9m this year, up from 3.5m in 2011.

There is no indication, however, that the Green Deal's planned launch this October will be delayed, but the review of the policy could prompt changes to it, according to reports.

Paul King of the UK Green Building Council said the government could bring in new Green Deal incentives,



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The Green Deal will seek to encourage people to improve the energy efficiency of their homes

such as reduced stamp duty for households.

David Frise, head of sustainability at the Building & Engineering Services Association (B&ES), said the government had not thought through the delivery process for the Green Deal.

'With just five months to go until launch, there is not a single building engineer working today who meets the Green Deal competence criteria,' he said. 'There are also no courses available to train them because the competence criteria have been set in line with new national qualifications that are not yet in place.'

Immediate past-president of CIBSE, Andy Ford, said he hoped the Green Deal would succeed and called on the industry 'to do everything it can to make it work'.

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Draft Energy Bill seeks reform

● Plans aim to make the electricity market greener and boost renewables investment

The government has published an Energy Bill aimed at reforming the electricity market to make it greener. The Draft Bill covers electricity market reform and nuclear regulation as well as sale of the government pipeline and storage system.

Ministers say the Bill will bring in long-term 'Contracts For Difference' with energy companies that will provide a stable market for them to invest in clean technologies for power generation.

It will also introduce a carbon floor price and an emissions performance standard to drive increased generation efficiency, a 'capacity mechanism' to pay for standby capacity to lessen the chance of supply shortages, and creation of the Office for Nuclear Regulation to deliver new nuclear plants.

But the plans have been criticised by business analysts and environmental groups. Hywel Davies, CIBSE technical director, suggested that this package will lead to increased energy costs to fund the £110bn investment. He also feared that the 'low-carbon support' may be diverted from renewable to support nuclear.

Peter Atherton, head of European utility sector research at Citigroup, wrote in a research note that



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The government is looking at making electricity greener

'the government seems no closer to being able to square its desire to support new nuclear with its political imperative not to be seen to be subsidising nuclear build'. Some analysts have even suggested that, far from the intention to demonstrate progress and reinvigorate investors' appetite for the electricity sector, it could put them off.

The Draft Bill has been published for comment and review, prior to the introduction of the full Bill to parliament in the autumn. CIBSE will be submitting evidence to the Energy and Climate Change Committee Enquiry into the Bill.

The full draft bill can be downloaded from www.official-documents.gov.uk/document/cm83/8362/8362.pdf

Renewables market 'outstrips the economy'

The UK renewables market grew by 11% between 2009 and 2011 – far in advance of the general economy – and is already worth £12.5bn, according to new research.

The industry supports 110,000 jobs across the supply chain. That could grow to more than 400,000 by 2020, the research found.

Renewable Energy: Made in Britain was published by the Renewable Energy Association

(REA), which said this was the first time that the turnover and employment figures of the entire UK renewables sector had been quantified.

The association claimed that by meeting its renewable energy targets, the UK would displace fossil fuels costing the economy £60bn – much of which would have to be imported – so providing a major financial boost

to British firms and consumers. REA president Tim Yeo said the government needed to show leadership with 'a clearer and more systematic approach to developing the skills required to ensure a shortage does not derail the industry's continued expansion'.

He added: 'This report provides a great synopsis of our current position and the opportunities for the future.' www.r-e-a.net

In Brief

CIBSE 'GREEN DEAL' APPROVAL

CIBSE Certification has been approved as a certification body for the government's flagship Green Deal policy. Training and certification will be offered to professionals wanting to offer advice under the Green Deal. www.cibse.org

CONSTRUCTION CHIEF SOUGHT

A new Chief Construction Adviser to government is being sought to succeed Paul Morrell, who will step down in November after three years in the post. Business Minister Mark Prisk said Morrell had encouraged the development of a construction industry 'fit for a low carbon future'. Prisk also announced £1m of funding for the Green Construction Board.

SOLAR CUT DELAY WELCOMED

The next round of cuts to feed-in tariffs for solar photovoltaic installations will be delayed, the government has said. The Solar Trade Association welcomed the move, saying it was encouraged that the government was listening to industry's concerns.

BIM GUIDELINES FROM RIBA

The Royal Institute for British Architects (RIBA) has published good-practice guidance for architects on using Building Information Modelling (BIM). The document takes the form of a 'BIM Overlay' to the RIBA Outline Plan of Work. www.architecture.com

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In Brief

NEW SUSTAINABILITY PANEL

The Mayor of London and Transport for London are calling on consultants to join a new architecture, design and urbanism procurement panel. One aim of the panel will be to promote sustainable development in the capital.

CONTRACTOR ORDERS RISE

About 44% of contractors have reported an increase in enquiries for the first quarter of 2012, up from 32% last quarter, while 37% saw an increase in orders, up from 30%. The National Specialist Contractors Council said this was the highest rate of improvement for three years and has created some 'cautious optimism' in the sector. www.nsc.org.uk

FM STANDARDS CONSULTATION

A consultation on standards in facilities management has been launched by the Royal Institute of Chartered Surveyors. RICS says it wants to provide a 'foundation for the wider promotion of facilities management in markets.

CCS TASK FORCE CHAIR

A chairman has been announced for the new Carbon Capture and Storage Cost Reduction Task Force, which will advise government and industry. Jeff Chapman is chief executive of the Carbon Capture and Storage Association.

Ministers accused of wasting time over school rebuilds

● Education Department says it will not be rushed over applications from institutions

Labour has accused ministers of time-wasting by failing to push ahead with the promised programme of school refurbishment projects.

Since Labour's Building Schools for the Future (BSF) programme was cancelled by the coalition government two years ago, schools have been waiting for news on their applications for rebuilding work. The cash is coming from the £2bn, five-year Priority School Building Programme announced by Education Secretary Michael Gove in July 2011.

Applications for funds from the scheme had to be submitted by October last year, with schools expecting a decision by last December. But, as the *Journal* went to press, the announcement of the first allocation of cash was still uncertain.

Shadow Education Secretary Stephen Twigg said the Department for Education's (DfE) delay in announcing which projects would go ahead was 'wasting precious time'. But the DfE said it 'would not be rushed' over such an important scheme.

About 35 secondary schools are expected to be given the go-ahead in the first wave of funding, but the full announcement of allocations will take much longer because a longer-term 'condition survey' of schools



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is being conducted by three project management companies. Davis Langdon, one of the firms, said the survey, begun in March this year, would take 15 months to complete.

The results will be used to determine which schools will receive rebuilding funding in future. Davis Langdon also said it had been working on new ways of building to cut costs, using standardised designs and new techniques.

This approach follows the findings of the government-commissioned James Review of school building procurement, carried out last year in the wake of the BSF closure.

Construction activity rising, says RICS

Despite the country's slip back into recession, activity in the construction industry rose slightly in the first three months of this year, according to the latest Construction Market Survey carried out by the Royal Institution of Chartered Surveyors (RICS).

The RICS data appears to

contradict figures from the Office for National Statistics, which reported that construction output fell by 3% and helped push the UK into a double dip recession.

RICS reported that 8% more chartered surveyors across the UK reported increases rather than decreases in workloads.

'This is a notable improvement on the negative reading seen towards the end of 2011 and reflects a marked contrast in performance between the private and public sectors. The former is now showing some signs of life, with workloads in the commercial sector in particular picking up,' said RICS.

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In Brief

CLEAN ENERGY CONCERNS

Clean energy technologies are not being deployed quickly enough, according to the International Energy Agency (IEA). Launching its annual report, the IEA said most clean energy technologies were not on course to reduce carbon emissions fast enough, while not enough is being made of energy efficiency. www.iea.org

HONDA BUILDS 'SMART' HOME

Technology giant Honda says it has built a 'smart home' in Japan. The house's features include thin-film solar panels, a gas-engine co-generation unit and water supply system, and an energy management device. world.honda.com

FUNDING FOR LOW CARBON

A \$35m Energy Entrepreneurs Fund has been launched to encourage small- and medium-sized businesses to develop low carbon, energy efficiency technologies. In the first wave of funding, \$20m will target energy efficiency in buildings. www.lowcarbonfunding.co.uk

ELECTRICAL STANDARDS CALL

The Trading Standards Institute has warned against any reduction in electrical installation and fire safety standards. In its response to the government's consultation on streamlining the Building Regulations, the TSI says Part P should be fully retained in its current form. www.tradingstandards.gov.uk

Homeowners 'dangerously ignorant' of Building Regs

● MPs call for a public awareness campaign for households on regulations

Householders are dangerously ignorant about their responsibilities under the Building Regulations, according to a leading group of MPs.

They are urging the government to work with DIY chains on a public awareness campaign to clear up confusion around

notifying work to Building Control, as well as gas and electrical safety.

Speaking at the recent CIBSE Patrons annual lunch at the House of Lords, Clive Betts MP, chair of the House of Commons Communities and Local Government select committee, told the meeting that most MPs were also unaware that householders were responsible for notifying local authority Building Control about changes in their homes.

'We all thought that was done by the contractor,' he said. 'This has had a big impact on our thinking and we recognise that there needs to be greater awareness among the general public.'

'We as MPs recognise that there needs to be greater awareness among the public of their responsibilities'

Betts also pointed out that 50% of gas work in UK homes is carried out by unregulated people and so was illegal. 'Part P [of the Building Regulations] has a big part to play in improving safety in British homes and the government must not diminish it in any way.'

CIBSE president Andy Ford thanked Betts for his 'honesty'. He said there was nothing more important than raising householder awareness and pointing out that people are 'breaking the law'.

Lord Martin O'Neill told the meeting that he was concerned about the impact labour shortages would have on the building engineering sector if the

economy started to recover. O'Neill, who is chairman of the Specialist Engineering Contractors' (SEC) Group also said the industry would find it hard to meet the government's challenge of reducing prices by 30% while also delivering the infrastructure improvements required.

He urged the industry to embrace Building Information Modelling (BIM) because 'it is the future and ebusiness will overtake us all before we know where we are'.

UK aims to simplify emissions trading

As part of the government's drive to cut red tape, the EU Emissions Trading System (EU ETS) regulation will be simplified for UK firms. The UK also proposes to remove the threat of criminal charges and only use civil penalties to enforce the scheme.

A consultation is now under way about turning 13 separate ETS regulations into just one from next year. The UK also wants to offer small emitters and hospitals the

opportunity to 'opt out' from 2013 into a 'lighter touch' alternative scheme.

'This will address the disproportionately higher administrative burden faced by these installations per tonne of CO₂ emitted,' the Department for Energy and Climate Change (DECC) stated. However, DECC said it was still committed to a system that is expected to help deliver two thirds of required

emissions reductions after 2012.

Climate Change Minister Greg Barker said: 'We have worked closely with industry to develop sensible proposals that will genuinely save companies money and time, while still allowing them to meet environmental goals.'

The consultation runs until 1 July and the revised regulations will take effect from January 2013, which is the start date for the third phase of the ETS.

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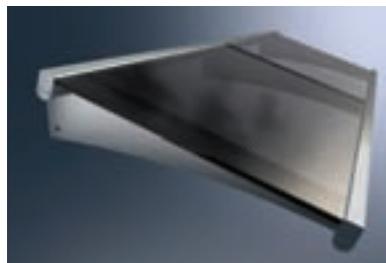
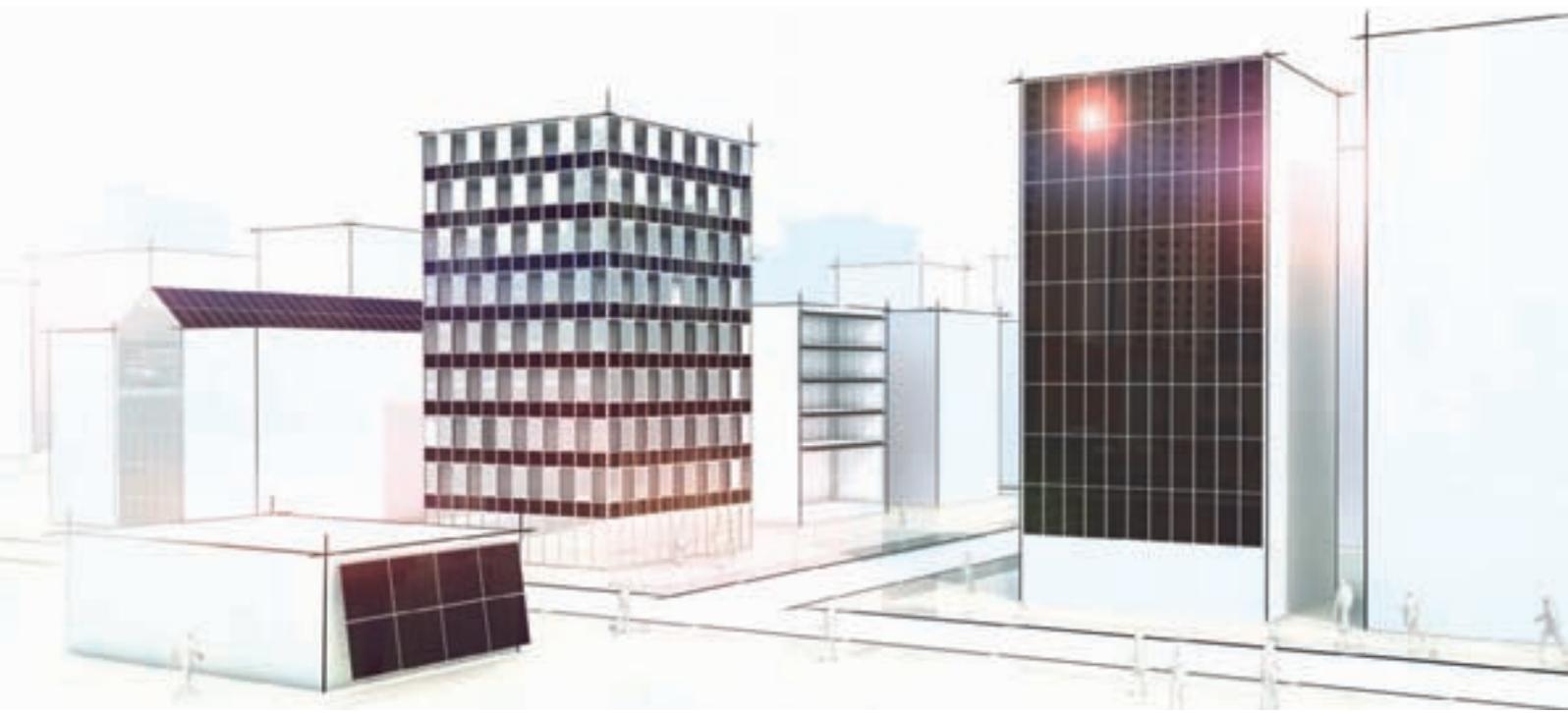
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REALITY CHECK

Plain truths about how buildings perform are obscured by spin and greenwash. But engineers are ideally placed to counter this misinformation, argues CIBSE's new President in his inaugural address. Report by **Mike Sewell**



Above and on facing page: David Fisk gives his inaugural presidential address

'It is time to be normal.' This was the call from incoming CIBSE President David Fisk as he urged engineers in the UK to rethink fundamentals – by reasserting normal engineering values and challenging spin.

Presenting the annual presidential address, which he called 'Reality Check', at Imperial College, London, Professor Fisk said he was 'haunted' by the list of countries now outperforming the UK economy.

'It is not that they are doing what we do, only better,' he argued. On the contrary, 'most are doing something different: being normal'.

So what does 'normal engineering' mean? Fisk said it was about measuring and learning from the performance of real buildings.

'If we knew how to deliver what we promised we would be much

more likely to be able to insist on promising something real. That must mean making a real effort to support benchmarking of occupied buildings.'

There was more work to be done to improve benchmarking processes, he said. 'We hope to work with our fellow institution ASHRAE (American Society of Heating, Refrigeration and Air Conditioning) in bringing benchmarking and labelling to the fore wherever high performance buildings are required in any part of the world.'

Fisk, who is director of the Laing O'Rourke Centre for Systems Engineering and Innovation at Imperial, was previously Chief Scientific Adviser to the Office of the Deputy Prime Minister and the Department of the Environment.

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Audience members were given the distinct impression that these roles had given him an insight into the way that information could sometimes be 'spun' with worrying consequences.

'Personally it has been very frustrating for someone who began life in monitoring buildings to see the prostitution of fact in the interests of spreading confusion.

'I hope individual members will feel free to mount their own protests, whether to planning authorities or advertisers, or even government press offices, because normal engineering cannot survive without its grassroots advocates.' He argued that there was too much lazy language, saving his particular ire for the overuse and misuse of terms such as 'sustainability' and 'low carbon', adding: 'If engineering institutions fail to comprehend that good engineering requires tight language, not diffuse ideas, we are in trouble.'

He picked out some of the information communicated about The Shard in London as an example of 'gobbledegook' that leaves a 'margin to bamboozle'. Describing The Shard as a structure that looks

impressive from afar but awful close up ('but that is all personal opinion') he said it was less a 'vertical city', as some have described it, but more a 'vertical cul-de-sac'.

However, what really concerned him was that the architect had been allowed to assert that The Shard is '30% more energy efficient than a building of its type without saying what type'.

'My back of fag packet has it twice the consumption of a more normal structure.

Developers naturally want to get their money back. But why should their PR

'What we do affects a third of the energy costs of the economy'

consultants seem to think they can exaggerate engineering with no risk of comeback?

In today's tough world, he said it would be impossible to survive without normal engineering. 'CIBSE is in one sense a small player, but in an area under much pressure.

'At the same time, what we do affects something like a third of the energy costs of the economy. We are about better building performance in the most rounded sense. We need to make that clear in how we present ourselves in the role we play.'



DISSEMINATING ENGINEERING KNOWLEDGE

Fisk urged building services engineers to maximise the benefits of CIBSE's new Knowledge Portal to tackle those who purvey 'greenwash' and spin.

Describing the Knowledge Portal as a 'game-changer' for the institution, he said it was where CIBSE should launch its fight back on behalf of normal engineering.

'We are no longer the owner of a selective bookshop; we are the purveyor of a knowledge system,' he said, describing the change as the equivalent to a move from WH Smith selling the Encyclopaedia Britannica.

The response to the portal had been fantastic and a credit to the CIBSE team that constructed it, with some 40,000 visits. 'In a time of mega info, nano know how and zero wisdom, a knowledge system is at a premium,' he said.

He urged members to help in making the portal as effective as possible. 'If you hear a media studies graduate say fuel cells run off water, do not fume – send us your piece on fuel cells in services. If you hear someone else talking about energy harvesting of body heat, don't bury your head – send us a piece on low temperature heat recovery.'

Medium Efficiency Energy Recovery Units

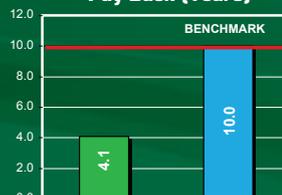
Energy Consumption usage/savings

Carbon Usage/Savings



Vs

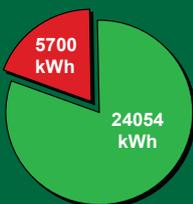
Pay Back (Years)



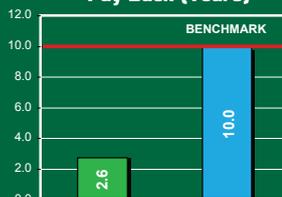
High Efficiency Energy Recovery Units

Energy Consumption usage/savings

Carbon Usage/Savings



Pay Back (Years)



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Sustaining Infrastructure

Government consults on CRC – again!

• More specific views are being sought on the carbon emissions scheme

The Carbon Reduction Commitment Energy Efficiency Scheme (CRC) – the UK-wide trading scheme targeting emissions from large public and private sector organisations – is being revised for the fifth time.

The *Consultation on a simplified CRC energy efficiency scheme* seeks views on further specific proposals to streamline the CRC. The Department of Energy and Climate Change says that the proposals take into account feedback from stakeholders on earlier consultations, from the *Administrative Burden Survey* and analysis of participant data from reports collected in July 2011.

This survey, by KPMG, identified a projected average cost per year of £7,600, to £9,200 per participant for years two, three and four of the scheme, based on participants estimated costs to date and their predicted future costs. Interviews with participants revealed strong support for measures to reduce the administrative costs of the CRC.

The consultation document includes proposals that aim to streamline the scheme to create a new leaner, simplified and refocused CRC. However, on the issue of responsibility for tenant emissions, the government does not propose to change the rules, so landlords remain responsible for the emissions arising from tenants' use of energy where it is supplied by the landlord.

The simplified CRC is expected to deliver its energy efficiency and carbon reduction objectives while making compliance easier and less burdensome for participants. Government is seeking views and evidence from all interested parties. To see the full consultation document, visit www.decc.gov.uk and click on the consultations tab.

CIBSE will once again make the case for using Display Energy Certificates (DECs) as one of the primary means of calculating emissions from buildings – which would be especially beneficial for those organisations that fall within the scope of the CRC scheme and also require DECs on many, or all, of their buildings. This has the potential to substantially reduce the administrative burden for these public sector bodies.

New code for SLL



A new 2012 revision of the *SLL Code for Lighting* is now available from www.cibseknowledgeportal.co.uk. This edition

provides information on three fundamental matters:

- A summary of what is known about the effects of lighting on task performance, behaviour, safety, perception and health, as well as its financial and environmental costs;

- A compendium of all the lighting recommendations relevant to the UK, with suggestions as to how these should be interpreted; recommendations for both interior and exterior lighting in normal conditions; and

- A detailed description of all the calculations required for quantitative lighting design. The details of vision and lighting technology now appear in the *SLL Lighting Handbook*.

To buy a copy, or for more information, visit www.cibseknowledgeportal.co.uk

New building services conference launched

Communications provider UBM and CIBSE are proud to announce the launch of Building Services – The CIBSE Conference and Exhibition. The new event will be positioned as the annual global meeting place for building services and its related industries. It will be held on 10-11 October at London Olympia.

As CIBSE's flagship event the exhibition will attract building services professionals from across the globe, and provide a superior platform for suppliers to showcase their existing products and launch new technological innovations.

Welcoming a wide variety of professionals, from consultant engineers, architects and property

managers to contractors, installers and energy managers, all will be looking to gain valuable information on the latest developments in building services.

The event will be co-located with Energy Solutions, the leading energy management



Tamsin Tweddle will be speaking at the event

and procurement event, and Total Workplace Management, the FM & Estates Event.

The 2012 CIBSE Conference will bring together the entire building services supply chain to debate the challenges facing the industry, identify the most

successful business strategies, forge and renew relationships for the future and ensure the success of your projects, your business and your career.

This year the conference is being further developed, invigorating the content, incorporating new partners and reformatting the agenda. The conference will bring you into contact with industry experts, show you the latest technologies and thinking, bring you up to date with legislation and regulation, and give you an opportunity to network with attendees from every sector of building services.

Visit www.buildingservicesevent.com for further information or to register your interest.



Speaker: Craig Sparrow

Learning online

May sees the launch of CIBSE's 10th online learning module, which is about air conditioning systems.

The series was first created more than four years ago, with assistance from Arup, AECOM, Crown House, Hoare Lea, NG Bailey and Laing O'Rourke. The aim was to produce a flexible training scheme that filled a perceived industry skills gap by focusing on practical skills, tailored specifically for the needs of building services industry.

For more information, visit www.cibsetraining.co.uk/online-learning or call 020 8772 3660.

A fine 'fellow'

Brian Roberts was awarded an Honorary Fellowship at CIBSE's AGM in May, in recognition of his contribution to the Institution. A citation was read by Neil Sturrock, and the award was presented by retiring president Andy Ford.

Walk about

This year's Society of Façade Engineering city walk, 'South of the River', will take place on 19 June at 4pm, at Southwark Cathedral. It begins with a lecture on The Shard at London Bridge, before the tour departs at 6pm. Speakers from Renzo Piano building workshop and Scheldebouw will describe key aspects of the all-glass façade. For more information contact Veron Williams on 0208 772 3613, email williams@cibse.org or visit www.cibse.org/events

SoPHE makes its voice heard at conference

How to engineer out and manage the risks effectively was debated at the 'Combating Legionella Manchester 2012' conference in March.

Attendees from the public health industry heard from speakers such as Chris Northey, chairman of the Society of Public Health Engineers (SoPHE), who presented 'Designing out the risks and incorporating L8 into buildings'. He described how to prevent or control

the risk of exposure, which can normally be managed by controlling the release of water spray and avoiding certain water temperatures and conditions ripe for bacterial growth.

Other control measures discussed included: avoiding water stagnation; the use of materials that harbour bacteria; maintaining the cleanliness of the system and the water in it; and the use of water treatment techniques.

The conference heard that the

system designer has a choice on the type of system to be designed, and that this will depend upon the size and configuration of the building, the needs of the occupants, and whether cold water storage is required.

The design of hot and cold water systems was one of the main themes throughout the conference, and CIBSE is pleased that SoPHE was able to address the audience and provide a designer's perspective.



New members, fellows and associates

- Fellows**
- Adams, George Edward** London, UK
 - Brinkley, Ivan Mark** Dubai, UAE
 - Cummings, Robert John** Brownlow Derry, UK
 - Diamond, Robert Elliot** Colchester, UK
 - Kinsella, Peter William** Mulgrave, Australia
 - Luker, Alexander Edward John** Hemel Hempstead, UK
 - Pardy, Steven Dennis** New Malden, UK
 - Silvester, Matthew** Ratchevee, Thailand
- Members**
- Biernacki, Grzegorz** Warszawa, Poland

- Brym, Alicja** Liverpool, UK
- Chan, Kin Shun** TKO, Hong Kong
- Chan, Tsz Kin** Kowloon Hong Kong
- Cheung, Chin Tung James** Hong Kong, Hong Kong
- Chow, Tok Raymond** Shau Kei Wan, Hong Kong
- Cocking, David James** Telford, UK
- Duggan, Neville** Caernarfon, UK
- Dunn, Alan Surbiton** UK
- Gomeseria, Ronald** Doha Qatar
- Hall, Adam Sebastian** Stockton on Tees, UK
- Kamarinis, Alexandros** Athens, Greece

- Kok, Yen Kwan** Kuala Lumpur 58200, Malaysia
- Lai, Chuen** Kowloon, Hong Kong
- Lee, Hong Mun** Hong Kong, Hong Kong
- Leung, Lok Man Chai Wan** Hong Kong
- Leland, Jason** Inverness, UK
- Lum, Tai Sing** Western District, Hong Kong
- Ma, Kai Ning** Shatin, Hong Kong
- Mui, Man Kui** Kowloon, Hong Kong
- Ng, Kin Chong** Hong Kong, Hong Kong
- Olbromski, Lukasz Jan** Leeds, UK
- Ong, Ronald** Wanchai, Hong Kong

- O'Reilly, Claire** Solihull, UK
- Philippides, Christos** Riyadh, Saudi Arabia
- Platt, Stephen John** Manchester, UK
- Pollock, Daniel** Stockton-on-Tees UK
- Rickard-Green, Peter** Sheffield, UK
- Roberts, Scott Sheridan** Hastings, New Zealand
- Robinson, Simon Edward** Leeds, UK
- Ruffin, Ashvind** International City, United Arab Emirates
- Shanbhag, Ramesh** Salford, UK
- Szmagara, Marek** Blackrock, Republic of Ireland

- Teoh, Dennis** Epsom, UK
 - Walton, Nigel** Rowley Regis, UK
 - Watson, Thomas** Virginia USA
 - Williamson, Andrew** Sharjah City, United Arab Emirates
 - Wong, Fan Ching** N.T. Hong Kong
 - Woo, Yan Ho** Kowloon, Hong Kong
 - Yeung, Ying Kwok** Fanling 852, Hong Kong
- Associates**
- Angus, Paul Mark** North Sydney Australia
 - Taylor, Simon David** Loughborough UK

- Licentiatees**
- Drew, Peter** Birmingham UK
 - Jarvis, Brian** Hartlepool, UK
 - Lindsay, Richard Alan** Winchester, UK
 - Lo, Snie** Sabah, Malaysia
 - McKinley, Kevin** Bexleyheath, UK
 - Mellings, Gareth** Birmingham UK
 - Starling, Christopher** James York, UK
 - Taylor, Zachary Paul** Hull, North Humberstone, UK
 - Tickle, James** Birmingham UK
 - Vidal, Dennis** London, UK

FELLOWS

Eur Ing Robert Diamond CEng CEnv FCIBSE FEI



Since entering the industry in 1997, Robert has worked on some landmark projects, designing low- and zero-carbon schemes as alternatives to traditional designs. His practical work is backed up by his academic studies through a part-time Masters Degree in Energy Engineering at Southbank University. He is currently the head of environmental design at Ingleton Wood and is chairman of CIBSE HCNE region.

Steven Pardy



Steve is a partner at Zisman Bowyer & Partners LLP, with more than 35 years' experience in the building services industry. He has dedicated a large part of his career latterly to the healthcare sector, and is currently responsible for the £800m New South Glasgow Hospitals project.

Matf Silvester



Matthew is an executive engineer with Meinhardt (Thailand). A champion for sustainable design, he is responsible for the design management of a variety of landmark projects, such as the 35-storey Capital Market Centre and 29-storey Sathorn Tower projects in Bangkok, each seeking LEED Gold certification.

George Adams



George commenced work in the building services division of Matthew Hall, where he completed a formal engineering apprenticeship and degree, moving to his current position of engineering director for Spie Matthew Hall. His business experience ranges from consultancy work, designing, managing sites, turnkey design and build work, through to engineering leadership of large teams. George is the serving president-elect of CIBSE.

Ivan Mark Brinkley



Ivan has worked in the Middle East for the past 15 years, where he has held pivotal roles as head of technical services for such iconic structures as the Burj Al Arab and the Jumeirah Beach Hotel. Senior management roles followed, such as facilities management (FM) director for the private facilities of the Ruler of Dubai, and for a number of large Middle East FM services providers. More recently, Ivan has specialised as a technical management consultant, targeting the critical optimisation of property operations, maintenance and energy costs.

Robert Cummings



Robert co-founded Gillespie & Cummings in 1991, after progressing to management level in consultancy in Derry. Robert has been directly involved with staff training from the

outset, and is responsible for the firm's graduate sponsorship programme.

Robert takes a keen interest in local engineering courses and promotes student placement within his practice. He is particularly interested in 'smart' and 'renewable energy' technologies and investigative reporting.

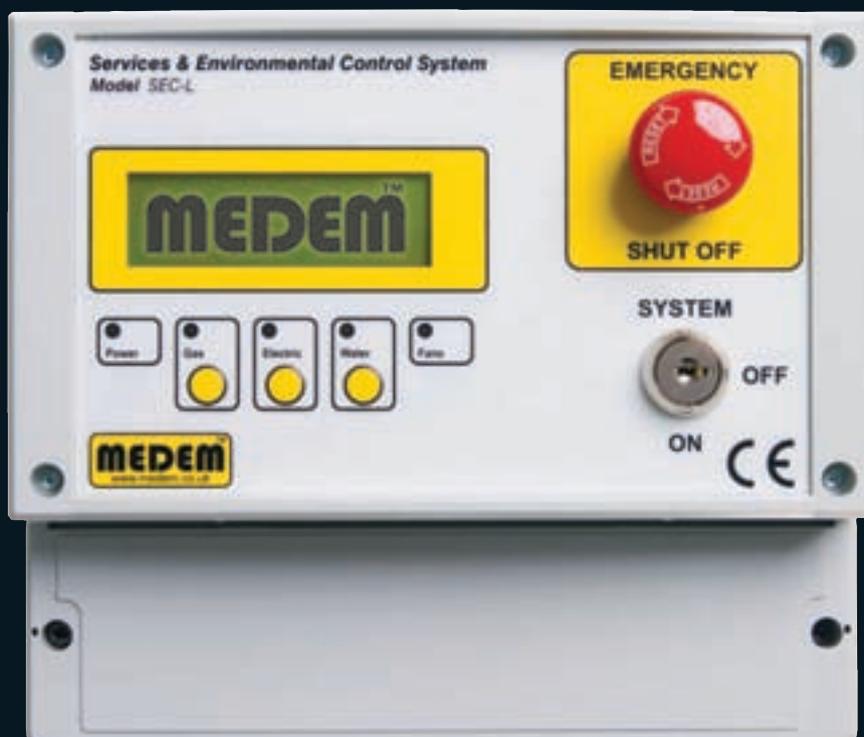
Peter Kinsella



Peter is the engineering manager of AE Smith, based in Melbourne, Australia.

He has spent his entire career working in the building services industry, moving to Australia from the UK in 1995. He has gained extensive mechanical services experience working on a range of high-tech, complex and landmark projects.

Peter is actively involved with CIBSE, serving both as a vice president and chairman of the Australia and New Zealand region.



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KNOWLEDGE SHARING

From a live presentation from Australia on a CIBSE award-winning commercial development to the use of solar panels on a single home – this year's two-day symposium covered the full range of building services systems. **Tim Dwyer** reports



CIBSE president-elect David Fisk addresses the Symposium

The CIBSE ASHRAE Technical Symposium 2012, held at Imperial College London recently, provided a great opportunity to share and discuss developments and applications of technology that contribute to the vast array of building services 'systems'.

The perspective was further widened this year by ASHRAE (the American Society of Heating, Refrigerating and Air conditioning Engineers) sharing in the planning and delivery of the Symposium and the meeting being attended by ASHRAE president Ron Jarnagin, together with other senior ASHRAE members.

Although focusing on 'systems', the inevitable breadth that represents 'building services' meant that the delegates were treated to 50 presentations covering areas ranging from individual domestic installations through to multi-million square-foot US army bases.

David Fisk, CIBSE president-elect, (now president) opened the event, introducing a live presentation from Australia highlighting the story behind the CIBSE 2012 Building Performance Award-winning Darling Quarter project in Sydney – a 58,000 sq m, low-rise,

campus-style commercial redevelopment. Neil Caswell of Norman Disney and Young described the integrated set of hybrid ventilation and air conditioning systems with control regimes that adapt the system operation to changes in occupancy; they sense not only CO₂ but also inhabitant use and activity such as window and door actuations – including alerting occupiers if doors and windows are left open when it is not the most effective means of maintaining appropriate internal conditions.

And with much of the UK experiencing 'drought', their application of black-water systems was of particular interest to the Symposium audience. As illustrated by Caswell, the system, thought to be the first of its kind in the world, treats sewage drawn from local networks to produce 'clean' water suitable for toilet flushing, irrigation and cooling tower make-up. So clean in fact that one of the project engineers was happy to drink it. Together with a tri-generation system (providing economical and secure power, heat and cooling) the development provided a major commissioning challenge.

And it was specifically for successfully meeting this challenge that the NDY team

Phil Jones: concerns over automatic meter readings



were awarded their CIBSE award. Neil Caswell said the team focused on 'delivery' from the earliest stages of design, ensuring positive collaboration with clear, active and identified lines of communication between all the project's professionals, including operational staff.

On a smaller scale, the presentation voted by delegates to have made the 'most significant contribution to the art and science of building services engineering' was by David Nicholson-Cole of Nottingham University. He convincingly showed that, in his experience, the operational 'zero carbon' house is very much a reality.

Using his own home as a living lab, Nicholson-Cole has installed a number of solar thermal and solar photovoltaic devices. As well as providing a direct source of heat for domestic hot water, the solar thermal panels play a critical role in 'recharging' the ground in summer to replace the heat removed by the boreholes feeding ground-source heat pumps. Without this seasonal charge there was a year-on-year drop in performance.

Nicholson-Cole reported that his team was looking at applying similar techniques to very tall buildings for sites in New York and London, using intermediate thermal stores on mechanical floors. He maintains a regular detailed blog documenting the work, including measurements and candid observations, at <http://chargingtheearth.blogspot.co.uk>

There was much talk of benchmarking and measurement at the Symposium, both in the sessions and during the 'networking' breaks. Phil Jones of Building Energy Solutions gave a spirited presentation where he spoke of the essential part that log books, sub-metering and automatic meter reading (AMR) play in managing energy in large buildings. (And when questioned Jones was clear that he was not talking of smart meters, but simply of meters that were capable of transmitting consumption data).

He said there are now a significant number of non-domestic buildings in the UK where AMR is operating successfully and is helping to drive down energy consumption, but in many cases they have failed to live up to expectations. Log books are often non-existent or ignored and sub-metering is seen as incidental to the management process.

Often, the way AMR has been introduced has left building managers with a tool they can't use. Jones said that vast improvement was possible using current technologies, but the industry is in need of improved training, guidance and regulation.



Symposium delegates visit the exhibition stalls

And in terms of the current reality of reporting the performance of buildings, the presentation by Benedict Vanheems of DeMontfort University explored whether Display Energy Certificates (DECs) are playing a part in helping to drive down building energy consumption. Based on surveys of active practitioners, his work showed that DECs have limited influence on building occupant behaviour, but are a motivator for those involved in the management of building energy consumption.

His work has shown that energy managers use the output from the certificates to make the case for more resources to improve building performance. But they identified areas that could make the DEC a more robust instrument, including the quality of the advisory report, which is generally felt to be of a poor standard and not specific enough. Furthermore, he noted that questions on the accuracy of benchmarks used for the calculation of operational ratings threaten to undermine their usefulness.

Sarah Russell-Smith of Stanford University extolled the potential benefits of building information modelling (BIM) to feed real building data into life-cycle assessment methods, making their collective use more valuable.

CIBSE president Andy Ford (now immediate past-president) closed the symposium by affirming that the sharing of knowledge was fundamental both to innovation and true progress in building services systems, and that he had been energised by the enthusiasm and diversity of the contributors. CJ

● **TIM DWYER** is *CIBSE Journal's* technical editor and a teaching fellow at University College London. All the presentations and papers are available at www.cibse.org/symposium2012

CIBSE president Andy Ford affirmed that the sharing of knowledge is fundamental to innovation and true progress in building services

Your letters

This month: Discussion on the merits of district heating networks

Seeking good-quality combined heat and power...

Following the article by Peter Hamnett and Phil Jones ('Power Debate', May *Journal*, page 38), in response to my article in March (page 55), it is clear that our principle difference relates to the reference factors taken for calculating fuel savings and carbon dioxide intensity in district heating (DH) networks.

Hamnett and Jones (and previously Paul Woods, on page 16 of the April edition) argued that an average electrical grid factor should be used for combined heat and power (CHP) – or possibly that a worse efficiency figure should be used – to maximise their CO₂ emission-reduction claims. The 'EU Directive on the promotion of cogeneration based on a useful heat demand' and the CHPQA take the view that fuel savings are measured against a 'same-fuel' source, with the CO₂ intensity of heat being calculated against this comparison.

The Directive is described in the above article as being 'quite removed in purpose', despite the fact that its



intention is to ensure the installation of 'good quality' CHP. The authors further suggest that a calculation methodology used for building regulation compliance should be used in lieu of the Directive to calculate the CO₂ intensity of their DH networks; but this methodology leads to the outcome that significant CO₂ savings can be claimed for DH networks that use *more* primary fossil fuel than conventional supplies.

DH networks are a monopoly utility provider and, given the vast amount of fuel that they consume, should be subject to national policy decisions on efficiency of fuel usage. Consequently they should comply with the requirements of the Directive. Building services engineers are simply the recipients

of this utility and have no influence on the CO₂ intensity of the heat delivered.

We know that DH networks can be economically feasible but the question is, can they meet our requirements of virtual zero CO₂ heat before 2050?

James Thonger

...Making emissions factors count

The combination of Paul Wood's letter with the Peter Hamnett/Phil Jones deserves further comment. Most importantly, the Directive applies to all energy using buildings individually as well as to grouped energy users. For compliance, there is no escape from this.

Effectively the Directive states that, given a combination of loads or a single load, to be met in whole or in part by different systems using the same fuel(s), the same factor(s) for emissions must be applied to the different systems. Different systems or combinations of systems will use different combinations of different fractions of different fuels, of course.

Thus for new loads to be met by use of *additional* supplies of natural gas, the only relevant emission factors are those applied to the use of the gas. Also, if other fuels are 'displaced' by any or all of the feasible systems, then the emission

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factors for the use of natural gas and the emission factors for the suppression of use of the displaced fuels must be the same for all the feasible systems.

John Moss

We can move forward together as an industry

I read with interest Terry Wyatt's article in the April *Journal* titled 'Forward Together' (page 20). We need to harmonise our designs with feedback from the facilities managers. It must be 10 years since I was involved in a research project, with the BRE, on this very subject. We do need to move towards being a Building Engineering Industry. If this means CIBSE amalgamating, then perhaps so be it. There will of course be many barriers and resistance to change, but the industry must move forward together to prosper

I see Building Information Modelling (BIM) as a vehicle to help the industry reduce its ills, as both the design teams and the contractors will need to work closely together, for the full potential of BIM to be realised. If the government is serious, both about BIM and about supporting the industry, then it does need to offer assistance, especially to the many SMEs that we have.

I hope, over the next five years, that the industry can change more than we have managed to do in the last 20.

Eddie Picton FCIBSE

Give us good teamwork, not one-stop shops

I was horrified to read the

solutions to issues in the construction industry proposed by Terry Wyatt (see above). He proposes merging companies to form 'one-stop shops' and even merging CIBSE with other building-related professional engineering bodies.

The one-stop shop principle can work on some larger projects if different divisions of the same company work well together. This is by no means guaranteed, and many companies struggle with working cohesively across divisional and geographical boundaries. Therefore it is often really no better than having the design team made up of multiple companies.

Second, this principle is a bad business model. For example, if you have both engineers and architects in the same company,

“The way forward for the industry must be based on good old-fashioned teamwork, communication and forming strategic partnerships

it can be a barrier to working with other architectural firms as they can see you as a competitor.

CIBSE and ASHRAE are the world's premier building services institutions, precisely because they specialise in this area. Merging with other engineering institutions would dramatically weaken this by diluting their focus and the interests of their membership. In New Zealand we have only one professional engineering body, which is too general to serve anyone.

The way forward must be based on good old-fashioned teamwork, communication and forming strategic partnerships.

Jonathan Foster
Wellington, New Zealand

MANUFACTURER'S VIEWPOINT



Very few applications for the Renewable Heat Incentive have been accepted. This is a sign that we need to do a lot more to promote renewables, says **Martin Fahey**

News of an Ofgem report, revealing that 95% of all applications for the Renewable Heat Incentive (RHI) have been rejected, contrasts starkly with the RHI launch press release from Department for Energy and Climate Change in March. DECC stated that more than 95% of heat in the UK is currently produced by burning fossil fuel. (Visit www.decc.gov.uk/en/content/cms/news/pn2011_023/pn2011_023.aspx)

The Ofgem report, covering the first four months of the Renewable Heat Incentive also highlighted that 80% of the successful applications were for biomass projects.

RHI has ambitious targets of increasing the use of renewable energy – and thereby reducing emissions – by 44 million tonnes of carbon by 2020, and we should rightly be proud that as a nation we are leading the world in incentivising renewable heating.

However, we are not going to get very far if we only convert 5% of all applicants and currently seem overreliant on one technology.

The DECC release also states that around half of the UK's carbon emissions come from the energy used to produce heat, so as an industry, we can see exactly what an important role we in the building services sector have.

As engineers involved directly with technologies that can affect energy use and emissions levels, we have a huge part to play in helping the country get anywhere near these targets – if not the biggest part. It is our job to ensure that energy-consuming building services – whether heating, cooling or ventilation, are engineered properly and effectively.

We also need to ensure that this equipment is maintained correctly, and that end users completely understand how to control their

systems and constantly get the best performance out of them.

In terms of the technology, we all know that there is more than just biomass that can reduce carbon emissions, so we need to examine why these have not so far been successful.

Of the 376 applications mentioned in the Ofgem report, most were turned down because of problems with what is referred to as 'supporting information'.

The Ofgem report also expresses concern about complexity in the current system, which it feels has led to the dismal success rate for applications.

While this call for a simpler process is to be welcomed, we within the industry should also look at whether there are any communication issues or barriers between the manufacturers of the equipment, the consultants, specifiers and installers.

We know that we have a host of renewable technology that can and will work effectively, so now is the time to examine what we can do to improve the success rate, and to increase significantly the number of projects eligible for RHI.

It's not actually rocket science. It's just doing what we are good at! Mitsubishi Electric has developed its Green Gateway philosophy to highlight how we can all make a difference in reducing the energy we consume in our buildings.

Green Gateway can be followed on Twitter (@green_gateway) or via the Green Gateway Group on LinkedIn

Martin Fahey is sustainable solutions manager for Mitsubishi Electric's Living Environmental Systems Division



CARBON COUNTERS



Must you be an accredited energy assessor to calculate carbon dioxide emissions under Part L, and who can give notice of the calculation? Hywel Davies explains

When a new building is being constructed, its expected carbon dioxide emissions have to be calculated. Under the Building Regulations, the Secretary of State must authorise a method for calculating the emissions rate (Regulation 24) and must set the targets to be achieved (Regulation 25). Under Regulation 26, the CO₂ emissions from a new building must not exceed the target as specified under Regulation 25.

There are two stages in the project when the local authority or the approved inspector must be told what the target and calculated CO₂ emissions rates are. The first notice is required no later than the day before the work starts, and must specify the target CO₂ emission rate for the building, the calculated CO₂ emission rate for the building as designed, and a list of specifications to which the building is to be constructed.

The specifications are intended to make it easier for Building Control to identify any significant changes when the building is constructed, and to seek confirmation that those changes do not have an adverse impact on the CO₂ emissions of the building.

The second notice is required no later than five days after the work has been completed. The person carrying out the work shall give the local authority a notice which specifies: the target CO₂ emission rate for the building; the calculated CO₂ emission rate for the building as actually constructed (taking into account any changes to the original specification); and explicitly whether the building has been constructed in accordance with that specification – and, if not, what the changes are. The Regulations say that an alternative to this notice is ‘a certificate to that effect by an energy assessor who is



Carbon emissions can be assessed by CIBSE Low Carbon Consultants

accredited to produce such certificates for that category of building’.

This raises a question that is often referred to CIBSE staff: ‘Does the completion notice of CO₂ emissions (under Regulation 26) have to be produced by an energy assessor, or can it be done by a CIBSE member or a Low Carbon Consultant?’ It is hard to argue that only an energy assessor can produce the notice, since they are identified as one potential source, and Regulation 27 offers an alternative.

Moreover, the government wrote to Building Control bodies in 2008 when the Building Regulations underwent changes affecting these notices. In those days the CO₂ emissions calculation was covered by Regulation 17C. The letter said:

‘Energy performance certificates can be produced only by members of an approved energy assessor accreditation scheme. However, it will remain possible for the calculations needed to demonstrate compliance with regulation 17C to be carried out by a person who is not a member of such a scheme.’ (See www.communities.gov.uk/documents/planningandbuilding/pdf/energyperformancedivletter.pdf)

So it is clear that, whilst you must by law be an energy assessor to produce an Energy Performance Certificate, you do not have to be an energy assessor to produce a carbon

dioxide emissions calculation.

CIBSE corporate members and Low Carbon Consultants, who are specialists in the requirements of Part L in England and Wales, should be well able to undertake these calculations and to explain to the client, Building Control and others how the result has been obtained. (To find out more, click on the ‘Find an Expert’ link at www.cibseenergycentre.co.uk)

LCCs are also able to give advice on the consequences of changes to the CO₂ emissions specification and the overall performance of the building. This is particularly important at the design stage, when there is no requirement to produce an Energy Performance Certificate, only to notify Building Control that Regulation 26 has been complied with.

The regulations say that the Building Control body is authorised to accept a certificate from an energy assessor on completion. They do not say that the body is required only to accept a certificate from an energy assessor. And where clients want the additional value of using an engineer who can not only produce the CO₂ emissions calculation, but can also consider the impact of the specification for the building on its overall performance – not just its CO₂ emissions – then they have every right to do that. Indeed, the provision of that sort of building performance expertise was precisely the reason why CIBSE created the Low Carbon Consultants Scheme.

The Building Regulations 2010, Statutory Instrument 2214, can be downloaded from http://www.legislation.gov.uk/uksi/2010/2214/pdfs/uksi_20102214_en.pdf

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

It is clear that, whilst you must by law be an energy assessor to produce an energy performance certificate, you do not have to be an energy assessor to produce a carbon dioxide emissions calculation

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GREENER HEIGHTS

Campus life need not only be about academic study, says one university, which has become a beacon for sustainable learning and living. **Andy Pearson** reports on a double CIBSE award winner



Energy consumption on college campuses is rising. The number of students equipped with laptops, TVs and other must-have electronic gizmos, coupled with the greater use of ICT for teaching and an increased need for air conditioning, are all pushing up usage. Except, that is, at the University of Bradford. This institution has not only succeeded in halting the rise, it has actually reversed the trend so that carbon emissions there have fallen by 8% since 2005.

This remarkable success is the result of a unique approach. The university has set out to ensure that sustainability underlies everything it does. It is not simply about how the 140,000 sq m estate is run; it is about involving 1,800 staff, 13,000 students and its contractors in addressing their environmental, social and economic responsibilities too.

It's a bold initiative – a fact recognised by the judges at this year's CIBSE Building Performance Awards, where the university's achievements were recognised

with the awards of Client of the Year and, the ultimate accolade, Carbon Champion of the Year.

The initiative was born on a train journey back in 2004 when Clive Wilson, head of estates at the university, was returning from a sustainability conference with his environmental manager and one of the academic staff. The discussion turned to how the three pillars of sustainability – social, economic and environmental – applied to the university. It was soon apparent that the university was already doing a lot that was sustainable.

Wilson said at the time: 'The social stuff a student needs, we've got. Environmentally we're already building low carbon buildings. We're recycling. Economically the university is spawning companies and using local suppliers to help keep revenue in the community.'

The conversation set Wilson thinking about what could be done to make the university more sustainable. His solution: turn the university into a beacon of





A £40m eco-village, The Green, forms part of Bradford University's plan to slash its carbon emissions



Above: Bradford University campus.
Below right: A student checks energy usage data

➤ sustainability in order to educate its students in all aspects of the topic so that when they leave they become sustainability ambassadors.

‘My vision was that the students here could learn about living a sustainable lifestyle so that when they finish university they become ambassadors for green living,’ Wilson explains.

Fundamental to Wilson’s plan was

the students’ accommodation. Like much of the university, the old halls of residence were built in the early 1970s on a brownfield, city centre site using construction methods that were common at a time of cheap energy. Rather than refurbish the halls, Wilson calculated it would be just as cost effective to knock down the existing building and replace it with something akin to his aspirations.

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

For further information on this year’s winners, as well as details of how to enter the 2013 awards, please visit www.cibseawards.org





'I calculated that, without the expense of eco-bling, for the same money as a standard hall of residence, we could build low-energy, well-insulated town houses based on a timber frame,' he says.

The Halls opened last year. The design is based on rows of town houses, because that was what was on the site before the university was built. For the Halls' construction, Wilson drew his inspiration from sustainable schemes such as BedZed and sustainable homes at BRE.

With the accommodation sorted, Wilson's attention turned to the students' education. He convinced the university's Vice Chancellor of the merits of introducing a sustainability module that was specific to each course. In 2005, the institutional change programme known as Ecoversity was born. 'From then on,

I calculated that, without the expense of eco-bling, for the same money as a standard hall of residence we could build low-energy, well-insulated town houses based on a timber frame



BREEAM: 'Outstanding' achievement for dwellings

The Green was the first student accommodation in the UK to achieve a BREEAM Outstanding rating. The development of townhouses and apartments has been designed to enable the 1,014 residents to live in a more sustainable way, and to encourage interaction between the tenants. 'We wanted to build in a sustainable fashion so that the students who live in the development go on to live sustainable lifestyles,' says Clive Wilson, director of estates at the university.

The £40m eco-village was designed by architect The Goddard Wybor Practice and developed by Listerhills Sustainable Student Village, a joint venture between Welbeck Land and the Hayat Group. It comprises four blocks of 12-room townhouses, and 101 apartments arranged as clusters of six flats in three five- to seven-storey blocks. The development is clustered around a pond, which is part of the scheme's sustainable urban drainage solution (SUDS). Only indigenous plants are used and the landscaped grounds include vegetable beds for student use.

Energy: A 1.6MWe combined

heat and power (CHP) unit provides energy for the development. The unit has been sized to meet the base hot water heat load of the 34 townhouses. Hot water for the apartment blocks will be pre-heated by solar thermal panels.

Metering: Energy meters monitor gas, electricity and water, with consumption figures displayed on screens in the kitchens. The displays are aimed at encouraging students to compare their energy use with their neighbours' – something that won the development a BREEAM Innovation credit. Low-energy light fittings are used throughout, and passive infrared detectors turn off the lights in unused communal areas.

Insulation: The high levels of insulation used in the scheme's walls, floors and roof, and the scheme's airtight construction, mean that heating loads are minimal. The accommodation has been constructed using a prefabricated panelised timber frame system.

Prefabrication: Wall and floor panels are manufactured off-site from FSC-certified timber to reduce waste and improve quality. The bathrooms are also

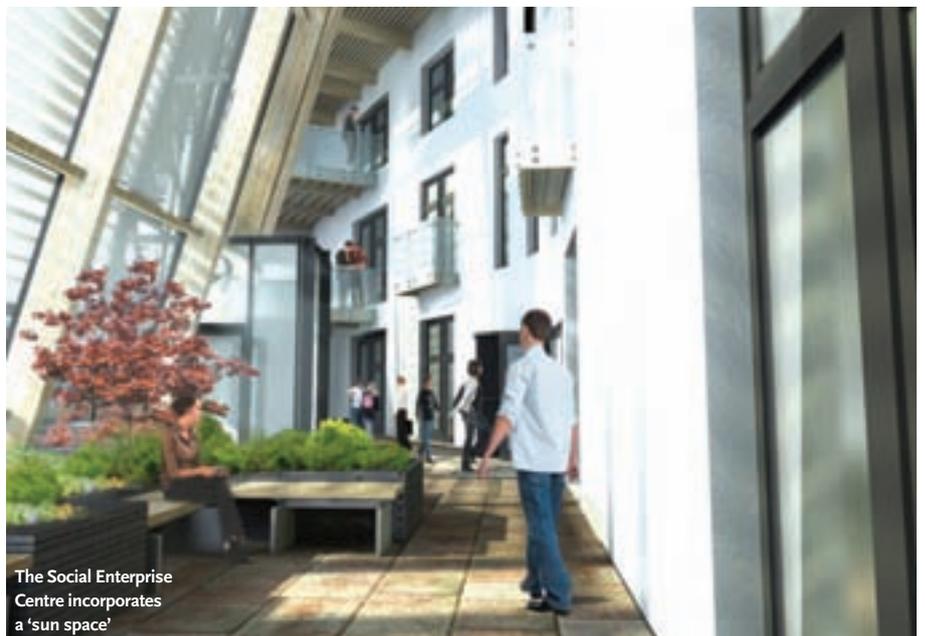
delivered to site as prefabricated pods with showers and toilets already installed, pre-plumbed and fully tiled.

Back-up heating: A low-pressure hot water heating system, based on radiators fitted with thermostatic radiator valves, provides background heat when temperatures are exceptionally low.

Ventilation: A mechanical ventilation with heat recovery (MVHR) unit circulates fresh, filtered air around the buildings, with extraction from the shower/toilet areas. These are claimed to recover 80% of the heat from the building.

Water: Washbasins and showers are fitted with aerated fittings, which use less water by mixing it with air. The scheme also features dual flush toilets, fed by rainwater harvested from the buildings' roofs and stored in underground tanks.

Waste: Extensive recycling facilities in the kitchens use colour-coded bins to enable waste to be properly segregated. The university also operates a Rocket Composter, which converts up to 10 tonnes of food waste into compost for use on the campus.





‘My vision was that the students here could learn about living a sustainable lifestyle so that when they finish university they become ambassadors for green living

➤ sustainability has been engrained into everything the university does,’ he says.

The university’s One Planet Carbon Strategy is born out of the Ecoversity philosophy. The strategy sets out how the institution will work with students and staff to achieve its vision of a 50% reduction in direct emissions from gas/oil usage, electricity consumption and fleet vehicle fuel (scope 1 and scope 2 emissions). It also sets out a plan to manage indirect emissions not owned by the university (scope 3 emissions), such as embodied carbon in products and emissions from commuting to and from the university.

The university has invested more than £4.5m in carbon-reduction measures across the campus, the bulk of which came through successful applications to the SALIX funding scheme, a not-for-profit



Eco-learning: New sustainability centre

Bradford University’s £5.2m Sustainability and Enterprise Centre (SEC) achieved the world’s highest pre-construction BREEAM score of 94.5%. Just as well, given that when it opens in 2013, the 2,000 sq m building will contain workshops, a business unit, an open-plan office and a multi-function space, which have all been designed to provide the learning facilities to promote sustainable living. In addition to its BREEAM score, the building is also aiming to achieve a LEED Platinum rating.

‘The university’s sustainability specification and building physics drove the design, not the architecture, yet we will end up with a fabulous-looking building with performance to match,’ says Russell Smith, estates manager for engineering and building.

➤ The result of this amalgamation is a glulam

timber-framed building, with its 450 mm thick external walls constructed from Hempcrete and Lytag to create a lightweight, insulating building envelope with low thermal inertia and high levels of thermal mass. Lytag is a lightweight aggregate manufactured from pulverised fly ash from coal-fired power stations, while Hempcrete is a concrete substitute formed from course hemp fibres mixed with a lime-based binder and water. This combination of sustainable materials has been selected to minimise the amount of energy needed to heat and cool the building.

Architect Farrell & Clark’s design has resulted in a four-storey structure built into a slope to incorporate a lower ground floor. The building is orientated to face south, where the glazed southern façade opens up onto a full-height sun space, also used to trap solar heat in winter.

In summer, brise soleil will minimise glare and prevent the space overheating.

The building’s shallow floor plan has enabled natural, cross-ventilation to be used. The relatively narrow floor plates also maximise the amount of daylight on the floors, reducing the need for artificial light. A full-height, naturally lit atrium in the centre of the building houses the central staircase and allows daylight into the heart of the structure.

Other sustainable features will include ground-source heat pumps to top-up the heating in winter, solar thermal and solar photovoltaic panels, and rainwater harvesting. These three solutions will result in a projected additional 20% reduction in the building’s carbon emissions, as well as dramatically reducing the reliance on mains energy and water.

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Top ten tips How cutting carbon emissions was achieved by the university

1 Improved building management system and integration of plant shut-down strategies

The university's building management system has been expanded to cover 80% of the mechanical plant. The use of the BMS has resulted in significant improvements in DECs throughout the estate.

There is also a plant shut-down policy linked to room bookings and space occupancy, and automatic shut-down software has been installed to switch off PCs when not in use.

2 Space management

The amount of space per member of staff/student has been reduced from one per 14 sq m to less than one per 10 sq m of floor area by removing redundant buildings and using existing spaces more efficiently through timetabling building usage. The university is also looking at reducing the amount of office space by encouraging home working and compressed hours schemes.

3 Sustainable building specification

The university's sustainability specification requires all new buildings to be built to BREEAM Outstanding.

4 Reducing carbon emissions of the estate

Moving the School of Health from a satellite campus to a new building on the main campus helped reduce the size of the estate by 7% and saved an estimated 450 tonnes of carbon annually. The move included a behavioural change project to prepare staff and students for the move, and to ensure they maximise the sustainable features of their new home.

With an estate primarily

constructed in the 1960s and 1970s, refurbishment is a key issue in reducing its carbon emissions. Projects include recladding several older buildings to improve their thermal performance and appearance, and installing energy efficient lights and PIRs to improve the carbon performance of the estate.

The management strategy is for all buildings to have a Display Energy Certificate rating no lower than D, with an aspiration to increase this to a C.

5 Outdoor areas are just as important as the buildings

Outdoor spaces are used to promote biodiversity by ensuring that all plants are either edible or insect friendly. Campus users are encouraged to eat produce grown on-site. Users can also enjoy the surroundings, which include a newly created woodland, wildflower habitats and an orchard. Beehives are tended by volunteer beekeepers.

6 Gaining staff and student engagement

This includes the Midnight Project, where student ambassadors patrol the offices across the campus with security staff to see where lights, computers and equipment have been left on. Information is fed back to the estates department, where it is incorporated into energy efficiency initiatives in these areas. The university also provides 'edd:e' meters to departmental Green Impact teams to allow them to record and manage their energy use and to find ways of reducing it. This is claimed to have resulted in 33% energy savings in those areas.

7 The increased use of renewable energy technologies

A 1.6MWe CHP plant will deliver power to the campus and heat water for the student accommodation along with annual savings of 19% in carbon emissions. As part of the refurbishment of the Students' Union building, 70 sq m of photovoltaic panels have been installed to generate power for the building. The amount of energy generated and carbon emissions saved is displayed in the building to help the behavioural change programme. A solar thermal system has been installed on the BREEAM Excellent-rated redevelopment of the School of Management. Other initiatives include biomass boilers using locally sourced FSC woodchips and rainwater harvesting at the Students' Union. The estates department is even investigating ground-source heating and a possible wind turbine.

8 Travel plan

Active travel planning has achieved a reduction in staff and students commuting to the university by 33%. The focus is now in limiting business travel.

9 Catering contract

The contract includes key performance indicators for year-on-year reductions in the consumption of energy.

10 Waste minimisation

Initiatives include diverting 64% of waste from landfill to recycling; reducing overall waste production by 4% per year; reducing paper procurement by 23% over two years; setting up a furniture re-use programme and an annual collection, at the end of the academic year, to amass items left by students for donation to a local charity.



company funded by the Department for Energy and Climate Change. All energy savings are ploughed back into new initiatives to reduce emissions further.

In addition to carbon savings, the Ecoversity initiative is starting to have an impact on the students. It is seen as being one reason why the number of students declining an offer of a place at the university has dropped to just 8%, compared with previous years when it was 22%. The latest campus survey shows that the initiative is having a positive impact on the existing students' perception of the campus.

And, if further proof of the university's commitment to becoming a green inspiration were needed, the Sustainability and Enterprise Centre (SEC), its flagship sustainability building currently under construction, has just received the highest ever BREEAM score at design stage of 95.

The record-breaking BREEAM score is one more step on the university's sustainability journey. The current 8% reduction in carbon emissions on the 14,000 tonnes emitted in 2005-06 is just the start of an ambitious plan for the university. It has set a target to achieve a 40% reduction by 2015, rising to 50% by 2020 and 80% by 2050. If the emissions cuts are achieved, perhaps CIBSE will have to introduce a new award of Carbon Champion of the Century to honour the achievement. **CJ**

A video about the Sustainable Enterprise Centre is available at: www.brad.ac.uk/estates/capital-projects/live-projects/sec

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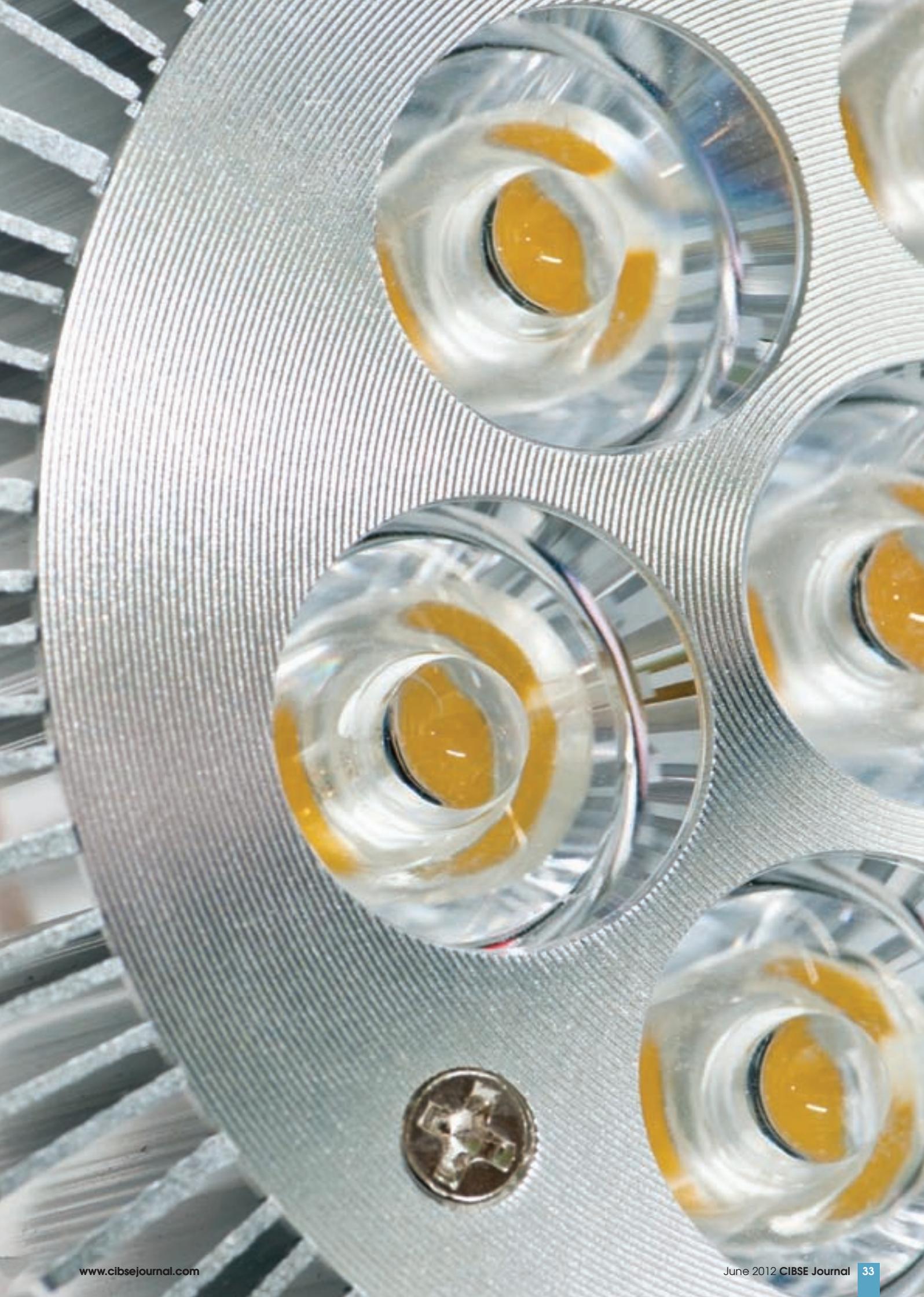
The colour rendering index does not measure up as a metric for LEDs. **Jill Entwistle** reports on its likely successor – the colour quality scale

Colour rendering, put simply, describes the effect that a light source has on the colour of a surface, and therefore the quality of illumination that the source produces. The first CIE (International Commission on Illumination) colour rendering scale devised to measure it appeared in the 1960s, and was designed in response to the appearance of the fluorescent lamp.

The system in use today is defined in CIE document number 13.3, published in 1995. Even that, of course, was long before the widespread use of white LEDs, the technology that has put a question mark over the colour rendering index (CRI) as a suitable metric. In fact the CIE positively recommends that it is not used with white light LEDs.

‘The conclusion is that the CIE CRI is generally not applicable to predict the colour rendering rank order of a set of light sources when white LED light sources

The arrival of LED technology put a question mark over the colour rendering index



are involved in this set,' said a 2007 CIE technical report, *Colour Rendering of White LED Light Sources*.

The problem is that LEDs have a different spectral power distribution (SPD) from traditional sources. To produce white light, phosphor is either added to a blue LED, or red, green and blue LEDs are mixed together. The former, most common, method produces an SPD that combines a distinct blue peak with a broad, secondary peak resulting from the fluorescent emission of the phosphor. The RGB approach features a distribution with three quite distinct spectral peaks.

'The shape of an LED's SPD is thought to explain why Ra values, computed using CIE 13.3, can disagree with visual observation,' says Robert Yeo, owner of Pro-Lite Technology, which specialises in measuring the colour and brightness of lamps and luminaires. 'CIE 13.3 computes the general CRI Ra based upon the mean of the first eight special colour rendering indices. These indices are computed from the difference in colour of non-saturated hues when they are illuminated by the test light source compared with the reference illuminant. LEDs, with their characteristic spectral peaks, render saturated colours very well, and can give illumination that we would regard as very appealing compared to more traditional lamps. CIE 13.3 fails to account for this phenomenon.'

Researchers Wendy Davis and Yoshi Ohno, at the National Institute of Standards and Technology (NIST) in the US, have devised an alternative metric which arguably overcomes the shortcomings of CRI. Like CRI, the colour quality scale (CQS) generates a single number



that describes the colour rendering performance of a lamp. And like CRI, CQS is also calculated by simulating the

appearance of a number of colours when they are illuminated with a test light source and with an idealised source of the same colour temperature. The differences in colour are assessed and, the larger the colour differences, the lower the overall score. However, there are a number of differences between the two metrics when it comes to the way this is achieved.

One of the key departures is that CQS compares the rendering performance with 15 more highly saturated colours, rather than the eight pastel shades. 'This ensures that there is much less chance of a small imperfection in colour rendering going undetected,' says Bartlett researcher Peter Raynham.

Another major difference is that, while CRI is about how close to their true tint and shade under a given light source, CQS accounts for the human vision system preference for light sources that promote

Colour Quality Scale: Key differences with CRI

- Rather than the eight pastel colours used by the Ra system to compare light sources, CQS has 15 saturated colours. This means less chance of imperfections in colour rendering going undetected.
- When a different lamp is used, the eye adapts to the white point of the new source. The Colour Measurement Committee's more accurate Chromatic Adaptation Transform of 2000 (CMCCAT2000) is used in the CQS system, instead of the Von Kries chromatic adaptation correction used for CRI which performs less well than other available models.
- CRI focuses on how close hues appear to their true colour under a given light source, while CQS considers people's preference for colour changes that increase chroma. It gives

a better score to light sources that increase chroma than to those that reduce it, so that a source can get a reasonable score even if it has a poor score on one colour.

- CQS is scaled so that it always gives a result between 0 and 100, whereas with CRI it is possible to get negative scores.
- The overall score is reduced slightly for light sources with very warm colour temperatures (less than 3500K). This is because these warm colour temperatures tend to lead to smaller colour differences, making it harder to distinguish colours. While this makes relatively little difference for most common light sources – it reduces the score of a standard incandescent filament lamp by about two per cent – it makes a much bigger difference for red lights based on LEDs.



Colour Rendering Index

CRI is a measure of how well light sources render the colours of objects, materials, and skin tones. The test procedure involves comparing the appearance of eight colour samples under the light in question and a reference light source. The general colour rendering index (Ra) scale goes up to 100, and the average differences measured between the two light sources are subtracted from 100 to get the CRI. So small average differences will result in a higher score, while larger differences give a lower number. Of all the colours possible, only these eight are measured. The samples used are pastels, not saturated colours.

be tested has a correlated colour temperature (CCT) of less than 5000K, the reference source is a black body radiator (an incandescent lamp). By definition, a tungsten lamp will have an Ra of 100. For higher CCT sources, the reference is a specifically defined spectrum of daylight. Therefore, light sources that mimic incandescent light or daylight for the eight colour samples are, by definition, the ones that will score highest on the CRI.

For general illumination, an Ra of 80 is considered the minimum acceptable, while for hazardous jobs, or tasks which rely upon precise colour matching, an Ra of 95+ may be necessary.

If the lamp to

Source: CIE

The Colour Quality Scale will provide a more level playing field with which to compare the performance of LEDs, according to some experts

increased chroma – making objects appear more vivid. ‘CQS gives a better score to light sources that increase chroma than it does to those that reduce it,’ says Raynham. ‘This means it is still possible for a light source to get a reasonable score even if it has a very poor score, on one colour. In CQS, a root mean square (RMS) summation process is used, so a single poor score makes a much bigger difference to the overall score.’

Another factor CQS takes into account is that when a scene is lit with a different lamp, the eye adapts to the white point of the new source. The Colour Measurement Committee’s Chromatic Adaptation Transform of 2000 (CMCCAT2000) is used in the CQS computation, rather than the somewhat discredited mathematical technique called a von Kries transform, used for CRI.

While LEDs have been the catalyst for

an alternative, the new metric is generally ‘a much more robust measure of colour quality than the old CRI system,’ according to Raynham.

‘Overall CQS will provide a more meaningful description of the colour rendering of any type of lamp,’ agrees Yeo. ‘It will provide a more level playing field with which to compare the performance of LEDs with more traditional lamp technologies.’ **CJ**

Colour rendering for different lamps		
Lamp type	CCT (Kelvin)	CRI (Ra, CIE 13.3)
Low pressure sodium	1,800	~5
Quartz metal halide	4,200	85
Incandescent (tungsten halogen)	3,200	100
White (blue + phosphor) LED*	3,500	85
Tri-phosphor warm white fluorescent	2,940	73

*Lumileds Luxeon Rebel ANSI 3500K

Source: Wikipedia

BOX OF TRICKS

The transformation of a hard-to-treat 1960s property into a low carbon home involved the use of some unusual technology, writes **Mark Dowson**

A key innovation of the project is a highly-insulated solar-air collector prototype integrated into the external insulation on the south façade

The Thamesmead housing estate in south-east London is a key example of the often poorly insulated and undervalued concrete dwellings built in the 1960s. It was featured in the Stanley Kubrick film, *A Clockwork Orange*, and more recently on television in E4's *Misfits*. But its other claim to fame is that it is now part of 'Retrofit for the Future', a government-funded competition launched by the Technology Strategy Board (TSB) in 2009.

The aim of the competition was to develop innovative, scalable, whole-house refurbishment strategies with potential to reduce 80% of CO₂ emissions in low-rise social housing. Following two intense design phases, 86 teams across the UK were shortlisted and awarded £150,000 to implement their strategies with occupied dwellings. The selected properties are now being monitored over a two-year period after refurbishment, with the findings feeding into research papers and nationwide design guidance.

As a shortlisted team, Buro Happold

collaborated with Fraser Brown MacKenna Architects, Gallions Housing Association, Martin Arnold Associates surveyors and Axis Europe contractors to super-insulate a pre-cast concrete end-of-terrace house on the Thamesmead estate.

Like millions of buildings across the UK, the estate consists largely of properties with solid walls, single glazing and uninsulated floors/roofs responsible for a significant amount of wasted heat. In its unrefurbished state, the hard-to-treat property suffered from moisture-related problems such as condensation, rising damp and mould growth, made worse by insufficient heating and high rates of fuel poverty. It possessed a mixture of single-glazed and old double-glazed windows, unused ground-floor garages (too narrow for modern cars) and a first-floor walkway.

Transformation

Through extensive retrofit works, the property has been transformed into a 'near Passivhaus' six-bedroom house, super-insulated with external cladding,





Above: The refurbished house at the Thamesmead estate in south-east London. The brightly coloured render, bold parapet walls and pebble dashed render on the ground floor serve to show that external insulation can be achieved without losing individuality amongst the building stock. This detailing is highlighted by angular metallic fins embedded into the render casting different length shadows over the building as the sun rises and sets throughout the year.

Right: The house last year, before the refurbishment.

Top left: The aerogel solar collector prior to being sealed.

Bottom left: The plant room for the property. This contains the mechanical ventilation with heat recovery unit, photovoltaic inverter and a 500 litre domestic hot water cylinder. Three dampers on the MVHR's extract ductwork control airflow to and from the aerogel solar collector. The rear wall of the plant contains power meters to monitor each technology and a 3G hub to transmit data wirelessly to an online server.

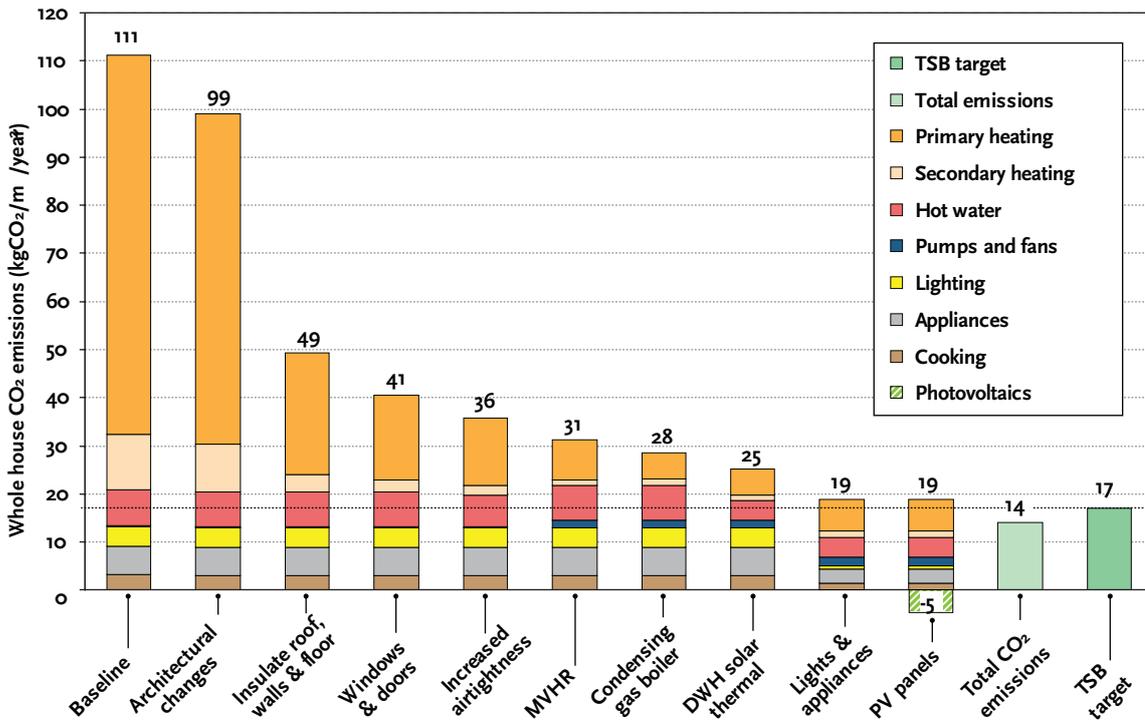


triple glazing throughout and high levels of air tightness. Fresh air is provided by a mechanical ventilation system with heat recovery (MVHR). Ten photovoltaic (PV) panels and a vacuum tube collector on the roof provide renewable electricity and water heating. Expected U-values and other projected performance data are shown in the table on page 40.

A key innovation of the Thamesmead project is a highly-insulated solar-air collector prototype integrated into the external insulation on the south façade. The

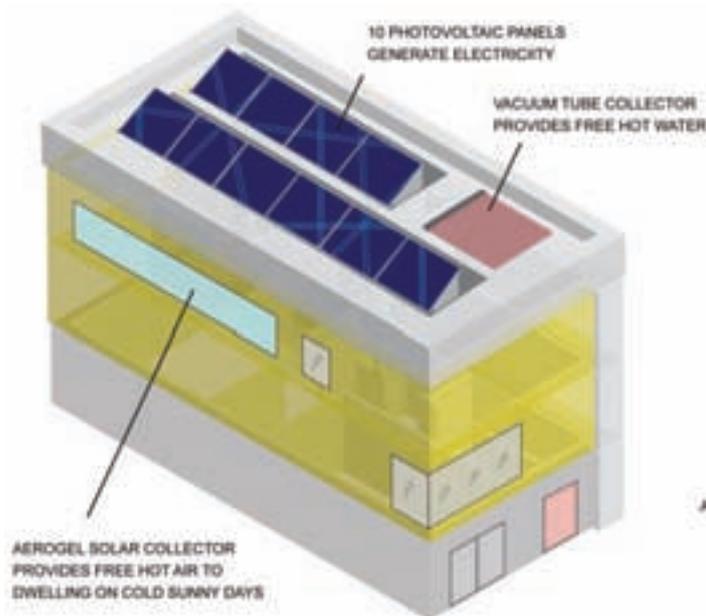
prototype consists of a cavity containing a black perforated metal sheet to absorb solar radiation and a highly insulated translucent cover, consisting of polycarbonate panels fitted with high-performance granular 'aerogel' insulation, to reduce heat losses to the outside.

Aerogel is an emerging material in the UK construction market. This unique nano-porous translucent insulation material has the lowest thermal conductivity of any solid, retaining up to four times as much heat as conventional

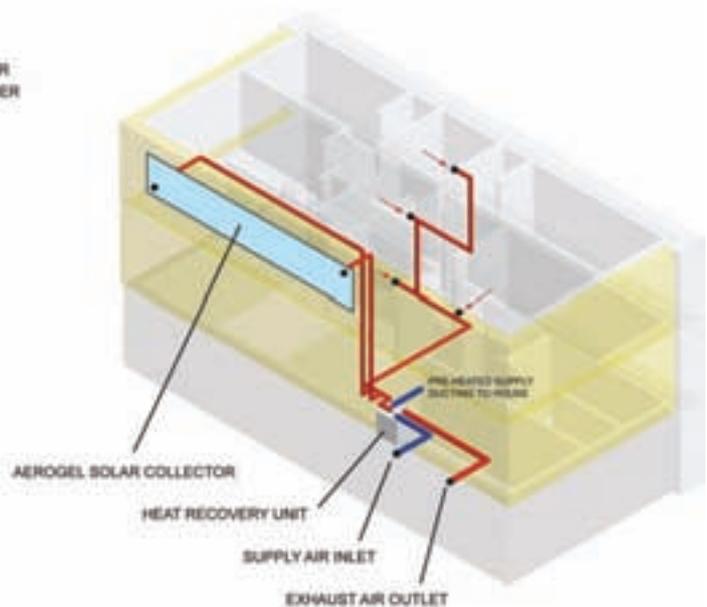


The whole-house CO₂-reduction strategy

Renewable Technologies



Aerogel solar collector:
(Connection to MVHR extract-air ductwork)



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The success of the retrofit will rely heavily on the occupants' comfort and satisfaction levels, combined with how well they engage with the new technologies and conserve energy at home

insulation, whilst being highly transparent to light and solar radiation. It is available commercially as translucent granules encapsulated within glass or multi-wall polycarbonate sheets, or as particles embedded within opaque insulation boards and blankets. The material can be applied to a building in a variety of ways.

Linked to the property's MVHR, extracted air from the kitchen and bathrooms is fed into the solar collector cavity, where it is heated by incoming solar radiation. This heat is then used to provide additional energy indirectly to heat the incoming fresh air supply to the property's living room and bedrooms. Automatic flow and bypass controls maintain comfortable living conditions all year round.

Some promising monitored results have already been observed for this system, indicating that it will play an important role in heating the property during cold-sunny conditions. During a seven-day controlled test in October 2011, the solar collector outlet reached 45°C on a cold sunny day, pre-heating the supply air in the mechanical ventilation system to 30°C, enabling the house to maintain comfortable living conditions at 21-22°C, without additional heating.

A custom-built 'aerogel door' developed

by Proctor Group was also integrated into this retrofit. The double leaf plant room door incorporates a 30 mm-thick opaque aerogel blanket, capable of achieving a central U-value as low as 0.39 W/sq m.K, or 0.65 W/sq m.K including the frames. In a separate application, 80 mm of aerogel was also applied to the ground-floor slab in a zone where the floor-to-ceiling height was limited.

Evaluation

Onsite work at the property finished in March this year, and a large family is expected to move in over the next one to two months.

Since last August, and for another 18 months, a package of wireless monitoring equipment is being used to capture important information such as the internal temperature and CO₂ levels within the house, power consumption of the MVHR, energy generation of the PV panels and solar water heater, as well as the total consumption of gas, electricity and water.

A roof-mounted solar radiation sensor, combined with temperature and humidity sensors inside the aerogel solar collector cavity and MVHR ductwork, provide a unique insight into this system's performance.

Ultimately, the success of the retrofit will rely heavily on the occupants' comfort and satisfaction levels, combined with how well they engage with new technologies and conserve energy at home. Interviews will be held to facilitate this process. Nevertheless, through this deep retrofit, the expected value of the property will have increased greatly, particularly due the extended living space, new kitchen-diner and additional two bedrooms.

There is scope to retrofit millions of buildings to make deep cuts in CO₂ emissions. However, effective implementation is no small task. Solutions must account for the variety in age, size, quality, composition, function, asset value and social value across the existing building stock, as well as the different needs, expectations and budgets of homes owners and occupiers. Understanding which solutions are cost effective and deliver real savings in-use is imperative. **CB**

Specification: Thamesmead refurbishment

Walls: 300 mm of Permarock EPS insulation to achieve U-value of 0.1 W/sq m.K. Yellow render with aluminium fins

Roof: New roof with airtight membrane, services core and PIR 300mm insulation for U-value of 0.1 W/sq m.K

Windows: Passivhaus-certified Nordan N-tech triple glazing with U-value of 0.8 W/sq m.K and solar G-value of 0.5

Doors: Passivhaus-certified front door. Plant door custom built by Proctor Group with U-value of 0.65 W/sq m.K

Ground floor: U-value of 0.15 W/sq m.K throughout. Spacetherm aerogel insulation used in zone with 80mm space available

Air tightness: Pro Clima airtight tapes, sealants and sleeves used throughout.

Target: 0.6 cu m/sq m/hr @50 Pa.

Best on-site : 3.5 cu m/ sq m/hr @50 Pa

Ventilation: Nuair MRXBOX95B-WH1 unit with summer bypass. Extract air for heat recovery boosted by aerogel solar collector

Heating: Warm air supplied by MVHR. System boiler with small-zoned radiators for peak winter conditions

Hot water: 500 litre cylinder fed by electric immersion and boiler. A 3 sq m vacuum tube collector meets 42% of load

Electricity generation: Ten PV panels generate 2.30 kW peak. Array is ballasted using aluminium frame to avoid piercing insulation.

Lights and appliances: Low energy fittings and light bulbs with A-rated appliances specified throughout property

Predicted CO₂ emissions

Baseline: 111 kg CO₂/sq m/year

Post retrofit: 14 kg CO₂/sq m/year

Predicted saving: 87%

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NATURAL GAS

Chillers have been developed that don't need to use hydrofluorocarbon refrigerants, thereby escaping EU restrictions. **Nicholas Cox** explains

Natural hydrocarbon (HC) refrigerant chillers are often regarded as just an easy way to clock up additional BREEAM points, but they now need to be taken much more seriously, particularly in light of current legislation.

The EU has passed regulations to impose restrictions on the use of hydrofluorocarbon (HFC) refrigerants in air conditioning systems¹. With this change in mind, larger air-cooled chillers that use HC refrigerant have been developed in recent years. HC chillers had been available in the UK as far back as 1995, but their capacities were limited to about 200 kW. HC chillers with outputs of up to 1,367kW are now on the market.

Energy savings of more than 20% have been achieved with HC chillers relative to comparable HFC chillers, with roughly half of this attributable to refrigerant selection and the balance as a result of improved engineering design².

The good performance of HC refrigerants can be attributed to a lower compression ratio due to higher suction pressures and lower discharge pressures at specific operating temperatures; to improved heat transfer in heat exchangers as a result of more favourable fluid thermal and transport properties; and to reduced system pressure losses arising from lower refrigerant density and viscosity.

For example, in the Earthcare Hydrocarbon Series (EHS) chiller, the HC refrigerant R-290 is used as a replacement for R-22, resulting in an extremely low



The EU has passed regulations to impose restrictions on the use of hydrofluorocarbon refrigerants in air conditioning systems

global warming potential of only three times higher than CO₂, compared with 2,090 for HFC-410A.

Energy efficiency can be maximised through a combination of factors, including: the favourable thermodynamic characteristics of HC; the use of sub-cooling circuits that improve coefficient of performance (CoP); and floating head pressure control that allows the condensing temperature to float as low as 20C if ambient conditions allow, instead of the normal 40C. This is particularly beneficial for chillers that operate all year round or



at night when ambient temperatures are lower. Further efficiencies are also possible – see the tables on page 48.

Plant-room applications

Most applications to date have been for external air-cooled chillers or external containerised plant rooms. However, various regulations and rules³ permit plant-room applications designed as Zone 2 special machinery rooms to accommodate HC chillers. Where the entire system is located in a special machinery room, HC refrigerants are permitted without

restricted refrigerant charge size.

Machinery rooms using flammable refrigerants must be designed to prevent the ignition of a refrigerant and air mixture. Construction should consist of fire- and vapour-proof walls. There should be an open area within an external wall to allow the refrigerant to migrate out, and to ensure that there is insufficient containment for a dangerous overpressure to develop in the event of ignition.

The opening should consist of floor-to-ceiling louvres with projected area typically greater than 62% of the area of the wall. ➤

“ The energy efficiency of chiller systems can be maximised through a combination of factors



A 450kW hydrocarbon chiller undergoes pre-commissioning checks

Nicholas Cox



CASE STUDY CHURCH HOUSE

Church House in London was built to commemorate Queen Victoria's golden jubilee and hosted the first meeting of the fledgling United Nations in 1945. In 2007, a 625 kW air-cooled water chiller using the HC refrigerant R290 was installed. The long-term payback, both financially and in reduced environmental impact, more than offset all the capital, installation and disruption costs. The project lifecycle cost analysis is summarized in the table on page 46.

The technical development of the system was straightforward; the most time-consuming element was optimising the selection of compressors, heat exchangers and valves for non-standard conditions. The main barriers faced in developing the technology were getting selection data for components using hydrocarbon refrigerants, and getting components CE marked.

➤ Preferably this should be split between two sides to encourage displacement of the leaked refrigerant. The floor should form a basin to hold twice the volume of the refrigerant liquid; a typical depth is 100 mm. The floor should slope towards an extraction point. Doors should open outwards with catches designed for overpressure above 2 kPa. They should be self-closing, well fitting, and with an appropriate fire rating.

The louvres will ensure that natural ventilation is available, even if a refrigerant release coincides with an electric power failure. In the event of a major refrigerant release, the plume from the bottom of the louvres may be flammable. Mixing of the plume with air outside the plant room should not be obstructed. Outside traffic and ignition sources should not approach the louvres closer than the plant-room floor-to-ceiling height.

Refrigerant pressure relief valves on the chiller should connect to steel pipes, which discharge outside the building upwards and 3m clear of ignition sources, persons or property. Extraction ventilation suitable for Zone 2 applications should also be

installed. Discharge to the outside of the building must be free from obstruction, suitably guarded, and located so as not to cause danger. The purpose of the ventilation is to simply expedite dispersal.

However, there is no need for the 158 air changes per hour required for exemption from EU rules known as 'ATEX' (Appareils destinés à être utilisés en atmosphères explosives). But to be effective, at least 16 air changes per hour are needed.

At least two flammable gas detectors should be used per plant room, and should be far from air inlets and each other. They should be fixed to a wall more than 300 mm above the floor to protect from accidental damage, and less than 600 mm to ensure detection of refrigerant vapour. Either of the flammable gas detectors should shut down the chiller, electrically isolate all electrical equipment except emergency lighting and extraction, activate alarms, and automatically switch on ventilation fans.

The alarms should include an audible signal and a flashing light, both in the machinery room and externally, so that emergency action may be initiated;



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“ An important strategy used to prevent explosions in process systems where flammable gases or vapours may be present, is to lower the oxygen concentration by adding an inert gas



where available the alarms should also interface with the structure’s building management system (BMS). The gas detectors should be calibrated to 10% of the Lower Flammability Limit (LFL), expressed in volume per cent. This is the lower end of the concentration range at a given temperature and pressure for which air/flammable refrigerant mixtures can ignite.

A remote switch should be provided outside and near to the machinery room door, for isolating all electrical equipment not protected for use with flammable refrigerants, and for stopping all machinery. An emergency lighting system should be provided to allow evacuation of personnel and for any necessary urgent operation of controls, suitably protected for use in hazardous areas.

Power sockets should permit plug

removal only if the socket is isolated, and should be located above the level of the leak detectors.

Fire extinguishers should be installed in accordance with local fire authority requirements, and notices describing their correct usage should be posted. Clear emergency procedure signs are needed inside the chiller plant room and outside the access door.

Water sprinklers for fire protection should be installed in the chiller plantroom. Warning notices should be posted stating that smoking, naked lights or flames are prohibited. Further steps may be required to comply with national or local regulations.

This procedure demonstrates that plant rooms for chillers with large hydrocarbon charges can be designed and used safely through proper refrigerant handling, leak minimisation, mixture dilution, ignition prevention and overpressure venting.

But, as the critics of HCs will be quick to point out, this only applies to above-ground plant rooms. For basement plant rooms, where many chillers are currently located, the 1 kg of HC refrigerant restriction still applies. To overcome this restriction, Earthcare is now working on designs for inert atmosphere plant rooms. An important strategy used to prevent explosions in process systems where flammable gases or vapours may be present, is to lower the oxygen concentration by adding an inert gas, to the point where the fuel-air mixture is no longer flammable. The oxygen concentration at the limit of flammability is referred to as the limiting oxygen

	HC chiller	HFC134a chiller
Cooling Output kW	625	625
COP	4.15	2.82
Power Input kW	150.6	221.6
Run Hours	3,000	3,000
Load Factor %	50	50
Annual Energy Consumption kWh	225,900	332,400
Cost of Energy £/KWh (2007 prices)	0.063	0.063
Annual Running Cost £	14,231	20,941
Capital Cost £	69,830	60,000
10-year Running Cost £	142,310	209,410
10-year life cycle cost £	212,420	269,410
10-year saving £	56,990	-
Payback Period (years)	1.5	-

Hydrocarbon-based chiller life-cycle analysis: Church House, London (see box on page 44)



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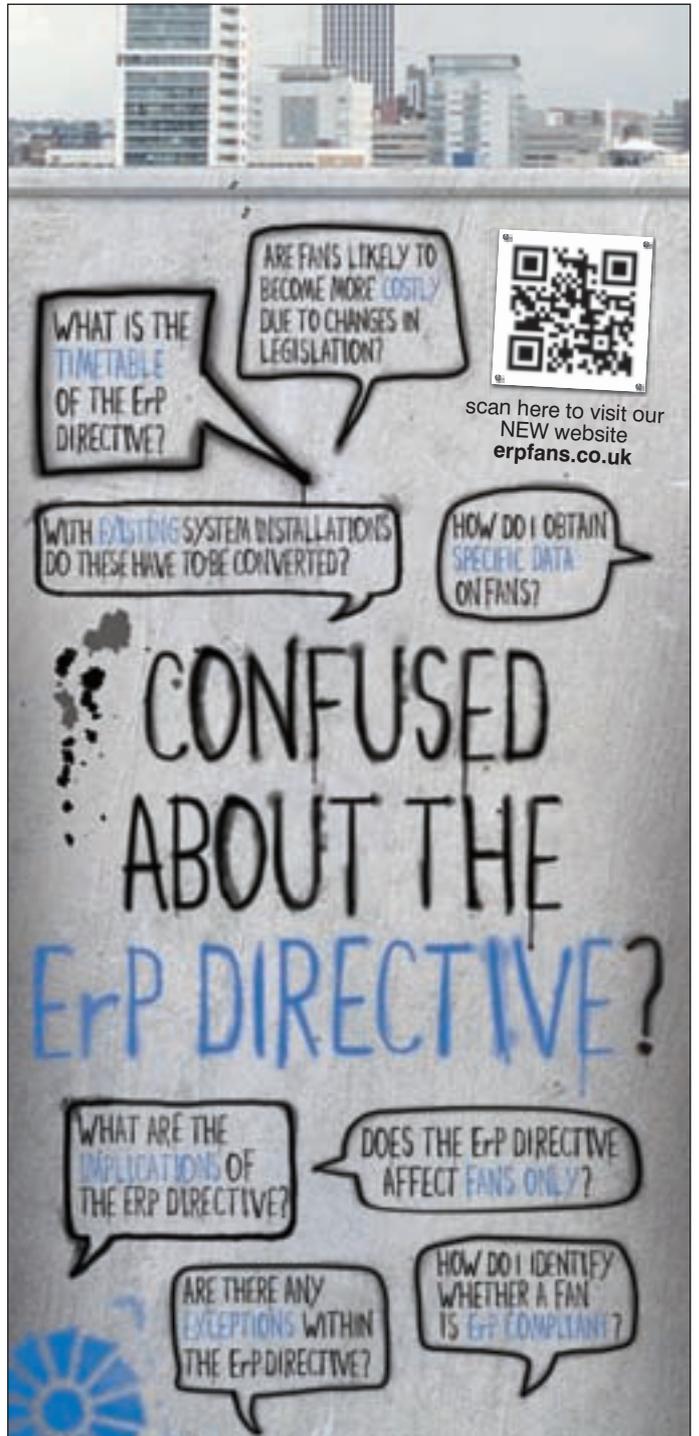


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Plant rooms for chillers with large hydrocarbon charges can be designed and used safely through proper refrigerant handling

concentration, or LOC. Determinations of LOC are made using the ASTM E2079 Standard Test Method for Limiting Oxygen (Oxidant) Concentration in Gases and Vapours. The limit of flammability is determined by specific pressure rise criteria of the test standard.

Once hazard studies are completed, this will allow the application of hydrocarbon chillers anywhere in a building, finally bringing to an end the dominance of halocarbon refrigerants for building air conditioning applications.

NICHOLAS COX is managing director at Earthcare Products Ltd. www.earthcareproducts.co.uk

References

1. Directive 2006/40/EC of the European parliament dated 17 May 2006 and amending council directive

70/156/EEC (the MAC directive) has commenced phase-out of hydrofluorocarbon (HFCs) refrigerants from mobile air conditioning systems. Regulation (EC) No 842/2006 of the European parliament and of the council (the F-Gas regulation) imposes restrictions on the use of HFC refrigerants in stationary systems. The UK has transposed the EC regulation through its 2009 GB F-gas regulation, which came into force in March 2009. There was a review of the EC Regulation in 2011 and the results of the consultation process have just been published (Please see: http://ec.europa.eu/clima/consultations/0011/summary_en.pdf). As a result of this, further activity by the European Community and its member states regarding the reduction of greenhouse gases including HFCs is expected very shortly.

2. Natural Refrigerants Sustainable Ozone- and Climate-Friendly Alternatives to HCFCs, GTZ Proklima, 2008; EC International Technical Meeting on HCFC phase-out, 05-06 April 2008, Atmosphere 2010 International Workshop on Natural Refrigerants Brussels 27-28 September 2010.
3. See the EU regulation BS EN 378-3; the Institute of Refrigeration code of practice for A3 refrigerants; the ACRIB guidelines for flammable refrigerants; and the GTZ Proklima guidelines for the safe use of hydrocarbon refrigerants.



SAFETY FACTORS

The safety principles relating to the use of hydrocarbon refrigerants in external air-cooled water chillers are:

Electrics should be sealed (to at least IP54) or non-sparking (i.e. solid state);

Access to the equipment must be restricted to authorised personnel only (although this is best practice regardless of refrigerant);

Clear labelling of the refrigerant and hazards;

Mechanical or natural venting to prevent gas accumulating inside the chiller and consideration of gas leak detection; and

Steps must be taken to ensure that refrigerant cannot leak into the building.

Efficiencies Example of HC technology

Further energy efficiency improvements are predicted with the development of a vapour injection economised screw with inverter part load controls:

% Capacity	CoP (with inverter)
100	4.0
75	4.6
50	5.1
25	6.0

Part-load efficiency data – 420 kW air-cooled chiller

% Capacity	CoP (with inverter)
100%: 4.0 x 0.03	0.12
75%: 4.6 x 0.33	1.52
50%: 5.1 x 0.41	2.09
25%: 6.0 x 0.23	1.38
SEER	5.11

Seasonal Energy Efficiency Ratio – 420 kW air cooled chiller

Even higher efficiencies can be achieved with evaporative condensers or cooling towers:

% Capacity	CoP (with inverter)
100	5.09
75	5.48
50	6.44
25	6.78

Part-load efficiency data – 950 kW water-cooled chiller

% Capacity	CoP (with inverter)
100%: 5.09 x 0.03	0.15
75%: 5.48 x 0.33	1.81
50%: 6.44 x 0.41	2.64
25%: 6.78 x 0.23	1.56
SEER	6.16

Seasonal Energy Efficiency Ratio – 950 kW water-cooled chiller

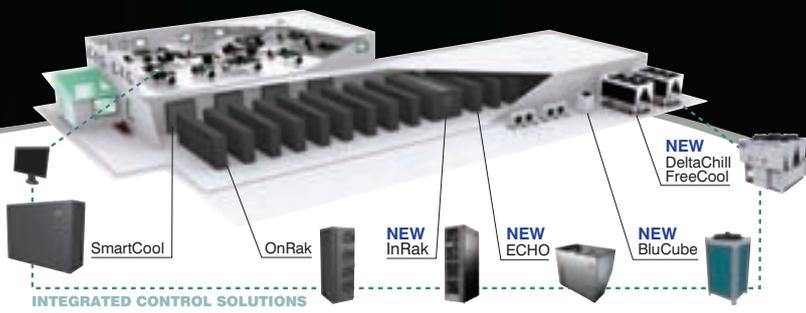



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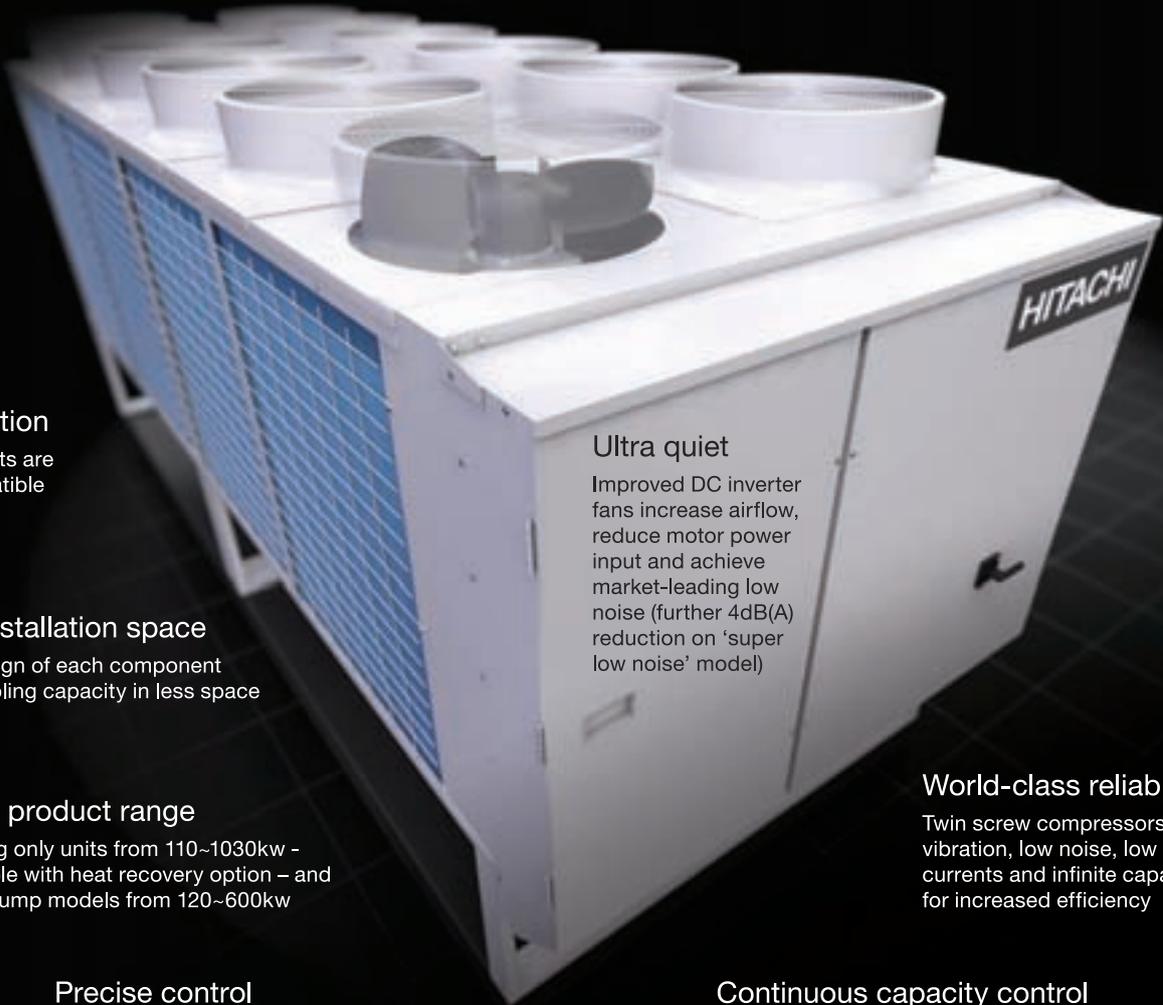
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Power quality for building electrical supplies

This CPD module looks at the principles of power factor and power quality on buildings

At the recent CIBSE ASHRAE Technical Symposium, 'power factor' correction was raised in a plenary session, and it was clear that there was some uncertainty about some of the concepts being discussed. This CPD article aims to provide an introduction to the principles of power factor, and some wider issues of power quality on buildings.

Electrical systems supply power to equipment incorporating magnetising actions – such as many motors driving fans, pumps and compressors, and certain types of lighting – will require additional current above that needed to do useful work; this current is used to produce the magnetic flux in the device. In addition, the basis for calculating electrical loads is based on the concept of 'linear' loads, which means that they draw a sinusoidal current wave-shape to match the supply voltage. However, increasingly there are a numbers of non-linear loads in buildings that will also de-rate the performance of the distribution network by adding harmonics into the supply system (due to their pulsing actions) potentially affecting the performance and longevity of equipment.

This reduction in power quality does not necessarily cost the consumer money directly, but for commercial and industrial users it may well affect the electrical tariff costs, and will alter the effective capacity of the electrical distribution system.

Load types

In an alternating current (AC) electrical system there are resistive, inductive and capacitive components.

Resistive loads include incandescent lamps, resistance heaters and the cable itself. If a circuit were purely resistive, the current and the voltage would be in phase. A representation of the voltage and current waveforms for a resistive system is shown in Figure 1. No real power system is purely resistive, as it will certainly also have some capacitive characteristics (the ability to store energy briefly).

Inductive loads would typically include induction motors, the ballast coils used with fluorescent lamps, many low energy lamps, and any systems that include magnetic components – such as transformers, welding equipment, and many electrical goods. In an inductive circuit, the current will 'lag' the voltage waveform, as shown in Figure 2.

Capacitive loads include such components as digital electronic equipment – a load that is becoming increasingly prevalent in commercial buildings. In a capacitive circuit, the current will 'lead' the voltage waveform. Capacitive loads (in the form of capacitors) are added to systems as a means of counteracting inductive loads.

Most commercial and industrial buildings are likely to have an overall load

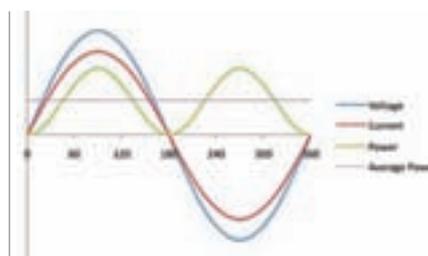


Figure 1: Voltages and current in a purely resistive system

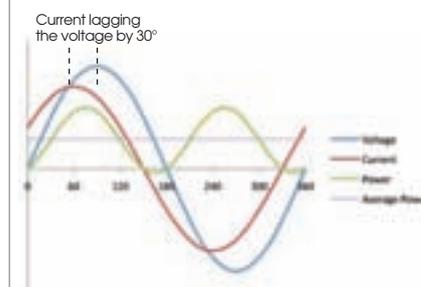


Figure 2: Voltages and current in a simple inductive system with a lag of 30° (and a resulting displacement power factor of $\cos 30^\circ = 0.87$)

profile that is inductive. Both inductive and capacitive loads are known as 'reactive loads' and, preferably, the goal should be to have almost zero reactive currents (meaning that the current and voltage are in phase) at the point that the electrical supply enters the building.

Inductive loads require a current to create a magnetic field (flux), and this field

enables the device to produce the desired work. The inductive circuit cyclically absorbs energy from the system (during the build-up of the magnetic field) and then re-injects that energy back into the system (during the collapse of the magnetic field). Hence the current (I) in the supply and distribution system will increase (with the additional inductive current), and so the losses in cables and transformers will rise – frequently referred to as ‘I²R losses’ (R being the electrical resistance).

This reactive power is also known as ‘wattless’ power. It does not directly affect the useful power (watts) drawn by the appliance to produce the work, heat or light. However, the total demand on the power supply systems, measured in VA (volts x amps), and the magnitude of the flow of energy in the conductors, will increase to provide the reactive power. The total or apparent power (kVA) required by a reactive system is the sum of the ‘true’ or ‘real power’ (kW) and the reactive power (kVA_R), commonly known as ‘kilovars’. The power factor is the ratio of the real power (kW) to the total (apparent) power (kVA).

The lag (or lead) angle can be shown using a phasor diagram (Figure 3) and simple calculations used to determine unknown values. The cosine of the angle ϕ is the ‘displacement power factor’ (normally simplified to just ‘power factor’).

So, for example, a particular 20kW motor operates at a power factor of 0.80 (lagging). Hence, the apparent power required by the motor = 20kW/0.80 = 25kVA. If the power factor is improved to 0.95, then the corrected apparent power = 20kW/0.95 = 21kVA. In this example, the apparent power is reduced by 16% – this will not necessarily reduce energy bills, but may contribute to having smaller cables or improved tariffs.

$$(\text{real power})^2 + (\text{reactive power})^2 = (\text{apparent power})^2$$

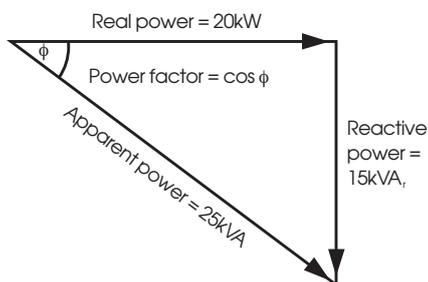


Figure 3: Phasor representation of power (with example values taken from the uncorrected example motor described in the text)

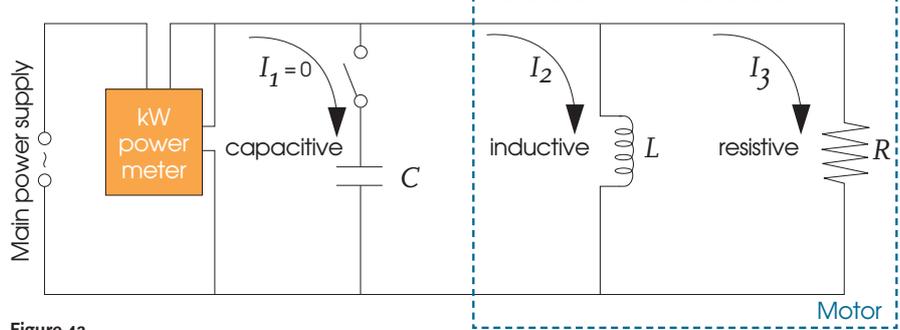


Figure 4a

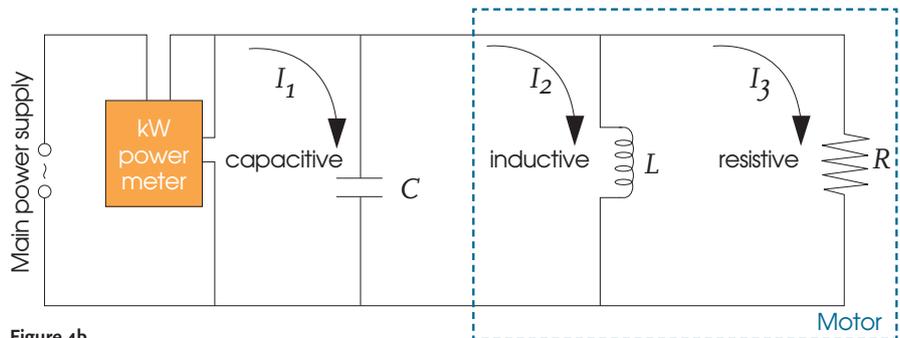


Figure 4b

Figures 4a and 4b: Adding a capacitor as a means of correcting the power factor (after)

In commercial and industrial buildings, a power factor of below 0.9 is considered to cause excessive running currents, and is often penalised through electricity supply tariffs by incurring a financial charge for reactive power (kVA_r) that goes above a set proportion of the real power (kW). So, typically, a building’s power factor would be maintained at 0.95 or above by the installation of ‘power factor correction’ (PFC).

The motor from the previous example can be simplified into a resistance, R, and inductance, L, as shown in Figure 4a. When voltage is applied to the circuit, the main supply will need to provide both I₂, the ‘inductive’ current, and I₃, the ‘resistive’ current.

If, subsequently, the switch is closed, as in Figure 4b, the capacitor is instantly charged and this charge oscillates between the capacitor and inductor, creating a current through C and L. The oscillating charge provides the ‘extra current’ in I₂ and the current from the main supply is reduced. This is known as static power factor correction, and is often used with individual pieces of equipment. It may not be physically practical or financially economical where there are a large number of devices requiring power factor correction.

These correcting capacitors can be of a fixed rating to match the inductive load of a large item of equipment, or be in



Figure 5: Centralised power quality correction automatically adjusts to meet the needs of the building electrical load

a bank of capacitors, mounted close to significant loads or at the building power intake switchgear. If centralised, these are likely to be progressively brought into circuit by automatic controls to match inductive loads in the building.

Power factor is unlikely to be a constant. For example, motor inductance will alter with motor speed (as shown in Figure 6). This may well demand more complex solutions, as inappropriate ‘balancing’

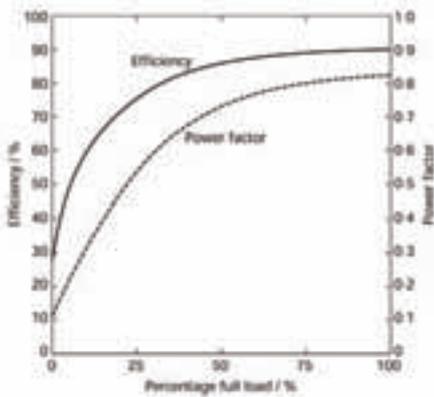


Figure 6: The variation of power factor with induction motor speed²

capacitance can add to the harmonic problems discussed below, or simply add unwanted reactance.

So induction motors, whether driving a fan, pump or lift, should be sized appropriately to meet the design requirements, otherwise they will always run at a lower power factor (and efficiency). Variable voltage AC drives and DC static converter drives have such a wide range of power factor over the speed and load range that it is very difficult to provide power factor correction to maintain values of 0.9.

For large motor loads – such as those used in lifts – variable voltage, variable frequency drives provide better all-round drive performance than variable voltage control alone, and give near unity power factor operation. (Static power factor correction must not be applied at the output of a variable speed drive, solid state soft starter or an inverter, as it will damage the electronics.) Some systems use multiple motors so that they can collectively operate with individual higher power factors (and efficiencies).³

Discharge lamps require a ballast to start and control the lamp and, if provided by traditional wire-wound coil ballasts, need some power factor correction. LED and some compact fluorescent lamps can have power factors significantly less than 1⁴ and will normally be corrected locally within the luminaire. High-frequency electronic ballasts are available for a wide range of fluorescent and compact lamps, providing a power factor of 0.95.⁵

Power factor correction can be implemented using fixed capacitors or automatic variable power factor units. By installing the equipment close to the load, the kVA_l load on the supply cable is reduced, thereby possibly allowing a smaller distribution cable to be used.

Harmonics

Modern power systems are increasingly affected by harmonic distortion. ‘Non-linear’ loads – such as computers, inverters (for speed controllers), electronic power supplies and discharge lighting – can affect the supply waveform. They ‘switch’ on and off very quickly, making step changes to the current and so creating harmonics in the electrical supply system. As illustrated in Figure 7, the harmonic components cause the (normally sinusoidal) waveform to be distorted. This will detract from the quality of the power supply and increase the ‘wattless’ current in the system – wattless, in this case, since the harmonic current has no matching voltage harmonic to produce useful power. This can cause excessive heating in motors, abnormally high current levels through system capacitors, voltage peaking and unexpected tripping, and may also affect the measurement accuracy of monitoring devices.⁶

The harmonic components cause greatly increased eddy current losses in transformers. These losses are proportional to the square of the frequency, so with the higher frequency harmonics, the operating temperature of the transformer will increase and equipment lifetime is shortened. Even moderately loaded transformers supplying IT loads will have much lower lifetimes than expected, unless proper precautions are taken.⁸

‘Passive’ harmonic filters may be used to reduce the harmonic current so that the non-linear device appears to the system to react in a way that is similar to a simpler linear load. The power factor can then be adjusted, using capacitors or inductors as required. So called ‘detuned’ capacitors may be used – these are a matched reactance/capacitance applied to ‘dampen’ the system harmonics at particular

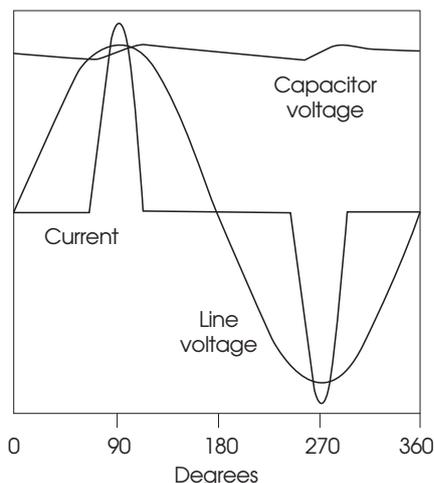


Figure 7: The current drawn by an uncorrected electronic power supply (note that EU regulations require computer power supplies to incorporate measures to reduce this effect on the mains supply)⁷

frequencies as well as providing power factor correction.

More flexible (and expensive) ‘active power factor correctors’ are also used to alter the waveform of the current drawn by a load to improve its overall power factor.

Under EU regulations, power supplies (such as those used in modern desktop computers) are required to have appropriate filters to minimise the adverse effects on the power supply systems.

Benefits of power quality correction

This article has provided a very brief introduction to the area of power quality in buildings. However an awareness of the issues may provide the basis for further discussions to improve systems that:

- Reduce/eliminate network utility charges related to reactive power;
- Reduced loads on power distribution systems;
- Improve the overall performance of the power system that can increase equipment longevity; and
- Provide greater stability through the reduction/elimination of harmonics.

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Further reading:

CIBSE Guide K – Electricity in buildings provides an excellent resource covering the main areas of electrical application in building services.

Power Quality Self-assessment Guide (and associated Leonardo Project Power Quality Application Guide documents) available as a free download from www.leonardo-energy.org provides detailed discussion of this area.

- Thanks to Les Norman at London South Bank University for his input to this CPD module.

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- 3 CIBSE Guide D, *Transportation systems in buildings*, CIBSE 2010.
- 4 BRE 15/10 *Specifying LED lighting*, BRE 2010.
- 5 CIBSE Guide F, *Energy efficiency in buildings*, CIBSE 2004.
- 6 Chapman, D., *Power Quality Application Guide*, European Copper Institute and Copper Development Association, 2001 (EU Leonardo Project).
- 7 Fortenbery and Koomey, *Assessment of the Impacts of Power Factor Correction in Computer Power Supplies on Commercial Building Line Losses*, California Energy Commission, 2006.
- 8 Chapman, D., *The Cost of Poor Power Quality*, European Copper Institute and Copper Development Association, 2001 (EU Leonardo Project).

Module 41

June 2012

1. Which of these is unlikely to provide a significant reactive load?

- A Incandescent lamp
- B Fluorescent lamp
- C Transformer
- D Digital equipment
- E Welding equipment

2. Looking at figure 2, what would happen to the value of the average power as the current lag increases towards 90°?

- A Stays constant
- B Rises towards a maximum
- C Goes towards zero
- D Goes negative
- E Little change in value

3. A 10kW motor has a power factor of 0.90 (lagging). What is the approximate apparent power required by the motor?

- A 1.11kVA
- B 10 kVA
- C 10 kW
- D 0.90kVA
- E 11.1kVA

4. If a 80W low energy lamp requires a reactive power of 90VAR, what is the approximate power factor?

- A 0.16
- B 0.33
- C 0.50
- D 0.66
- E 0.88

5. Which of these is least likely to be a significant direct result of improving power quality in buildings?

- A Reduce kW power costs
- B Reduce loads on distribution networks
- C Reduce potential for reactive power costs
- D Reduce potentially damaging heating in transformer equipment
- E Reduce instability in power systems

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Innovation & Expertise



Airedale launches 1MW scroll chiller

Airedale has pushed the boundaries in the application of scroll compressors with the new 460 – 930kW air cooled DeltaChill and 450 – 1010kW DeltaChill FreeCool. To accommodate the increased capacity and achieve as high an efficiency level as possible while maintaining a compact footprint, Airedale has applied micro-channel coils in each range, contributing to 38% more cooling per square metre. The DeltaChill FreeCool achieves an ESEER up to 4.8 and allows free-cooling for more than 95% of the year. A combined 182 model offers exceptional application flexibility.

● For more information call 0113 238 7817 or visit www.airedale.com

Zehnder Nova radiator specified at Olympic Village

Offering a sense of sophistication and style when entering the larger apartments and town houses of the Olympic Village, the Zehnder Nova radiator has been specified for use within the entrance hall. While underfloor heating was the preferred choice throughout the remainder of the apartment or house, unfortunately the heat loss calculated within the entrance



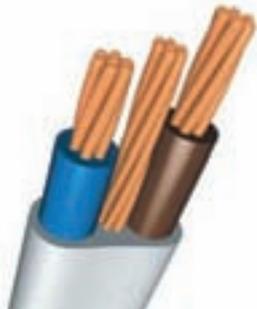
halls necessitated an additional heat output. 'The Zehnder Nova was an obvious choice for the parameters we were working within,' explains Paul Doyle, mechanical consultant at Hilson Moran, an engineering consultant.

● For more information call 01252 515151 or visit www.zehnder.co.uk

Casella to show CEL-960 vibration meter and CEL-630 sound level meters

Casella CEL will be highlighting its range of high performance industrial hygiene and occupational health and monitoring equipment at Safety & Health Expo 2012. The company's new lightweight CEL-960 Human Vibration Meter, with associated dB98 software, features remote operation mode for easier measurements and better quality data. The recently enhanced CEL-630 Sound Level Meter with innovative 'audio recording' functionality will also be on display.

● For more information call 01234 841490 or email www.casellameasurement.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 program, 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

Polypipe thermal duct conserves energy and exceeds Building Regulations



Polypipe Ventilation, manufacturer of market leading energy-saving domestic and light commercial ventilation systems, has launched Domus Thermal, a uniquely

engineered, patent pending duct insulation system for round and rectangular duct systems. Domus Thermal has been designed to comply with 2010 Building Regulations and to prevent both heat loss and the formation of condensation. Domus Thermal has been developed by Polypipe specifically to meet the recommendations of the government's 2010 *Domestic Ventilation Compliance Guide*.

● For more information call 0844 3715523 or visit www.polypipe.com/ventilation

KNX Consultants specified for super-yacht luxury and security

KNX UK association member KNX Consultants has opened up a new world to KNX intelligent building technology with entry into the market of super-yachts. On the new Pegaso 73.6-metre super motor yacht, KNX bus technology has demonstrated its versatility, flexibility and total suitability for controlling many of the key lifestyle functions that the yacht managers wanted to provide. Alex Flemming of Pegaso Marine, managers and administrators of the Pegaso fleet, was delighted with the KNX solution.

● For more information call 0845 869 5908 or visit www.knxuk.org



Multipurpose BACnet temperature controller from Titan

The BACnet enabled CCM-204 multipurpose temperature controller is designed to offer complete control flexibility for ventilation and air conditioning systems. With a vast array of inputs and outputs, the advanced application-specific controller can offer control strategies ranging from single stage heating or cooling to three-stage heating, venting and cooling. Designed and manufactured in the UK, the CCM-204 multipurpose controllers can be used stand-alone, as part of a master/slave group or part of a building management system.

● For more information call 0161 4066480 or visit www.titanproducts.com





Myson reaches for the Skye

Myson Floortec, one of Europe's leading names in underfloor heating (UFH), is reaching for the Skye after having its product installed into a holiday home on a Scottish island. Renewable energy products installer Greenheat Renewables chose Myson Floortec's underfloor heating for the 100 sq m ground floor of the new build home on the Isle of Skye – after meeting the company's UFH team at a recent trade show. Greenheat Renewables is now fitting the UFH in two homes.

● For more information call 08454023434 or visit www.myson.co.uk

WindowMaster launches new easy-to-navigate website

WindowMaster, Europe's largest provider of natural comfort and smoke ventilation solutions, has launched a fresh new website. The new website is a one-stop shop for architects, consultants, specifiers and installers, where they can find all the information they need on solutions for indoor comfort and smoke ventilation in just a few clicks of a mouse. Links to WindowMaster standard natural ventilation products, solutions and applications are presented in an easy-to-navigate style with clear explanations and illustrations.

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



Systemair adds to the Topvex Series

The new Topvex SC is a compact air handling unit with plug and play controls, duties up to 1.9m³/s. • Low energy use – EC motors, double by-pass of heat exchanger secures lowest possible internal pressure drop and reduces the need for filter changes • High efficiency counter-flow heat exchanger – no mixing of extract and supply air, automatic summer operating, cool recovering. • Integrated control system • CAV or VAV options. All units are transportable through 900 mm openings.

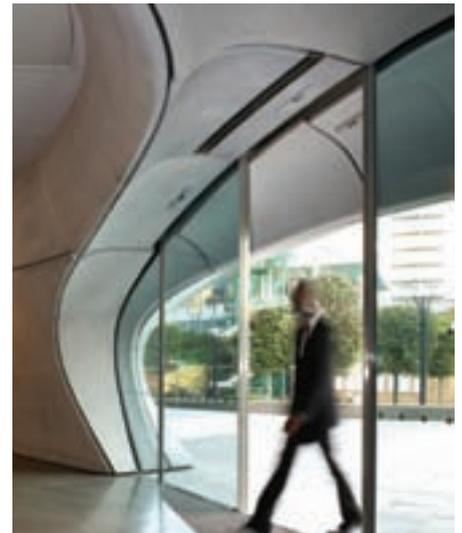
● For more information email info@systemair.co.uk



Logicool is product distributor of the year

Logicool Air Conditioning Distribution of Derbyshire has secured the prestigious Product Distributor of the Year Award at the ACR News Awards 2012, one of the air conditioning industry's premier annual events. The company, which is a VAR (value-added reseller) for Mitsubishi Electric was formed in 2008 and built on advanced technical knowledge married to a customer-focused approach. Logicool has technical staff that are experienced in all sectors of the industry with a first-hand understanding of contractor, engineer and end-user requirements.

● For more information call 01283 218277 or visit www.logicool-ac.com



Trend Controls: 'Developers failing to make buildings fit for purpose'

Despite the ongoing drive towards greater energy efficiency within buildings, Trend Controls believes that some property developers are failing to recognise the long-term value of installing a fully featured building energy management system (BEMS) at the initial construction stage. The company argues that this lack of foresight is leading to a situation where a significant number of new builds are simply not fit for purpose.

Implementing a BEMS means that energy savings of 10 to 20% can be achieved.

● For more information call 01403 211888 or email marketing@trendcontrols.com



The art of air curtains at Roca Gallery

The Roca London Gallery has been designed by Zaha Hadid Architects to complement the hallmarks of global bathroom brand Roca's identity – design, innovation, sustainability and wellbeing. Mechanical and electrical engineer Max Fordham was tasked with specifying the air curtains to fit seamlessly into the reception space and chose three 1.5m electric Windbox air curtains from JS Air Curtains. The design of the Roca London Gallery is highly stylised and the reception area is no exception.

● For more information call 01903 858656 or email sales@jsaircurtains.com

Hitachi Air Conditioning goes from strength to strength, creating a new European company

Hitachi is growing its air conditioning and heating products business in 2012 and has established a new company in Europe called Hitachi Air Conditioning Europe SAS. The new company incorporates all activities for air conditioning products, including sales, manufacture and service operations across the European market. Martin Richards, UK and Ireland manager, Air Conditioning Europe SAS, said: 'This new organisation, under one management and leadership team, will bring benefits for everyone, but especially for our partners, distributors and customers.'

● For more information call 01628 583394 or email aircon.enquiries@hitachi-eu.com



Martin Richards



MCS Solar PV test kit's special capabilities

The latest solar PV electrical installation test kit from Seaward Solar enables contractors to meet the requirements of MCS MIS 3002, quickly, thoroughly and effectively. The new MCS Solarlink Test Kit includes all the necessary test equipment and datalogging capabilities needed to perform pre-installation site surveys, and to measure the electrical safety and performance of PV systems. The kit combines the comprehensive electrical commissioning test capabilities of the new PV150 solar installation handheld tester with the advanced Solar Survey 200R multifunction PV survey meter.

● For more information call 0191 586 3511 or email sales@seaward.co.uk

John Lewis Partnership enlists the help of Weatherite for listed building

Weatherite Building Services (WBS) has fulfilled a contract to improve the heating system at Leckford Abbas Manor House Hotel. Leckford Abbas, in Hampshire, is a large manor house belonging to the John Lewis Partnership (JLP). The property has been refurbished throughout to a high standard, in line with its grade II listing, and will continue as a country house hotel for use by JLP partners. WBS improved the current heating system and also provided additional heating to suit the new layout of the hotel.

● For more information call 0121 665 2266 or email rboswell@weatherite-holdings.com



MWA to launch new data capture solution at NEMEX 2012

Centre stage on stand R29 at NEMEX 2012, which took place from 22-24 May at the NEC, Birmingham, was a new cost-effective data capture range of products from leading independent meter specialist, MWA Technology. M-Log provides a cost-effective automatic monitoring and targeting am&T solution. The device helps to save energy by identifying wastage and ensuring long-term effectiveness of other energy-saving measures. Whatever their source, whether water, gas, energy or electricity, M-Log provides valuable data.

● For more information call 0121 3277771 or visit www.mwatechnology.com



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 of 0-500 litres. Heating: LPHW/ELECTRIC. Cooling: CW/DX. Larger air volumes and bespoke units are available.

● For more information visit www.aircraftairhandling.com



SeaCity Enhanced with FP Plus

Prysmian's FP Plus enhanced cables have been installed at Southampton's SeaCity Museum, a 3,252 sq m visitor attraction that celebrates the city's historical relationship with the sea. The SeaCity Museum is expected to attract thousands of visitors every year and, as a consequence, the fire safety systems are of paramount importance. With this in mind, FP Plus enhanced cables have been used for both the fire alarm system and disabled refuge alarms throughout the attraction.

● For more information call 02380 295029 or email cables.marketing.uk@prysmian.com



IBD installs InvisibleAC at Hotel Chocolat

IBD Distribution has supplied a 20kW Invisible.AC small duct, high velocity air handling system (sdHVAC) to Hotel Chocolat's new store at Westfield Stratford, the largest shopping centre in Europe. It will help both to keep the chocolate pristine and to provide comfort for staff and visitors in this latest high ceilinged, open-fronted store. Key to the ambience of the store is an ideal in-store climate and the Invisible.AC sdHVAC system offers advantages not achievable with other types of climate control systems.

● For more information call 01202 825682 or visit sales@ibd-distribution.com



Polypipe Ventilation wins biggest ever Megaduct project

Polypipe Ventilation, manufacturer of market leading, energy-saving domestic and light commercial ventilation systems, has received its largest single order of Domus Megaduct high capacity ducting. The order is from the Ardmore Group for Genesis Housing Association's new mixed development in the Olympic Village, East London. Based at 150 High Street, Stratford's Halo is a landmark regeneration project. Providing 704 homes, the scheme includes seven blocks of between seven and 43 storeys, the tallest of which, at over 132 metres, will be one of the highest residential towers in London.

● For more information call 0844 3715523 or email vent.info@polypipe.com

Hunter SUDS system makes sense for installers

Hunter Plastics is launching the perfect complement to its extensive underground drainage range. A SUDS system, Waterloc offers installers a quick and easy underground infiltration and soakaway solution for light duty and landscaped areas that fully complies with myriad regulations and legislation. Hunter's Waterloc system provides an effective infiltration solution to deal with surface water runoff by dispersing rainfall before it can reach public sewers and watercourses, minimising the risk of flooding.

● For more information call 0208 855 9851 or email stephanie.bolton@hunterplastics.co.uk



Riello UPS launches PowerBox

Riello UPS, Europe's leading manufacturer of uninterruptible power supplies (UPS), has launched a new containerised solution, PowerBox. PowerBox provides a robust, highly resilient site-specific power solution with minimum impact on existing plant room and facilities. It has zero downtime and is easily installed with components within a stand-alone 20 ft or 40 ft container.

Containerised power solutions are available for short-term hire to allow clients to perform their own on-site tests prior to purchase, or to provide clean, resilient power for a specific event or project.

● For more information call 0800269394 or visit www.riello-ups.co.uk/ups-products/powerbox



Excellent response for Elta energy efficiency at Ecobuild

As the doors closed on Ecobuild 2012, ventilation specialists Elta Fans reported an excellent response at the show. Ecobuild, the world's biggest event for sustainable design, construction and the built environment, took place at London's ExCeL from 20-22 March. Elta Group vice chairman David Ball said: 'For us the timing of the show proved perfect as the introduction of the new European legislation on energy efficiency in the HVAC sector is less than a year away.'

● For more information call 0138427500, visit www.eltafans.com or www.eltaselect.com/ecobuild



Danfoss takes control of energy savings

Living eco is the latest programmable electronic radiator thermostat from Danfoss. With its clear digital display and simple push-button programming, it offers a cost-effective way to control energy consumption in the home, without compromising comfort. Pre-installed programmes make it easy for heating installers to set the thermostat to suit their customer's needs. Choosing the Po programme maintains a constant temperature 24 hours a day, while the P1 and P2 settings will lower the temperature at predefined periods of the day to save energy.

● For more information call 0845 1217400 or email www.danfoss-randall.co.uk

Aico Firecap fire-rated air valves combine ventilation with safety

Aico has added to its Firecap range of intumescent fire safety products in the form of fire-rated air valves. The valves are designed to allow air flow from ventilation systems, while providing a 60-minute fire barrier. When a hole is made in a ceiling to install an air valve, it compromises its fire safety rating. Aico's Firecap fire-rated air valves are manufactured with a built-in, non-toxic intumescent material that expands in the event of a fire to create an effective barrier.

● For more information call 08707584000 or visit www.aico.co.uk



Panasonic partners with British Gas on BASF eco-home to deliver heating solution

Panasonic has partnered with Cool Planet, the renewable energy design and installation arm of British Gas, to deliver an industry-leading eco heating solution for the BASF House, part of the ground-breaking Creative Energy Homes Project at the University of Nottingham. Cool Planet has retrofitted Panasonic's pioneering Aquarea air-to-water heat pump technology at this showcase home. The aim of the Creative Homes Project is to demonstrate compliance with the Code for Sustainable Homes, using low energy principles from the PassivHaus standard.

● For more information call 01344 853390 or email grahamj.evans@eu.panasonic.com



Ceravision's New Alvara High Bay cuts carbon with high efficiency plasma technology

The new Alvara High Bay luminaire – part of the new Alvara product range from Ceravision, incorporating the company's high efficiency plasma (HEP) technology – has the potential to reduce the energy consumption of high bay lighting installations by 75%. Alvara is a truly innovative product that, compared to high-intensity discharge (HID) lamps, is more efficient and delivers the lumen output (minimum 96 lm/system watt) to replace, on average, two traditional high bay fittings.

● For more information email info@ceravision.com



Continued growth creates more new jobs at SE Controls

Continued growth and success at international smoke and natural ventilation solutions specialist, SE Controls, has led the company to take on a further eight new technical and customer support staff, bringing the total number of new jobs created during the past year to 21. SE Controls' most recent appointments cover a range of roles, including business development, technical sales and key account management, as well as installation engineering and project management. The new staff are not only helping SE Controls meet growing demand for its fire safety and energy efficient ventilation solutions, but they represent a significant investment in its future, which is underlined with the appointment of its fourth trainee project leader in the past 12 months. Maj Mohammed joins Faisal Amir, Ross Cameron and Sion Wilcox, who are being mentored by SE Controls' experienced project leaders, as well as studying for a BTEC level 4 HNC Diploma in construction and the built environment through the company's in-house training and development academy.

● For more information call 01543443060 or visit www.secontrols.com



Maximum energy savings from NEW Remeha Gas 310/610 Eco Pro

The new Remeha Gas 310/610 Eco Pro, available in five to nine sections with outputs from 51 to 1060 kW, brings rapid energy savings at low capital expenditure. This versatile, flexible, eighth-generation condensing boiler offers exceptional efficiencies of 106.4% NCV at 50°C/30°C and excellent, ultra low NOx and CO2 emissions.

With its modern, compact design, the Remeha Gas 310/610 Eco Pro can fit through all standard doorways. Easily disassembled and supplied on wheels for easy manoeuvrability, it is the perfect solution for both retrofit and new build projects. With a reduced footprint and ability to be installed side-to-side, it is suitable for modular configuration

● For more information call 0118 978 3434 or visit www.remeha.co.uk



Easier rainwater harvesting

Easier on-site installation and long-term maintenance are benefits offered by the WISY Vortex Filter used by Rainharvesting Systems in its bespoke designs. Its robustness renders an external protective chamber unnecessary, making installation much simpler. The unique vertical cleaning mesh uses gravity to remove debris up to a particle size of 280 microns from the rainwater, preventing blockage and resulting in crystal-clear stored water. Would the building contractors and the end-users thank you for choosing Rainharvesting Systems?

● For more information call ring 01452 772000 or visit www.rain.uk.net



Vent-Axia offers complete air handling unit solutions

Vent-Axia, a leader in air movement solutions, now offers customers a comprehensive range of air handling units (AHUs), providing a one-stop shop for ventilation. Following the introduction of Vent-Axia's high efficiency range of eViking Air Handling units, the company's expanded product portfolio now offers outputs from 1m³/s up to 16m³/s, thus providing solutions for a wide range of applications from residential to large commercial projects.

Offering flexible build solutions, Vent-Axia's

Eurovent certified range of AHUs allows an extensive variety of modular configurations.

● For more information call 0844 856 0590 or visit www.vent-axia.com



Hager launches prefabricated electrical distribution system

Hager has launched a fully pluggable, electrical distribution system, from the distribution board to luminaires, which significantly reduces installation time and ensures full compliance with the wiring regulations.

Klik.system consists of a number of distribution products linked by prefabricated wiring sections, which simply plug together. To ensure that the final installation complies with all of the relevant standards and regulations, Hager has also developed a bespoke software package. This produces a fully calculated design, which includes drawings, electrical calculations, test information and delivery schedules.

● For more information call 0870 607 6677 or email info@hager.co.uk

Nuair celebrates success of CPS training service

Nuair is celebrating the successful delivery of its BPEC-approved training course to installers across the UK. Delivered from its in-house training centre in south Wales, which has been recognised as a registered training facility, the service forms part of Nuair's commitment to its installers, engineers and customers. Nuair is the UK market leader in the design and manufacture of energy-efficient domestic ventilation systems. The accredited installer programme – Training and assessment in domestic ventilation systems – offers participants interactive, practical training.

● For more information call 02920 858463 or visit www.nuair.co.uk



Next Controls launches fully integrated Energy Management Services



Next Controls is to launch a fully integrated, web-based energy management service; to be showcased at Sustainability Live – NEMEX 2012. Recognising the need for a fully integrated energy management solution, on a non-proprietary technology platform that delivers quick ROI, Next Energy

Management is set to become the only truly end-to-end solution, from consultancy, design and delivery to web-based dashboards. Focusing on rapid returns, both carbon and financial, Next Energy Management Systems have been designed to optimise the performance of existing plant and installations.

● For more information call 01252 406398 or email press@nextenergymanagement.co.uk

High-quality humidification for the Hayward Gallery, South Bank Centre

HygroMatik's humidifiers were specified in the prestigious Hayward Gallery, situated by the River Thames at London's Southbank Centre. HygroMatik's HyLine HY45 and HY90, with an additional MiniSteam MS05C – all with SuperFlush – have been installed to service the entire gallery, which was built in 1968. Specifying the correct and optimum humidity is of paramount importance to an art gallery. Paintings, sculptures and other works of art are hygroscopic, meaning they will react to small changes in humidity levels.

● For more information call 02380 443127 or visit www.hygroamatik.co.uk



Invicta Clean Up with BoilerMagXT

Following the launch of the BoilerMagXT magnetic filter system, Eclipse Magnetics has teamed up with Invicta Water Treatment to provide solutions to some high-profile locations. Invicta Water Treatment is a leading full-service provider; it recently worked with QMH UK to improve the efficiency and performance on hotel chilled-water systems. QMH operates a number of Holiday Inn, Crowne Plaza and Best Western Hotels. The first location was the Crowne Plaza in Glasgow, and the second was the Holiday Inn at Stratford-upon-Avon.

● For more information visit www.boilermagxt.com or email info@eclipsemagnetics.com

PRODUCTS & SERVICES

Telephone: 020 7880 6206 Email: Darren.Hale@redactive.co.uk

Grundfos is admitted to The Royal London

The Royal London Hospital, which can trace its history back to 1740, has recently undergone an extensive redevelopment costing £650m that has seen it transformed into a state-of-the-art medical centre delivering world-class facilities. Grundfos Pumps worked closely with Skanska to ensure that the complex pump solution would meet the very highest standards. Grundfos provided pumps for all the heating, chilling, HWS and chilled water, as well as the pressurisation units and packaged booster sets, which are such a vital part of the hospital's infrastructure.

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



New Vitocrossal 300 brings unique condensing technology

One of the largest condensing boilers on the market offers high users wet central heating reduced costs and improved efficiency, thanks to low water resistance and stainless steel surfaces. Viessmann has launched a new model to its line of Vitocrossal 300 gas-condensing commercial boilers, for heat outputs ranging from 787 to 1400 kW. The Vitocrossal 300 is perfect for systems with large water volumes, such as district heating networks, schools and hospitals and other buildings with large radiator coverage or underfloor heating systems.

● For more information call 01952 675000 or email info-uk@viessmann.com



Fan coils with automatic power factor correction

Advanced Air's new range of fan coil units include electronically commutated motors (ECM), which can be selected to give a leading current characteristic. Most buildings have an inductive or lagging current characteristic. The ECM's leading current acts in opposition to the lagging current, thereby automatically providing a level of power factor correction. This has an impact on energy usage and charges for the electricity consumed in commercial buildings. It can also make a contribution to reducing the costs of power factor correction equipment.



● For more information call 01842 855586 or email swyman@advancedair.co.uk or visit www.advancedair.co.uk

DIRECTORY Your guide to building services suppliers

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CLIVET
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E: info@clivet-uk.co.uk
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W: www.versatemp.co.uk

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See: Taking Control - CIBSE Journal Dec 2011
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Building Services Design Engineer (2 posts)

Loughton, Essex

Higgins Group PLC is at the forefront of modern procurement and construction methods. The company is a market leader in urban regeneration, social housing and education with a reputation for delivering a quality service for our clients.

We intend to deliver a proportion of our building services design 'in-house'. We are therefore seeking to fill two vacancies for a professionally qualified mechanical design engineer and a professionally qualified electrical design engineer. The posts will be head office based in Loughton, Essex reporting to a Building Services Design Manager. The successful candidates will have worked in a design consultancy role and have had experience in our work sectors of housing and education.

The successful applicants will need to be strong team players, have demonstrable design experience, have good communication skills and will be expected to positively interact with our staff, clients, other consultants and our supply chain.

If you have the relevant experience and ability to make a measurable contribution to Higgins' growing success, we will provide a good remuneration package in addition to the opportunity to progress your career.

Please apply with a full CV and current salary details to: Keith Briggs, Pre-construction Director, Higgins Construction PLC One Langston Road Loughton Essex, IG10 3SD

Email: keith.briggs@higginsconstruction.co.uk

NO AGENCIES PLEASE



An equal opportunities employer.

We have the following positions available working full time, 37 hours per week based at Sandwell Council House, Freeth Street, Oldbury B69 3DE.

Senior Mechanical Engineer

Band H, SCP 44-49, £37,206 - £41,616 **Ref: ES3126**

Seeking Mechanical Engineering talent for a vital role in protecting Sandwell's assets. Responsibilities include assisting in team leadership, feasibility design work, cyclical, reactive and programmed maintenance, reporting to the Principal Mechanical Engineer. This challenging role provides an opportunity to join our in-house multi-disciplinary teams on working on a variety of the Council's building assets.

Mechanical Engineer

Band G, SCP 38-43, £31,754 - £36,313 **Ref: ES3125**

Are you up to the challenge of Mechanical Engineering design, programming and costing? We need a proactive Engineer keen to deliver an efficient mechanical repair and maintenance service for Sandwell. Responsibilities also include mechanical services based building surveys, condition reports and property maintenance, reporting to the Senior Engineer. You will join an experienced team in a multi-disciplinary environment.

Senior Energy Officer

Band G, SCP 38-43, £31,754 - £36,313 **Ref: ES3127**

As leaders in sustainable design, Sandwell seeks a Senior Energy Officer to safeguard the Council's interests in respect of energy matters. Your role will involve the carrying out of works and services related to energy conservation and management in support of the Council's Carbon Management Plan. Responsibilities include tendering, managing works on site, commissioning plant and settling final accounts.

Closing date for the above roles: 15 June 2012.

You can get more information about these and all our latest vacancies, or apply online, at www.sandwell.gov.uk/jobs



We are committed to equality.



Specialists in Building Services Recruitment

Principal Mechanical Design Engineer | Portsmouth | to £50K | ref: 2680

A privately owned M&E consultancy is looking for an experienced mechanical design engineer to join their team. Candidates will have experience leading projects, representing the company at meetings and dealing with projects from initial concept through to completion. Excellent opportunity!

Security Cleared Candidates | Berkshire | £HIGH! | ref: 1198

We are looking for Building Services engineers and Cad Technicians for a number of large government related projects. You will currently hold, or have held, SC or DV clearance in the past 12 months and have extensive experience within your specialist area. Permanent and long term contract opportunities available.

Resident Engineers | London | £NEG! | ref: 2424

Our client is looking for one mechanically biased and one electrically biased resident engineer for a 2 year contract based in central London. This is an excellent opportunity to work on one of London's largest developments. Previous major project experience is essential.

Mechanical & Electrical Associate | Southampton | to £55K++ | ref: 2279

A reputable M&E consultancy is looking for two Chartered engineers with experience leading teams and projects, who have ambitions to progress to director level within 2 years. Excellent opportunity!

Mechanical Associate Director | London | to £65K+ | ref: 2446

We are looking for a qualified mechanical design engineer to lead a major client account within a well-known M&E consultancy. Ideal candidates will have previous retail experience and a proven track record managing projects and teams to deliver cost effective and sustainable solutions.

Senior Electrical Design Engineer | London | to £55K | ref: 2470

An international M&E consultancy involved with data centres and high technology projects are currently looking for a senior electrical design engineer. Ideal candidates will be Chartered, or working towards, and have significant experience within the mission critical sector.

t: 02392 603030

e: cv@blueprintrecruit.com www.blueprintrecruit.com

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M&E Design Engineers

Manila, Philippines, £35k Tax Free + Accommodation

Our client is an international consulting engineering company with projects in Europe, Middle East, Asia, and the USA. They provide multi-disciplinary outsourced engineering design services and 2D/3D/BIM drawing/modeling production to a number of the leading international consultants. They are involved in some of the most prestigious projects worldwide across a variety of sectors currently including a bank tower in Saudi Arabia, Dubai Metro in the UAE, and a 500,000m² residential project in the Philippines. Their Manila office requires Mechanical and Electrical design engineers capable of managing teams of between 10 and 15 production engineers to carry out design work in accordance with the client's brief, and liaise direct with client's engineer. Ideally you will be degree qualified with 7 years or more design experience in an engineering consultancy environment. The position is available on both married or single status and includes a conveniently located fully furnished apartment and medical insurance.

Manila is a popular choice for ex pats and is one of the most inexpensive cities in the world. Here you can find friendly and hospitable local people, an excellent climate and cuisine.

BAR854/PA

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

Thinking of your future

CBRE is working in partnership with Talent Motion. As the world's leading commercial real estate advisor, we advise on all aspects of commercial property to help our clients realise the true value of their real estate. Operating within Building Consultancy, our Engineering Services Group provides expert guidance on energy use, building engineering system performance and sustainability. Our core business areas are Building Services Design, Maintenance Strategies, Due Diligence, Vertical Transportation Consultancy, Sustainability, Energy Buying and Plant Replacement Projects.

CBRE is a growing and visionary organisation, comprised of the best and brightest professionals. People are the foundation upon which our success is built.

We understand that a career is about more than just hard work. It's about achievement, rewards, job satisfaction and work/life balance. People are our most precious asset. We owe our success to their talent and commitment to delivering superlative service. So we do all that we can to attract the best – and keep them.

We have the following requirements for commercially aware engineering professionals, across our UK Engineering Services Group:

SENIOR ENGINEER / AD DESIGNATE (ELEC), MANCHESTER

We are looking to recruit a commercially aware, client facing engineer that has either design or technical asset management skills. We require an electrical discipline bias, although we would welcome applicants with a balanced knowledge of both M&E services. This is an excellent opportunity to take ownership of your own client base and the nature of our work gives you the opportunity for travel within the EMEA region.

ELECTRICAL ENGINEER (STRUCTURED CABLING & IT), LONDON

Following the successful start up of the Structured Cabling & IT division 12 months ago, we are seeking to appoint a qualified Engineer to support the unit leader in the design and project management of structured cabling systems, data networks, infrastructure and physical security, full client liaison, project meetings, management and tender of RFP's and the management of external consultants.

ENERGY ENGINEER (EPC / BREEAM), LONDON

Working in a specialist team of 5, you will be involved in delivering Energy Performance Certificates (EPC), BREEAM Assessments, Building Energy Audits, Dynamic Thermal Simulation (IES), Energy Reduction and Energy Metering Strategies. You will need to be a qualified EPC/ Low Carbon Energy Assessor and BREEAM Offices Assessor and have a good level of commercial awareness. Opportunities exist on either long term contract or permanent employment.

For a confidential discussion, please call Dominic Evans of Talent Motion on 0207 614 3431. Alternatively, please forward your resume to hello@talentmotion.com

CBRE is an equal opportunities employer

CBRE

www.cbre.co.uk

M&E DESIGN ENGINEERS, LONDON

Operating from a superb office space in the heart of the City, you will be supporting Senior Design Engineers within the established Engineering Consultancy team. You will be involved in brief definitions, due diligence & feasibility studies, outline proposals, scheme designs and development monitoring across a 'blue chip' client portfolio in the UK and mainland Europe. Excellent communication and report writing skills are essential.

ENGINEER / SENIOR ENGINEER (ELEC), BIRMINGHAM

We are looking to recruit a commercially aware, client facing electrical engineer that has either design or technical asset management skills. You will be responsible for maintenance strategies, due diligence & plant replacement projects. This is an excellent opportunity to take ownership of your own client base and the nature of our work gives you the opportunity for travel within the EMEA region.

M&E ASSET ENGINEERS, LONDON

Operating from a superb office space in the heart of the City, you will be assisting Senior Engineers in the established Asset Engineering team. You will be responsible for maintenance strategies, due diligence and plant replacement projects across an impressive 'blue chip' property portfolio in the UK and mainland Europe. Excellent report writing skills and experience in either M&E design or maintenance management is essential.



www.talentmotion.com

Central Bedfordshire Council

ASSETS TEAM

● PLANNED PREVENTATIVE MAINTENANCE ENGINEER

£28,063 - £29,410 pa (Quote ref: 2961)

Full-time, 37 hours per week

As a key member of the Council's Assets Division, you will take on a wide and varied workload including the Planned Preventative Maintenance of all Building Engineering Services for CBC's building portfolio, whilst ensuring compliance with all statutory requirements and keeping auditable records.

This will require you to be responsible for many tasks simultaneously, preparing or assisting in the preparation of specification documents and monitoring contractors' performance against set specifications. You will also be required to support and provide technical advice to colleagues and clients.

To apply you will have at least a minimum of BTEC/ONC Building Services Engineering qualification and a sound working knowledge of Microsoft office.

A working knowledge and recent experience of ACop L8, 17th Edition Wiring Regulations and Gas Safety (Installation and Use) Regulations is also required.

For an informal discussion please contact Rob Windrum, Temporary M&E Maintenance Engineer on 0300 300 75980 or Deborah Hoy, Head of Service Capital Projects on 0300 300 75974.

To apply, please visit www.centralbedfordshire.gov.uk/jobs

Closing date: 15 June 2012.

Interview date: 5 July 2012.

Want to find out more about jobs and careers within Central Bedfordshire Council?

Follow us on Twitter @CBCCouncil_jobs or visit our website

Posts working with either children and/or vulnerable adults will be subject to the disclosure of criminal records.

Central Bedfordshire



Central Bedfordshire Council is committed to equal opportunities.

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in between?



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An award winning International multi-disciplinary consultancy who have worked on some of the most high profile and prestigious projects are currently recruiting for an associate mechanical engineer. Successful applicants will be a chartered engineer or working towards CEng status and will have worked as a mechanical associate or principal mechanical design engineer, leading a team of building services engineers on commercial or high-spec residential projects, the ideal candidate will possess advanced design skills along with strong interpersonal and client interaction experience.

BAR693/JA

Contract Mechanical and Electrical
Building Services Engineers
Dorset, £21 - £23 per hour

As one of the leading building services consultancies in the UK, our client has an impressive portfolio of projects in the UK and worldwide delivering high quality and innovative MEP engineering solutions. Established for over 150 years and winner of numerous awards, the company have a requirement to expand its mechanical and electrical team in the South West. Projects include data centres, commercial, defence, leisure and culture schemes. Ideal candidates will be degree qualified and working towards CEng status.

BAR780/JA

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

Thinking of your future

Events & Training

NATIONAL EVENTS AND CONFERENCES

Decommissioning – the beginning of the end...?
7 June, Aberdeen

A variety of young professionals explain their role in the complex work of contract management and supply chain, followed by debate.
eiypn.ahi@gmail.com

Decarbonising heat: evolution or revolution?
12 June, London

Breakfast briefing discussing the needs of the energy user, as well as key features and dependencies of the options available to decarbonise heat.
vnaidu@energyinst.org

POWER-GEN Europe 2012
12-14 June, Cologne

How to integrate the power sector.
www.powergeneurope.com

ThinkFM
18 June, London

Industry leaders and thinkers talk about facilities management.
www.thinkfm.com

The cost-saving energy efficiencies conference
19 June, London

A one-day energy efficiency conference and networking event.
www.theenergyconference.com

Getting ready for renewable energy – green new deal – 15th European conference
22 June, Edinburgh

Putting into practice the aims of the Green New Deal, it will explore opportunities for partnerships throughout Europe between businesses and institutions within the expanding field of renewable energy.
www.EUenergycentre.org

CHP/DH delivers – especially in a credit crunch
28 June, London

There is a huge interest in CHP and district heating as a result of the current credit crunch.
www.cibsetraining.co.uk/conference

Government construction summit 2012
2 July, London

A platform for the government to clarify and communicate their strategic plans for the construction market, outline future investment and explore how the government and construction industry can work better together.
www.governmentconstructionsummit.co.uk

The Energy Event
11-12 September, Birmingham

Headline speakers include Alistair Campbell, Prof Brian Cox, Daisy McAndrew and Philip Lowe, director general for energy at the European Commission.
www.theenergyevent.com/PR

Second symposium on lift and escalator technologies
27 September, Northampton

This symposium will provide a detailed, academic study of engineering and related management issues, for people employed in lift-making and allied industries.
www.liftsymposium.org

Building services – the CIBSE conference and exhibition
10-11 October, London

Bringing together the entire building services supply chain to debate the challenges, identify the most successful business strategies, and forge and renew relationships.
www.buildingservicesevent.com

CIBSE GROUPS AND REGIONS

For more information visit www.cibse.org/events

CIBSE North West region annual dinner
07 June, location TBC

Details to be announced.
j.massey@tace.co.uk

CIBSE Peninsular region summer social
12 June, Plymouth

An evening cruise from Plymouth harbour, with a buffet and entertainment.
millham.orchard@tiscali.co.uk

London city walk
19 June, London

Organised by the Society of Façade Engineering. Refreshments at 4:30pm for 5pm start.
sfe@cibse.org

Developing membership meeting
21 June, Bristol

South West region event: CIBSE representative to provide information and guidance to those interested in joining the Institution or upgrading their membership.
millham.orchard@tiscali.co.uk

CIBSE South West region summer social
28 June, Bristol

Details to be announced.
millham.orchard@tiscali.co.uk

Building simulation and optimisation
10-11 September, Loughborough

The challenges in applying building information modelling to the design of buildings.
p.j.allen@lboro.ac.uk



CPD TRAINING

Visit www.cibsetraining.co.uk or call the events team on 020 8772 3672

Introduction to energy efficiency
1 June, London

Fans for a greener future – the obligations of specifiers, manufacturers and users
6 June, London

Electrical services explained (three days)
6-8 June, Bristol

New online module: design of air conditioning systems



The CIBSE 'Design of air conditioning systems' module has been developed as an introduction for building services engineers/project managers with little or no air conditioning design experience.

It aims to introduce the design of air-conditioning systems, a process by which air, as a space, is modified to make it comfortable for the occupants.

The CIBSE online learning system is a series of training modules aimed at bringing practical engineering based skills to you. The training covers a range of essential skills and practical topics presented in an interactive, flexible format, making it easy to learn and refresh your skills.

For more information visit www.cibsetraining.co.uk/online-learning

Practical controls for HVAC systems
7 June, London

Fire sprinkler systems: design to BS EN 12845
7 June, London

Mechanical services explained (three days)
11-13 June, London

Preparing FM and maintenance contracts
12 June, London

Overview of current fire legislation and guidance
13 June, London

Best practice in energy management: ISO50001
13 June, London

Electricity at work regulations explained
14 June, London

Low carbon buildings and energy infrastructure for local authorities
14 June, London

Electrical Services Explained (three days)
19-21 June, London

Understanding and application of psychrometric charts
19 June, London

AC lodgement update
19 June, Manchester

Energy performance certificate training
19 June, London

Smart metering
20 June, London

Building drainage explained
21 June, London

Air conditioning inspection for buildings
22 June, London

Introduction to facilities management
27 June, London

Energy strategy reports
28 June, London

Mechanical services explained (three days)
2 July, Loughborough

Electrical services explained (three days)
3 July, Manchester

Display energy certificate training
4 July, London

The Carbon Reduction Commitment (CRC)
10 July, London

Sergei Khakimullin / Shutterstock.com

Upcoming CPD courses from the Mid-Career College, CIBSE

11-13 June 12 – Mechanical Services Explained (3 days) – London

This course provides a background and an understanding of the different systems widely used to service buildings. It gives delegates a better appreciation of the many issues associated with design, operation and maintenance of mechanical services.

13 June 2012 – Best Practice in Energy Management: ISO50001 – London

International Standard 50001 provides organisations with management strategies to increase energy efficiency, reduce costs and improve energy performance. The standard is intended to provide organisations with a recognised framework for integrating energy performance into their management practices.

19-21 June 2012 – Electrical Services Explained (3 days) – London

This three day course will give you a grounding in electrical services and a better appreciation of many of the issues associated with design, installation and maintenance of electrical systems.

For a full list of upcoming MCC training courses or for more information visit www.cibsetraining.co.uk/mcc or call 020 8772 3660



Society of Public Health Engineers (SoPHE) in association with WaterAid

Young Engineers Award 2012



The Challenge

Develop an innovative communal water delivery strategy to the problem of supplying water to those that cannot afford a water connection. Participants should pay special attention to the technical and financial sustainability of their proposed solution.

Submissions

Demonstrate your idea on one A1 poster. Please refer to the SoPHE website for more information.

Entrants

Teams of up to 3 people aged 18-35



The Award

An in-country trip to verify the applicability of the design **and an iPad**

in association with
WaterAid

www.cibse.org/sophe



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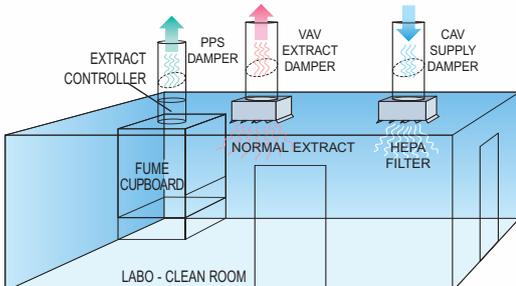


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A complete turn-key system to control room pressure to +/-1Pa. Fume cupboard face velocity to 0.5m/s at high speed and provide constant air changes into the labo - clean room.



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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

