

CIBSE

JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

September 2009

Learning curve

Tackling performance
gaps at new academy

SPECIAL REPORT
SOCIAL HOUSING
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CIBSE Journal is written and produced by Cambridge Publishers Ltd. Tel: 01223 477411. www.cpl.biz 275 Newmarket Road, Cambridge CB5 8JE.

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

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

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©CIBSE Services Ltd. ISSN 1759-846X

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If you are not a CIBSE member but would like to receive CIBSE Journal, subscribe now! Costs are £30 (UK) and £100 (international). For subscription enquiries, and any change of address information, please contact:

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Individual copies are also available at a cost of £7 per copy plus postage.

Cover photo: Courtesy of BDP



ABC audited circulation: 19,851
February to April 2009

From the editor



Overactive policing

I wouldn't claim to be an expert on passive housing, but I know a genuine controversy when I see one. Indeed, one of the most striking sentences in this issue of the *Journal* comes from an architect. Howard Liddell of Gaia Architects writes that his office was "showered with emails ... from what I can only refer to as the PassivPolice" (Letters, page 16).

The emailers had responded to an article in the July issue that had profiled Gaia's Acharacle primary school project in Scotland. The correspondents in question appear to be complaining that the school certainly does not fully meet official PassivHaus standards; and that, anyway, it would need a certificate from the PassivHaus institute to be able to make this claim.

Granted, the *Journal*, in its headlining of the story, was strictly speaking inaccurate in referring to the project as being a PassivHaus one. However, there is a danger that sticklers for accurate labelling may become myopic when it comes to passive housing success stories. Common sense suggests that a project that in some ways exceeds some official PassivHaus standards while, for all the right reasons, falls below others, should be lauded as passive (and near-as-dammit PassivHaus).

What the Acharacle case study shows us is that one size does not necessarily fit all. The overall achievement of a project is what's important – more so than the individual parts or what particular certification regime it may fit. By the same token, much argument rages

in the profession around mechanical versus natural ventilation. But, as the debate on this topic at this year's CIBSE national conference suggested to me, different approaches will suit different needs and environments. We need to mix and match, and be flexible in our thinking.

I'm sure I'm opening a can of worms in making this argument. The PassivPolice might even come after me. Hopefully an open and healthy debate about which passive solutions may or may not work is no bad thing. And one of the best ways of generating this is exactly the kind of detailed case study that is

exemplified by the Acharacle story. So let us know what project you're working on, or have completed, or are in the process of evaluating – whether you're an architect, buildings services engineer or in any other part of the industry.

Another contribution from an architect in this issue will, hopefully, also prompt further debate. Greg Slater calls on his fellow professionals to

help push forward the retrofitting of existing properties to cut carbon. Our special report on social housing, starting on page 33, offers some further valuable insights on this theme.

We'd be very interested to hear what other architects feel about this and other key ways of meeting sustainability objectives. And, as he's clearly now an honorary member of that profession, any contributions from Prince Charles would be more than welcome.

Bob Cervi, Editor
bcervi@cibsejournal.com

There is a danger that sticklers for accurate labelling may become myopic when it comes to passive housing.



Energy group threatens to take legal action over 'omission' in Part L 2010

An energy group has threatened the government with legal action for abuse of power if ministers refuse to consult on the question of consequential improvements (CI) in the planned revisions to the Building Regulations.

The Association for the Conservation of Energy (ACE) has written to two government departments asking for CI to be reinstated into the consultation on Part L 2010 of the regulations, or for a separate consultation to be held.

ACE says it has been advised by lawyers that it has a "good arguable case" for taking the government to court for abuse of power after it broke its promises to consult on CI.

A consultation on CI was first pledged earlier this year in DECC's Heat and Energy Saving Strategy, and it was widely expected to appear in DCLG's consultation on Part L 2010, but was left out of the final

document. Instituting CI would mean that all homeowners who planned to carry out substantial refurbishments to their properties would be required to make energy efficient improvements to other parts of their buildings too. Currently only properties larger than 1,000 sq m are subject to the regulation.

In the letter, Andrew Warren, director of ACE, says: "We were both surprised and shocked to see that the issue of 'consequential improvements' had been removed from the issues officially covered by the consultation. This is despite repeated promises being given that it would be included.

"I am informed that this issue was in the draft circulated within Whitehall, and approved by your fellow Secretaries of State, until the very last minute when it was removed by your Minister of State."

Warren told the *Journal* that the



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failure of DCLG to consult on the matter was "quite extraordinary".

ACE has also requested to see the original economic impact assessment for Part L 2010 under the Freedom of Information Act after statements by the government said the decision on CI was on grounds of cost-effectiveness.

A DCLG spokesman said: "We are

currently considering ACE's letter, however we remain committed to zero carbon new homes and to a range of policies for improving the energy efficiency of existing buildings.

"We are continuing to consider the full range of options including regulation and will set out our approach later."

Construction workloads continue to show fall

A construction market survey has found that workloads across the sector have continued to fall except in the non-housing public sector.

The report by the Royal Institution of Chartered Surveyors revealed that construction workloads remained in negative territory for the fifth consecutive quarter.

Twenty-six per cent more

surveyors reported a fall in overall workloads, up from a net balance of minus 45 in the first quarter.

The RICS *construction market survey* also found, however, that workloads in non-housing public sector construction reached their most positive level since the fourth quarter of 2007, as the increases in state spending started to filter

through into new projects in education and other areas.

The private housing sector was also more positive than in recent months, seeing a significant reduction in falling workloads.

In the final quarter of last year, 66 per cent more surveyors were reporting a fall in workloads. This figure lessened to 49 per cent in the

first three months of 2009, and 28 per cent in the second quarter.

The worst hit areas were the private commercial sector and the private industrial sector, which recorded negative net balances of 41 per cent and 39 per cent respectively.

It is anticipated, however, that more redundancies will be announced this year.



BREEAM 'promotes' EIB building

The European Investment Bank's new East building has had its green credentials upgraded following a post-construction assessment in 2009. Environmental building assessors BREEAM (BRE Environmental Assessment Method) originally gave the wave-shaped building, designed by Ingenhoven Architekten, a "Very Good" rating because of its design, but it has now been ranked "Excellent". The building has a surface area of 72,500 sq m spread over 10 stories, and an 11,000 sq m doubled layer glass façade.

Sign up to 100 Hours of carbon cutting

CIBSE's fourth annual 100 Hours of Carbon Clean-Up campaign will officially launch on 3 September at Whitechapel Gallery, London.

It aims to bring energy saving measures into the workplace and to engage employees in reducing the amount of carbon emitted by their buildings. All participants have to do is commit to 100 hours of cutting carbon in their workplace.

During the launch speakers will include Tom Whitehouse, chief executive of Carbon International, and Andrew Stanton, head of sustainable buildings at TfL (Transport for London).

Organisations of any size and budget can sign up and take part in carbon reduction activities to try to make energy efficiency second nature.

For the past three years hundreds of UK organisations, including the Natural History Museum, Cancer Research UK and BBC Wales, have taken part.

Previous participant Simon Grinter, head of facilities' services at the Greater London Authority, said: "Our home is an efficient iconic building, yet we were able to improve our DEC rating and moved from an 'E' to a 'D' in our recent assessment."

www.100hours.co.uk

EU revamp of building services directive comes under fire

CIBSE has questioned plans by the European Commission to seek changes to a key directive on cutting emissions from buildings.

The Commission wants to extend the scope of the Energy Performance of Buildings Directive (EPBD) and has outlined its proposals to "recast" the legislation.

The Department for Communities and Local Government (DCLG) has now issued a consultation document on the proposals in which it has questioned some of them.

Hywel Davies, CIBSE's technical director, agreed with the government's decision to request further consideration of the proposals – in particular

the proposed new calculation methodology which seeks to address both energy performance and cost.

But he added: "In short the Commission is being far too optimistic about this combined methodology, attempting to solve problems that have been around for two decades or more in two years."

Davies also questioned whether the Commission needed to impose common principles for the identification and definition of zero carbon, which is another proposal that DCLG is requesting be considered further.

He described the Commission's proposal to set targets to increase the number of low or near-zero

carbon buildings as nothing more than "new building myopia".

He said: "We need to focus on reducing the impact of the existing stock, not be navel gazing about the low-carbon new stock."

There are 26 proposals listed in total in the consultation document issued by DCLG, with the department seeking industry wide views on half of these – although it has pledged to support about 16 of the proposals.

There are three key Commission intentions identified as requiring "further consideration" by DCLG because the department believes the costs of implementing these may outweigh the benefits.

News Analysis, page 14

Sector optimism rising, says ACE

An association representing the business interests of building services firms is expected to reveal cautious optimism for the sector in its latest report.

Due to be released this month, the Association for Consultancy and Engineering's annual *State of Business* report indicates that while the current economic climate is challenging, there are still opportunities for growth in the consultancy and engineering sector.

The report has been compiled using answers from an extensive

sample of members, focusing on five main areas: the economic picture; UK sector activity; the international marketplace; business trends; and the political environment.

Chief executive Nelson Ogunshakin said that although many member firms had found the last 12 months tough going, the situation was not all doom and gloom.

"Considering this report has been produced against a background of economic stress, the results

could have been far worse," he said. "We're not trying to pull the wool over anyone's eyes – the past year has been devastating for some companies and that is an unpleasant but unavoidable truth."

This year's full report is expected to show the effects on ACE member firms of a challenging 12 months for the consultancy and engineering sector, with workloads and fee levels coming under heavy pressure, while competition for each tender has also increased.

www.acenet.co.uk

Project seeks to revitalise seaside town

London-based architects CZWG have designed a £50m development to help revitalise a key part of Bournemouth's town centre. The scheme includes a 173 bedroom hotel, 120 homes and 1,500 sq m of office space. If the development is approved by Bournemouth Borough Council's planning committee in October, five new buildings will be sited around an existing multi-storey car park and shopping arcade.



News in brief

Building Schools for the Future refurbishes under fire

Britain's Building Schools for the Future programme came under fire after the Liberal Democrats revealed that, while more than 40 schools were completed under BSF in 2008, nine were for computer installations only. The details came in a parliamentary answer by Schools Minister Vernon Coaker to the LibDems. A spokesman for the Department of Children, Schools and Families, said: "The vast majority of BSF schools are complete new builds, rebuilds or major refurbishments – we have been clear from day one that in addition, we will be refurbishing recently rebuilt schools with ICT."

Turnover increases 6%

Turnover has increased by 6 per cent in UK, Europe and Middle East operations at engineering consultant Davis Langdon. Senior partner Rob Smith revealed that turnover from the Gulf had more than doubled, from £13.2m to £31m, with Langdon planning to strengthen its overseas offices over the next three years.

Three new deals for firm

Southampton engineering consultancy Henderson Green has won three new projects in the education sector. It will be modernising the boarding houses at Winchester College, and designing and managing a two-year programme of electrical replacement work at St Anne's Catholic School. Its third contract, for Southampton Solent University's Warsash Maritime Academy, involves moving its Manned Model Centre to Timsbury Lakes near Romsey.

Go online for contacts

A business group is advising companies to go online to win public sector contracts. The advice from the Forum of Private Business comes after the government decided to scrap the £180 annual charge for using its supply2.gov.uk portal. The Glover review of public procurement recommended the fee be scrapped last year.

News in brief

Plan for research hub

A new hub for environmental research and knowledge is to be designed by building services engineers and architect, BDP. Once constructed, the 3,000 sq m research institute for the University of Exeter, in Falmouth, will research clean technologies, the natural environment and systematic socio-economics.

Davis and DEGW merge

Property and construction consultancy Davis Langdon has announced it is to merge with space planning consultants DEGW. According to Davis Langdon, the move will enhance its international services. DEGW has offices in the UK, mainland Europe, Asia, Australia and North America.

Build up your skills

Built environment professionals who are unemployed, expecting to be made redundant or on reduced working hours can reskill on the University of Westminster's Build Up programme. Free places are available between now and September 2010. www.wmin.ac.uk

£51m for green technologies

Interest-free loans worth more than £51m are being made available to public sector organisations to install energy efficient technologies. The project, funded by the government and the Carbon Trust, could help public sector bodies, such as hospitals, leisure centres and local authorities, save around £14 million per year in energy bills. Around 80 different energy efficient technologies are available.

NG Bailey disclosure move

Engineering consultancy NG Bailey has agreed to publicly disclose its economic, environmental and social performance annually. The scheme, called the Global Reporting Initiative, provides a framework for making public an organisation's sustainability progress.



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A large number of opposed wind farms are approved on appeal, says the report

England misses target for renewable electricity

■ England is likely to hit only half its renewable electricity generation targets by 2010, according to a report by a wind energy trade association.

The British Wind Energy Association (BWEA) found that of the eight regions across England, on average only half will reach their voluntary 10 per cent renewable electricity generation target by 2010.

Some regions, such as the South West, will fail to reach even a third.

The report, *England's Regional Renewable Energy Targets: Progress Report*, shows that overall the UK target will only be met because

both Scotland and Northern Ireland are set to outstrip their own targets.

A slow and ineffective local planning system is blamed for hampering efforts in England and Wales, with wind farm planning applications taking an average of 14 months. Statutory guidelines state they should take 16 weeks.

The report also shows that around a half of wind farm applications taken to appeal are then approved, raising doubts about the ability of local planning authorities to deliver the nation's renewables programme.

According to the report, there is enough renewable generating

capacity approved, meaning the UK's 10 per cent figure will eventually be met, albeit with a significant delay.

Maria McCaffery, BWEA chief executive, said: "If we want to use 2010 as a dry run for [the EU's binding] 2020 [target], timeliness and political initiative would be the two key lessons we should implement.

"A clear schedule of implementation backed by central government, with a system of checks and balances as we approach 2020, will be crucial if we want to join the renewable energy revolution, and not be laggards in Europe." www.bwea.com

BRE tackles code certification delays

The Buildings Research Establishment (BRE) has boosted its staff and their training in order to combat delays in issuing certificates under the Code for Sustainable Homes.

Talks have been taking place in recent weeks between government, BRE, and housebuilders relating to the amount of time it has been taking for certificates under the code to be issued.

In advice sent to assessors, BRE said a significant increase in the number of assessments was impacting on "the timescales for

Quality Assurance required for design stage assessments".

BRE has now increased staff numbers and training, although it does stress that a full audit could take longer than expected to be reviewed.

It expects that where an assessment is not selected for a credit check or full audit, a certificate will be issued within a matter of days, and feedback will be given on post-construction stage assessments within two weeks.

A spokesman for the Department for Communities

and Local Government said:

"Post construction certificates are being issued within agreed timescales, and the department is working with the Buildings Research Establishment (BRE) and other stakeholders to ensure that the approvals system for design stage assessors runs as smoothly as possible."

The Code for Sustainable Homes became operational in England in April 2007 and a code rating for new build homes became mandatory from May 2008.

www.bre.co.uk

RIBA seeks minimum spaces in new homes

Architects are calling for minimum space standards to be introduced in all newly built UK homes, after a study found Britain has some of the smallest dwellings in Europe.

The Royal Institute of British Architects (RIBA) issued the plea after a report by the Commission for Architecture and the Built Environment (CABE) reported that the average floor space of a new dwelling in England and Wales is 76 m sq, compared with an average 92 m sq in Japan and 115 m sq in Holland – two countries with similar pressures on land as in Britain.

RIBA said the report raised the question of whether many new homes are actually fit for purpose.

Ewan Willars, head of policy at RIBA, said: "This report by CABE is a very important first step into reviewing the condition of current private housing stock, and how people are using their space. This research shows that the current system is not working for many.

"We want local authorities to lead the way in introducing



New homes in the UK are built too small, says CABE

minimum space standards, through their planning departments and ultimately for the government to introduce national standards for all homes."

CABE's key findings include: a growth in properties with inadequate space; 47 per cent of all respondents don't have enough space for all their furniture; 57 per cent don't have sufficient storage in their homes; and 35 per cent don't have enough kitchen space for appliances.

The RIBA will now be working with CABE on a number of proposals, including working

to understand best practice in the internal and external layout of homes; exploring successful Continental examples of minimum space standards to understand how in practice they might work in England; and promoting the provision of better information for consumers about the size of the homes they are buying.

Space in new homes: what residents think was jointly commissioned by CABE and English Partnerships with the RIBA.

www.architecture.com
www.cabe.org.uk

International lighting body tackles new technologies

New measurement procedures and specification criteria for emerging technologies and new approaches in lighting are being developed in an attempt to increase practitioners' understanding and implement the results.

The International Commission on Illumination is looking into how to specify criteria for measurement of a range of new technologies, including LEDs

The commission, known as the CIE from its French title Commission Internationale de l'Éclairage, and which shares information worldwide on the science and art of lighting, is also investigating the development of mesopic photometry.

The mesopic system looks at the changes in our eye's response to lighting levels, using a combination of photopic vision and scotopic vision in low but not quite dark lighting situations.

Teresa Goodman, of the National Physical Laboratory, said that using approved methods and measurement techniques will help minimise errors and uncertainties.

When it comes to measuring the changes in our eye's response to light level, there is currently no system in place for the mesopic approach. The CIE is now trying to create a measuring system, which, if approved, should be published later this year.

Goodman said further research into mesopic photometry is needed.

Lighting feature, page 44

Waterfront addition

Building work is now complete on the latest addition to Liverpool's iconic waterfront setting, the Mersey Ferry Terminal. Engineering consultant AECOM carried out all the building services and structural design work on the terminal, based at Pier Head.






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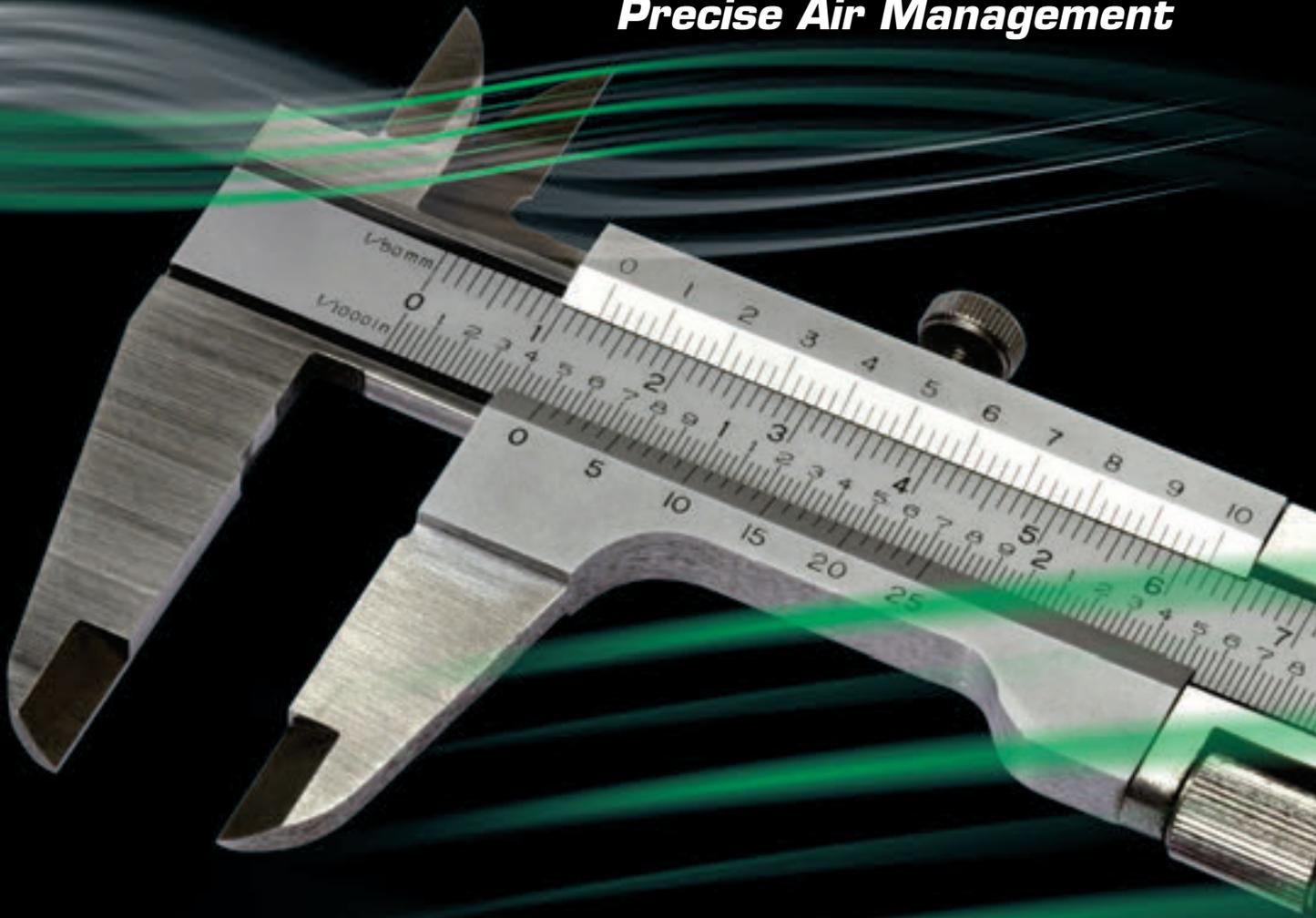
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Down the rabbit hole with Alice

"If you don't know where you are going, any road will take you there."
LEWIS CARROLL, *Alice in Wonderland*

There are many conflicts as we try to raise the professional standards and deliver more and more complex projects – and now that the long-fanfared Copenhagen agreement on climate change is less than six months away, I am forced to ask myself: "Do we know where we are going?"

All this navel-gazing was started by the recent heavy thump of the Parts L and F consultation landing on the CIBSE doormat. Undoubtedly it is a most important document, but still I have the question: "Where are we going?" Already within the UK, with its Energy Performance of Buildings Directive (EPBD), and in Europe generally, we have a process for measuring the performance of buildings with the Display Energy Certificate (DEC) and its



accompanying report. Yet there is a significant bow-wave of opinion that the quality of many of these DEC's is questionable. All schemes are subject to Quality Assurance review but some would say some schemes have higher standards than others. W. Edwards Deming says, with regard to quality: "If you can't measure it, you can't manage it..." A well-worn phrase but those who seek to meet our carbon reduction targets would do well to remember his advice.

Certainly, the government's *UK Low Carbon Transition Plan*

includes many proposals that CIBSE wholeheartedly supports, but also poses some major challenges. In order to deliver on anything like the scale proposed, much more focus on delivery and compliance across the sector will be required.

If governments and others are serious about making carbon reductions then we must know where we are going, be clear on that plan and enforce the regulations equably and fairly. We do need an enforcement body, to measure, manage and inform, and to ensure we can meet our targets and the tools we use are accurate and reliable; how else can we achieve the savings required?

For, if Copenhagen sets even more demanding targets and there is still no credible plan to deliver, then I for one will certainly believe that I am back with Alice and Lewis Carroll, and that would never do.

Stephen Matthews
Chief executive

Win a trip to Hong Kong

The Society of Public Health Engineers is now accepting entries for the 2009 Young Engineers' Award, with a trip to Hong Kong as first prize.

Teams must submit proposals to the following challenge: *Public health systems are vital to a building's function. How would you reduce the energy consumed by their operation?*

Entries should explain proposals, using an appropriate development as an example. Teams of up to three people, aged 18 to 30, can enter. The prize includes return flights to Hong Kong and four nights' hotel accommodation.

To view the full details, visit www.cibse.org/sophe. Entries must be received by 30 September.

Boost for Graduate Award

The 15th annual CIBSE/ASHRAE Graduate of the Year Award, sponsored by Baxi Commercial, will take place as part of a brand new CIBSE education and training event at the Institution of Mechanical Engineers (IMechE) on 15 October.

CIBSE president Mike Simpson will explain the institution's wider education and training objectives during a special reception after this year's award, followed by a gala dinner hosted by CIBSE Patrons to mark their 30th anniversary.

Simpson will be joined on the graduate award judging panel by ASHRAE president Gordon Holness, who will give the annual ASHRAE presidential lecture to the UK industry as part of the event.

Every year the winner of the award receives a trip to the ASHRAE Winter Meeting in the US – this year to be held in Orlando, Florida.

Former ASHRAE president Richard Rooley and CIBSE/ASHRAE group chairman Tim Dwyer will also help to judge the winner, who will be selected from five finalists – each of whom will give a presentation.

The event, which starts at 5pm, is also being supported by the CIBSE Young Engineers' Network, whose chairman is Arup's Morwenna Wilson, the current holder of the graduate award, and by the Rumford Club, which presents bursaries to the two runners-up every year.

Attendance is free – except the Patrons' 30th dinner – and open to all, but email ewenrose@btinternet.com for more information and to register.

Places at the Patrons 30th dinner are limited and must be booked and paid for.

To receive more information email cbrown@cibse.org

News in brief

Simulation group seminar

CIBSE's Building Simulation Group will be holding its inaugural seminar on 30 September at BSEC, Balham, on 'Thermal Simulation'. Reserve a place at www.cibse.org/groups

Declare your feelings

We want to hear your views on CIBSE. We'll be emailing a membership survey to all members in early September. The results will help develop the future of CIBSE membership. If you're not on email, but would like to complete the survey, contact Bobby Wright on 020 8772 3639. A summary of the results will appear in the November edition of the *Journal*.

Writing in Hong Kong

CIBSE's Hong Kong branch is inviting entries to a writing competition on climate change. Papers can be written on any technical subject relating to the theme, and can take the form of an opinion piece, news story, project sharing, study findings or idea sharing. The competition is open to all Hong Kong region CIBSE members and there are two categories: Open – for all; and Student – for undergraduates. The closing date is 30 October 2009. For full details and rules visit www.cibse.org.hk

International views sought

CIBSE is looking to revise its publication, *TMO4: Design notes for the Middle East*, expanding it to include other non-European regions. We would like to hear from members who are working in, or have recently worked in, regions such as the Middle East, India, Singapore, China etc to form part of a publication steering group. To take part contact Claire Ruston at cruston@cibse.org with a brief summary of your expertise.

Training and Development

Submissions

The closing dates for annual submissions to be considered at the October 2009 and January 2010 Training and Development Panel meetings are 8 September and 18 December, respectively.

Training submissions and any queries, plus employers' enquiries and applications for approved company training schemes, should be addressed to Olwen Williams, training and development administrator, on 020 8772 3605 or e-mail owilliams@cibse.org

CPD directory update

To be added to the Directory of CPD Course Providers contact Olwen Williams on 020 8772 3605 or owilliams@cibse.org

We also accept applications for online courses and welcome e-learning applications.

Gent by Honeywell, KNX UK Ltd and Swegon Ltd have recently been added to the directory.

A concessionary rate is available for entries of the following categories:

- Academic institutions;
- Not-for-profit organisations offering free or non-profit training courses;
- Sole traders who are members of CIBSE and offering free, non-profit training courses; and
- Sole traders who are members of CIBSE and the training business amounts to less than five per cent of their annual turnover.

For more information on training and development visit the IPD CPD section of CIBSE's website, at www.cibse.org

Company visits

Is your company benefiting from membership, products and services that CIBSE has on offer?

Let us help you meet the competence levels required by your staff to excel in their workplace. If you would like a company visit, contact Bobby Wright on 0208 772 3639 or bwright@cibse.org

Rallying government on new policy continues

The last party conference season before the next general election is approaching – the perfect time to lobby government.

CIBSE is currently working with the Construction Industry Council (CIC) and other member bodies to produce a joint industry manifesto to tell candidates from the main political parties about the vital contribution construction makes to UK plc – the major hidden employer in constituencies, with 2.8 million people involved directly in designing, building, repairing and maintaining the built environment. The manifesto is a reminder that major social programmes depend on construction. It contains recommendations and evidence of direct relevance to building services engineers.

Meanwhile, CIBSE continues to build relationships with senior officials in various government



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departments. The RADAR Group is a pan-industry group that meets with government officials to share intelligence on regulations and directives from Europe. Early information enables industry bodies and government to influence and implement legislation. So far, this has resulted in information on the Energy Using Products and F-Gas Directives, a possible forthcoming directive on eco-labelling of buildings and the recast of the Energy Performance of Buildings Directive. There has been useful discussion on the co-ordination between the Carbon Reduction Commitment and energy

certification and wider roll-out of Display Energy Certificates.

The Engineering Forum for Energy has been reformed into an advisory group on energy for the Royal Academy of Engineering. The forum provides information and shared opinion to government on energy issues in engineering. CIBSE provided valuable balance in this group, championing the issues on energy demand and management. The provision of advice to the RAEng is a significant development.

For details on any of the above, or any other current policy issues, contact Samantha McDonough at smcdonough@cibse.org

New improved YEN site

Following some extensive development and 'beauty treatment', we are now pleased to relaunch the new and improved young members' website (previously the young members' blog).

No longer just a blog, the website has been redesigned to be easier to use, with a more focused and relevant approach for users. More articles and better selected information will make it easier for young members to find exactly what they are looking for.

The new website has branched out to incorporate graduates and young professionals, and will also provide careers and study advice for 16- to 18-year-olds considering a career in the building services engineering industry.

It houses discussion forums for industry, study or career issues; a live chat application; and a profile space where users can upload photos and information about themselves – allowing them to network with like-minded people in a safe and relevant environment.

Young members will also be able to find the latest jobs, career advice and industry news, and keep abreast of what's happening in CIBSE – including training, events and publications.

We want the website to continue to develop and welcome all feedback from our young members. Let us know what you think by emailing Chloe Lacey at clacey@cibse.org and putting New YM website feedback in the title box. www.cibseyoungmembers.co.uk

Don't forget your discount

For those who haven't used it already, don't forget the 10 per cent discount voucher you received in our recent letter to all members. You can get 10 per cent off your next order of any combination of CIBSE publications before the

end of September (not to be used in conjunction with any other offer). To claim your discount, simply quote code 58761359 when ordering online at www.cibse.org/publications or when calling our sales team on 020 8772 3618.

First SBEM long-distance learner pass

Richard Adeduntan has become the first person to pass the online version of the SBEM exam in Ireland.

The new distance learning training is the first to use Irish software, meaning Richard will be able to practice in both England and Ireland.

Richard achieved a good pass in both parts of the SBEM examination and, based on his result and already having completed the CIBSE Low Carbon Energy Assessor course, will be pursuing completion of the registration process to be officially recognised as a CIBSE Low Carbon Energy Assessor.

The new online learning package is produced by ELSOL in conjunction with the Dublin Institute of Technology. For more information visit www.elsol.ie

The online learning package is now available across England and Wales.



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Sizing up the cost

Doubts have been cast over EU plans to extend the scope of rules on energy certificates for buildings. Carina Bailey reports

The European Commission's (EC) intention to extend the application of Display Energy Certificates (DEC) to smaller buildings has failed to gain the support of the UK government in England and Wales.

First adopted in 2003, the Energy Performance of Buildings Directive (EPBD) is designed to tackle climate change by reducing the amount of carbon produced by buildings. In late 2008, the EC put forward a draft recast of the EPBD that would have the effect of extending the directive's scope and clarifying certain aspects of it.

The UK government has now issued its own response to the recast, and has launched a consultation into its position on the proposals to gain the views of professionals within the building services sector.

Although the Department of Communities and Local Government (DCLG) says it is "not



The EU wants to reduce the size of public buildings that are required to have Display Energy Certificates

mindful" to support changes to DECs, it has largely welcomed the EC's proposals, describing them as having "considerable merit". According to the DCLG's response, the UK already has, or intends to, go further than many of the changes suggested in the recast to cut carbon emissions from buildings.

There are 26 proposals listed in total in the consultation document, with DCLG seeking industry-wide views on half of these, although it has pledged to support about

16 of the proposals. Significantly, there are three key EC intentions identified as requiring "further consideration" by DCLG because it believes the costs of implementing these may outweigh the benefits. Expanding the scope of DECs falls under this category.

DECs

In the existing directive, DECs are only required for public buildings frequently visited by the public that are more than 1,000 sq m in

size. The current proposal in the recast would see DECs required in frequently visited public buildings that are larger than 250 sq m. The proposal also reiterates the need for Energy Performance Certificates (EPCs) to be issued on the sale, rent or construction of a building. EPCs would also have to be displayed in all advertisements issued for the sale or rent of a building.

However, according to the DCLG consultation document, expanding the scope of DECs would increase

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the number of buildings affected from at least 42,000 to 64,000, but the energy used in these additional buildings would only account for 1.4 per cent of the total energy used in the public sector.

DCLG estimates that it would cost about £8m and save 12,400 tonnes of carbon per year. The government would prefer to encourage the owners of the buildings already affected

■ The UK government fears that focusing on smaller buildings could divert resources and attention from stimulating real carbon cuts.■

by DECs to implement the recommendations provided in the accompanying report, fearing that focusing on smaller buildings could divert resources and attention from stimulating real carbon cuts.

Methodology

The second area in the recast that DCLG lists as requiring further consideration is that of creating a single methodology to calculate the energy performance of buildings. According to the recast, the methodology would distinguish between new and existing buildings, and different building types.

Member states would be expected to calculate the "cost-optimal levels" of minimum energy performance requirements using this methodology, and compare the results of these against their own minimum energy performance

requirements. The results of this comparison would be reported to the EC every three years, although member states would be allowed the freedom to decide on the specific methodology to be applied. The EC would then publish a report showing member states' progress in reaching cost-optimal levels of performance.

However, DCLG argues that a single methodology may raise problems in terms of subsidiarity, and although it feels that the current UK approach would at least equal, and probably could exceed, the cost-optimal levels required, "this cannot be confirmed until the methodology has been developed by the commission" – and so it believes that this proposal requires further, broader consideration.

Zero carbon

The third key proposed change in the recast is establishing common principles for the definition of low and zero-carbon buildings, and setting targets for achieving these.

The EC proposal would still allow member states to set their own definition of low and zero-carbon, as long as they complied with Europe's common principles. The EC also intends to publish a report showing each member's progress in increasing the number of buildings achieving low and zero-carbon status, which may lead to recommendations being made by the EC.

But, according to the DCLG consultation document: "The UK supports the proposal to increase the number of buildings in this category as a general aspiration. It does not support the proposal that targets should be set for an increase in the number of low and zero-carbon buildings."

Key proposals in the planned recast of the EU directive

- DEC to be displayed in buildings larger than 250 sq m that are occupied by a public authority
- EPC to be displayed in commercial buildings larger than 250 sq m that (a) are frequently visited by public and (b) where an EPC has previously been produced on the sale, rent or construction of that building
- The energy performance of existing buildings of any size that undergoes major renovations to be upgraded in order to meet minimum energy performance requirements
- Minimum energy performance requirements to be set in respect of technical building systems – boilers, air conditioning units, etc
- European Commission to establish

common principles for definition of low and zero-carbon (LZC) buildings. The definition of LZC to be determined by member states, but it must be in accordance with the principles set by the commission

- Requirement to set targets for increase in LZC buildings, with separate targets for: new and refurbished dwellings; new and refurbished commercial buildings; and buildings occupied by public authorities
- Member states to aim for cost-optimal levels of energy performance of their buildings using a methodology developed by the commission

Source: DCLG

The DCLG says it doesn't feel that setting targets for achieving zero carbon in existing buildings is appropriate, and any targets set for achieving low carbon in existing buildings should be split appropriately across domestic and non-domestic properties.

A key proposal supported by the DCLG is for displaying existing EPCs in commercial buildings larger than 250 sq m in size that are visited frequently by the public. Another is upgrading the energy efficiency of an existing building, or its systems, when it is undergoing major refurbishment works.

Other proposals in the recast that are backed by DCLG include:

- Minimum energy performance requirements for technical building systems, such as boilers and air conditioning units;
- Checking a sample selection of EPCs and air conditioning reports for accuracy;

- Regularly inspecting heating systems and boilers; and
- EPC report recommendations to be made more precise and detailed.

The EC is proposing that the recast directive be implemented by 31 December 2010 where proposals affect the public sector, and 31 January 2012 for other buildings. But DCLG says it has reservations about the timetable, describing it as challenging and unrealistic. ●

CIBSE is seeking members' views on this consultation. To view the consultation please go to <http://www.communities.gov.uk/publications/planningandbuilding/recastepbdconsultation>. The closing date for the consultation is 2 October 2009, so please send comments in by Friday 25 September 2009 to Samantha McDonough, CIBSE policy manager, at: smcdonough@cibse.org



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Letters

EU law will bring in improvements

The difficulty in having a debate on consequential improvements (CIs) (Hywel Davies's letter, August, page 16) is that we don't know the detail of what the UK government's proposals might have been, had they not been withdrawn.

If their proposals would have been exactly in line with the draft recast of the Energy Performance of Buildings Directive, they would have required CIs only in cases where "major renovation" (defined as an investment of at least 25 per cent of the building's value) takes place. This is a high threshold and would in effect mean CIs were required only when a building is being gutted. I think most reasonable people would support this requirement.

On the other hand, if CI meant that every householder undertaking a modest home improvement would also have to implement a raft of energy saving measures throughout the house, my view is that this would be unfair. Indeed, the most likely consequence would be to deter the householder from undertaking any improvement in the first place. Worse, it could be counter-productive in energy terms. For example, a householder contemplating replacing their single-glazed windows with modern energy-efficient ones might decide not to do so.

Given that the government will have to transpose the recast Energy Performance of Buildings Directive into UK, why not let this process take its course, and we will inevitably end up with the EU version of CI anyway?

Rick Wilberforce BA MSc CEng MCIBSE
EU Public Affairs Consultant

Dancing on the point of a needle

When I answered the phone to give an interview to the *CIBSE Journal* on our school at Acharacle, I was blissfully unaware of what was to come ('Learning from passive action', July, page 29). We were certainly surprised to see it featured on the front page and even more surprised to note the references to Passivhaus web addresses at the end of the article. It is this latter factor which has led to an interesting aftermath.

Our office was showered with emails (some quite offensive) from what I can only refer to as the PassivPolice. This appears to have come

about from a round robin email, appending the *CIBSE Journal* article without the final page, which tabulated the key aspects of the building, and how they compared with conventional construction and PH standards. I was prepared to ignore the whole thing, but now it has spilt onto the *CIBSE Journal* letters page ('Not so passive house', August, page 16).

Passive design Acharacle certainly is; indeed the superstructure construction was delivered



from Austria with a passiv-standard equivalent guarantee. However, importantly, it was without the associated MVHR. As a practice we have no interest in signing up to a certification system which makes mechanical ventilation and heat recovery mandatory, while not taking a broader interest in healthy indoor climate. We find this kind of leap into prescriptive certification myopic. Even the German passiv-enthusiasts are split between the energy and carbon obsessed (currently in control of the certification) and those, quite rightly, concerned with other key issues related to construction materials, healthy indoor climate, and so on.

If we are to create buildings which are truly more sustainable, we must not dance solely to the tune of indoor CO₂ levels (a point of needle), which are themselves a very crude indicator of air quality and often set at a threshold which calls for mechanical ventilation far too early and too often. We must also take into account serious issues of toxic emissions from materials and finishes (all materials for Acharacle were vetted in accordance with Gaia Publications). Acharacle also addresses passive methods of

maintaining constant RH levels through the excellent hygroscopic properties of the mass timber and unburnt clay finishes. Although no doubt there will be bigger fluctuations this winter, RH in the school has been around 50 per cent (+/- 2 per cent) since it opened in May, and with no mechanical ventilation in sight!

We are very lucky to have an enlightened client in the Highland Council who is paying for us to be involved for two years post handover to ensure the building works as intended. We shall be delighted to share our findings at the end of this period and equally happy in the meantime to arrange for CIBSE members to see the building for themselves, before rushing to judgment, or insisting that we should get a whole set of certificates.

Howard Liddell, Principal
Gaia Architects

No ambiguity in advice

The article 'Keeping the legions at bay' (August, page 40) comments: "Document L8 from the Health and Safety Executive is not entirely clear about how frequently the anti-legionella cycle should be operated."

This is not the case; there is no ambiguity at all. Paragraph 158 of L8 recommends the whole water content of the calorifier is heated to 60 deg C for one hour each day, normally during the early hours of the morning.

In the same article Yan Evans of Baxi Commercial Division recommends an anti-legionella cycle of once per week, otherwise the economic and environmental benefits of solar water heating are negated. It would appear then that solar water heating is not economically viable for those of us following the practical advice of the ACOP L8.

Tim Othen

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

Please send all letters and any other items for possible publication to: editor@cibsejournal.com, or write to Bob Cervi, editor, *CIBSE Journal*, Cambridge Publishers Ltd, 275 Newmarket Road, Cambridge, CB5 8JE, UK. We reserve the right to edit all letters. Please indicate how you wish your letter to be attributed, and whether you wish to have your contact details included.

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Fit for purpose?

Architects can shake off their reputation for ignoring retrofits by taking a lead on this key contribution to sustainability in buildings, says **Greg Slater**



Upgrading existing housing stock is essential in the UK, and PRP welcomes the Technology Strategy Board's funding competition aimed at enabling building and renovation companies to retrofit social housing stock (*Journal* news, August, page 10).

The Stern Report on the economics of climate change showed us that not tackling climate change now will cost us a great deal more later. The dangers of environmental neglect, coupled with a shrinking economy, have highlighted inefficiencies in the existing housing stock, and the link to a rapid growth in fuel poverty.

But in the pursuit of zero carbon in new housing, we tend to overlook the energy saving potential of the UK's existing housing stock. To meet our targets we must retrofit 500,000 homes a year for the next 40 years.

Architects can play a pivotal role in planning and delivering 'strategic retrofitting'. They offer balanced professional leadership, technical specification knowledge that can fulfil sustainability requirements and aesthetically pleasing design solutions.

The government has concluded three linked consultation initiatives that set the framework for a 'Great British Refurb'. The first two build on existing measures-based activity (insulating cavities and lofts, etc) through an extension of CERT funding from energy suppliers, and aim to generate a further £350m in funding from this source via a Community Energy Saving Programme. This is to upgrade whole houses for 90,000 vulnerable households, offering an opportunity to upscale the prototypes from the retrofit competition.

The third, the Heat and Energy Saving Strategy consultation, sets the framework for a national delivery programme beyond 2012 and challenges us to achieve near zero carbon housing by 2050, offsetting more tricky economic sectors. It also projects 1.2m retrofits per year by 2020.

These consultations are welcome but we must act now and challenge the government's commitment to delivery through the UK Low Carbon Transition Plan

and UK Renewable Energy Strategy, both published on 15 July.

PRP will do this as part of the Existing Homes Alliance, a coalition of organisations calling for urgent action to transform the UK's existing housing stock and make it fit for the 21st century. We also responded to the consultation initiatives, directly setting out PRP's views.

We have developed a series of exemplar schemes for properties ranging from solid walled Victorian terraces through to a grade II listed concrete high-rise. The BRE Stableblock in Watford, for example, comprises three different flat types, while Balfron Tower in Tower Hamlets has 146 units. All these suggest that emission reductions in excess of 80 per cent are achievable, even in the most difficult circumstances.

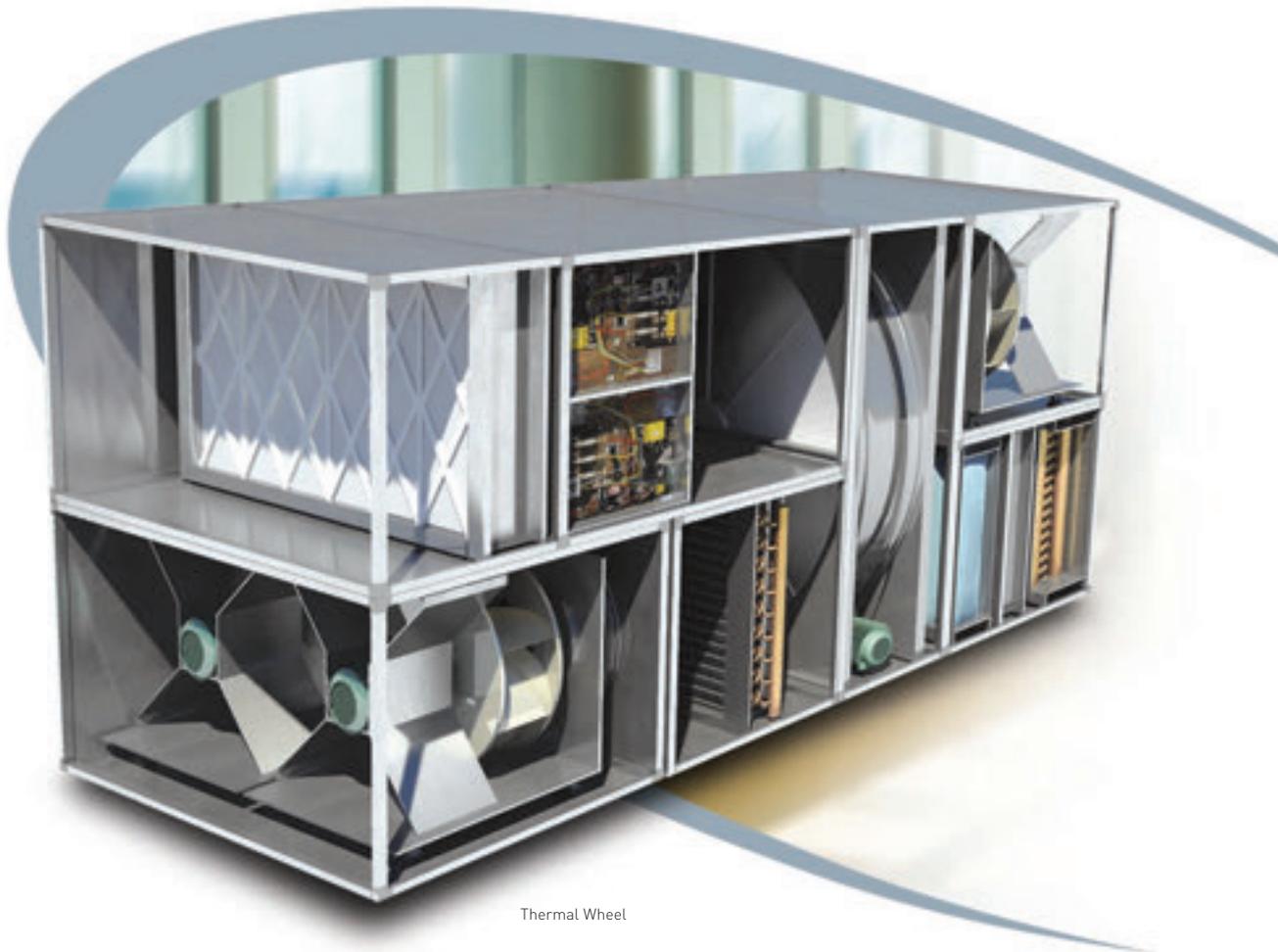
Architects are in pole position to help drive the changes needed. From option appraisal and technical specification to statutory compliance and resident consultation, architects must be employed as a key professional resource to ensure all upgrade activity is designed for long-term gain.

Our profession stands accused of ignoring refurbishment in favour of the new and modern; now is the time to redress this and ensure the work we carry out has lasting impact, in both economical and sustainable terms.

Society must change; the way in which we design and build must change, too; and the retrofit sector provides an opportunity to maximise sustainable output while making social and financial profit. It's not too late. In fact, it's happening now. But if we're going to meet targets, deliver long-term solutions and reduce fuel poverty, we need to get moving. ●

Architects are in pole position to help drive the changes needed – and making sure that all upgrade activity is for the long term.

Greg Slater is associate director at architectural firm PRP. A version of this article first appeared in *RIBA Journal*



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The right climate

The industry can't afford to repeat its past mistake of being slow to learn from experience – best practice must be promoted more widely to combat climate change, says **Ken Dalton**



>Welcome the UK government's new energy strategy aimed at boosting renewables, which was highlighted in last month's *Journal* (August, page 14). Our industry has long advocated the need to tackle climate change. So, now that we have strategies in place, how can we as an industry help it become reality?

Our biggest impact on carbon emissions reduction, and indeed in ensuring that the UK can be better equipped to adapt to climate change, is through our project work.

It is no longer good enough for us to deliver projects that are compliant with regulations – we need to act as advocates of solutions that significantly reduce carbon emissions. This requires long term reductions over a project's whole life cycle, in addition to the immediate reductions made via energy efficiency measures.

We need to demonstrate our commitment to our employees and our clients by greening our own operations. The challenge here is that many companies, ourselves included, identify project and operational carbon footprints separately. How do we ensure that companies, and the industry as a whole, produce meaningful indicators showing progress and relative performance in both areas?

We can't afford to repeat our past approach within the industry of being slow to learn from experience. The key here is training. At AECOM we already invest hugely in training, and we will have to invest further, and not just in our own people, but in our supply chain and industry bodies, so as to promote new and best practice more widely.

Here I see CIBSE continuing to play a pivotal role. I also recognise a need to support a construction research and education infrastructure without which we won't have the talent necessary to enable the transition to a low-carbon economy.

We also need to do more to tell our employees, clients, supply chain and communities what we are already doing, and what more we can do to reduce carbon emissions. Then we need to keep on telling them.

The low carbon economy will become a reality both because of climate change agreements, and the need to ensure security of energy supplies.

To meet the challenge we must constantly check that our business planning processes result in the development of new services and capabilities, which will meet future client needs. As such climate change and other sustainability issues need to be firmly embedded in our mindset, so they automatically affect the way we think about and plan our future.

Regulations, carbon pricing, and other instruments need to be rolled out effectively and in detail by government so as to support industry efforts. Government strategies like the Low Carbon Transition Plan are well thought through and should be commended, but it's the attention to detailed policy implementation that tends to be lacking – and here the Government needs to listen to industry to be effective.

The 80 per cent target is hugely demanding, but achievable. AECOM wants to work with others in the industry and the supply chain to get there. We appreciate that it's not a case of whether government, industry, or clients take the lead – we all have to.

As the Copenhagen Communiqué from the Prince of Wales Corporate Leaders Group on Climate Change says (see www.copenhagencommuniqué.com): "The problem of climate change is solvable ... The one thing we do not have is time. Delay is not an option." We all need to step up a gear. ●

 **The challenge is that many companies identify project and operational carbon footprints separately. We need to show relative performance and progress in both areas.** 

Ken Dalton is chief executive of AECOM Europe.

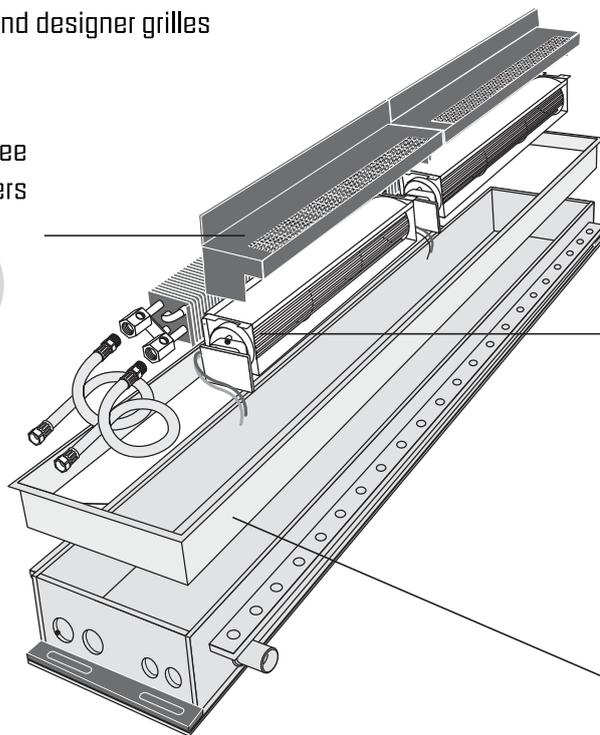


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Don't get into hot water

Changes to Building Regulations Part G, covering water supply in buildings, come into force next month. **Hywel Davies** looks at some key new provisions that come into effect on October 1



Many in the industry are busy thinking about proposed changes to the requirements of Parts L and F of the Building Regulations. But Part G, on water supply to buildings, has recently undergone major revision, with several new requirements introduced. The previous three requirements are replaced by six requirements, which come into force from 1 October 2009.

The six relate to: cold water supply (G1); water efficiency (G2); hot water supply and systems (G3); sanitary conveniences and washing facilities (G4); bathrooms (G5); and kitchens/food preparation areas (G6).

The main changes are a new limit of 125 litres per person per day on provision of “wholesome” water in new homes, or those created by a “material change of use”. New rules cover use of “non-wholesome” water to flush toilets, safety of hot water systems and measures to prevent bathwater from exceeding 48 deg C. A new requirement is for sinks in food preparation areas.

G1 requires provision of “wholesome” water for drinking, washing and food preparation. However, it also introduces a provision, which is optional, to use “non-wholesome” water – recycled greywater or water from industrial processes, harvested rainwater or water from springs and boreholes – for toilet flushing or irrigation. There is guidance on assessing the feasibility and risk of using such supplies, as well as on the installation, marking, maintenance and operation of such systems.

G2 covers “reasonable provision” for the installation of water-efficient fixtures and fittings. From October, not only will new dwellings need a SAP calculation for carbon emissions, but also a new calculation of the potential water consumption, using the government’s “Water Efficiency Calculator for New Dwellings”. This describes the approach that must be used when calculating the potential consumption per person, in order to demonstrate that the dwelling meets the new requirement set out in Regulation 17K

of the Building Regulations. The calculator uses capacity or flow-rate details of the toilets, baths and showers, sinks and washbasins, appliances and water softeners, and calculates the daily usage per person. New homes must not exceed 125 litres per person per day, although the Code for Sustainable Homes requires lower consumption (120 litres at levels 1 or 2, down to 80 litres at levels 5 or 6). The Regulation specifically addresses “consumption of wholesome water”, so it can be anticipated that this will begin to drive wider use of recycled water in new developments.

A further new Regulation, 20E, requires that the calculation is submitted to building control, along with the carbon emissions calculations introduced under Regulation 20D.

G3 is the most detailed requirement, and also has the most comprehensive guidance to accompany it. It now addresses all hot water supply in buildings, whether from vented or unvented systems, and whether from conventional water heating sources, or from solar heating sources. There is explicit guidance on the use of additional heat sources to ensure that water heated by solar systems is treated to restrict microbial growth. There is also a reference to the CIBSE Domestic Building Services Guide to solar water heating, as a source of authoritative guidance on solar thermal systems.

G3 also introduces a requirement for hot water systems to be commissioned, and brings in limits on water temperatures when water leaves storage tanks and when it is discharged into baths. Where water in a domestic hot water store is capable of exceeding 80C in normal operation, then the store must be so designed that it does not allow water into the distribution at temperatures exceeding 60 deg C.

Engineers need to be aware of these imminent changes, as they will have an impact on services provision in both homes and non-domestic buildings. ●

Hywel Davies is technical director of CIBSE.

KEY DOCUMENTS

CIBSE Commissioning Code M: Commissioning Management – this is the approved methodology for management of the commissioning process for fixed building services.

CIBSE Domestic Building Services Panel:

Solar Heating Design and Installation Guide. Covers predominant types of systems and notes their advantages and disadvantages. The broad range of systems covered will assist those engaged in repair and maintenance work to understand the principles of operation of existing equipment, as well as guide the design and installation of new systems.

The water efficiency calculator can be downloaded from www.planningportal.gov.uk/uploads/.../water_efficiency_calculator.pdf

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Quality assured?

The role of the energy assessor has become crucial now that more and more buildings are gaining performance certificates. But there is concern that some of these professionals are not up to the job, writes **Carina Bailey**

When domestic energy assessments were first required in the UK in 2007 the emphasis was on churning out certificates in order to comply with the law. Jacqueline Balian, managing director of CIBSE Services, says the darkest period was in the first year, when profit was the sole driver of the profession: "A large number of individuals without experience 'qualified' as energy assessors and their entry into the market forced down fee levels as they marketed certificates as a commodity, competing for work solely on price."

The job of the energy assessor was created as a result of the European Performance of Buildings Directive (EPBD) – new legislation requiring properties to be graded on their green credentials.

In 2008 the EPBD was rolled out further, firstly to commercial premises and later to the lettings sector. This brought about the need for non-domestic energy assessors with a wider remit than the domestic energy assessor.

Since then quality has been rising, particularly with the introduction of the CIBSE Low Carbon Energy Assessor (LCEA) register in 2008, which was launched to coincide with the roll-out of EPBD that year.

But the poor level of service offered to clients by some energy assessors with low skill levels is still one of the biggest problems the industry faces. Balian believes this has to some extent undermined the credibility of energy performance and display energy certificates (EPCs and DEC)s, although she admits this has actually led to lighter costs for businesses than originally anticipated.

Gerald Israel, a Low Carbon Energy Assessor at CIBSE Certification Ltd, agrees. He

attended a recent update course at CIBSE, where he was appalled to hear of falling quotation prices due to poor industry knowledge. He learned of one quote being made for a DEC in a hospital totalling just £150, while another assessor charged £180 for an EPC to be carried out on a 900 sq m office block, including lodgement.

"It is simply not good enough to accept the generic recommendations provided by the software," Israel insists. "The assessor must use his/her experience and knowledge to adjust these into a meaningful set of results. This requires that the assessor has the prior knowledge and training to be able to produce the documents. How can companies advertise that they can train someone who has been made redundant (and not necessarily with a building services background) to become an assessor [in four days]? I have been in building services and energy for the past 42 years and I'm still learning."

Quality issues

In contrast, the CIBSE scheme genuinely has a reputation in the marketplace for providing quality, and its assessors can offer so much more than just energy certificates, Balian says.

For instance, a package of both EPC and DEC certificates can now be provided because CIBSE-accredited LCEAs have the right qualifications. They can advise firms on operational improvements, as well as enhancements to the building's fabric and plant. Another benefit is that many LCEAs now offer follow-up services, such as full surveys or improvement programmes, and the loan funding to undertake the work. And despite the flood of energy assessors now qualifying through other schemes, LCEAs still account for a sizeable amount of the marketplace.

LCEA registration is open only to those who are experienced building services or energy specialists with at least two years' solid experience. In order to be admitted to the register, suitably competent individuals have to take further training in energy assessment law and in the use of their chosen software.

"CIBSE LCEAs are widely recognised as the professionals and highly competent, in a market becoming awash with energy assessors who have 'qualified' after two or three days' training," insists Balian.

However, there is still a ripple of disquiet running

CIBSE

Range of guidance and training available

TM47: *Operational Ratings and Display Energy Certificates* from CIBSE provides guidance on the requirements for DEC)s, and also provides assessors with good practice guidance on the whole process of assessing a building for the purposes of producing a DEC.

TM47 is priced at £35 for CIBSE members and £70 for non-members. For more information or to purchase this publication, visit www.cibse.org/publications or call 020 8772 3618.

CIBSE provides training for those wanting to join the Low Carbon Consultants Register, to become a Low Carbon Energy Assessor to produce Energy Performance Certificates, Display Energy Performance Certificates or to become accredited air conditioning inspectors.

CIBSE also has ongoing CPD events for energy assessors. For more information on training visit www.cibsetraining.co.uk/energyassessor



through the industry about the fact that no one has yet been prosecuted for failing to have an EPC, DEC or air conditioning inspection report.

Balian adds: "Some research indicates that as many as 80 per cent of commercial letting agents are failing to require EPCs for properties they are placing on the market and currently the average period a commercial premises is on the market exceeds 300 days.

"Even if lawyers make sure a certificate is available for the actual conveyancing, certificates obtained at this point will have no influence on the prospective tenant or purchaser."

Israel reported that estimated figures show that only 15 to 25 per cent of all required DEC and EPCs have actually been completed so far.

"How can companies advertise that they can train someone without a building services background to become an assessor in days? I have been in building services and energy for the past 42 years and I'm still learning."
 – Gerald Israel

According to Balian, the Department for Communities and Local Government (DCLG) is trying to persuade trading standards officers to take action.

Israel believes that with Part L 2010 of the Building Regulations impending, it will be more important than ever to understand the requirements of DECs and EPCs, and for update days to be held by CIBSE, as not only do they satisfy the taught requirement of CPD, they also provide a great opportunity for assessors to meet and learn about new regulations.

Balian believes one of the biggest successes of the LCEA scheme so far is the fact it has seen 20 per cent of its clients want to make real improvements to the energy performance of their buildings.

However, in the current economic climate, LCEAs are being urged to find new ways to expand their services: "There is a need for firms to continually expand their offerings to clients in order to take advantage of what will undoubtedly be a changed market as we come out of the recession."

CIBSE aims to help LCEAs by significantly improving the quality of its technical support, and has already employed two quality assurance managers – described as a vital part of the energy assessor accreditation scheme by quality assurance manager, Ying Chen. "CIBSE certification takes quality assurance very seriously. Our aim is to help ensure LCEAs are working within the DCLG rules and guidance. This helps to give clients confidence in the CIBSE LCEAs, assuring them they are getting good quality energy certificates [and sound advice]."

CIBSE is launching a new website for clients shortly, and several major announcements for LCEAs are expected in the coming year. ●

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Learning curve

Early indications from post-occupancy monitoring of a new academy school in the UK have highlighted strengths and weaknesses in the award-winning project's energy saving strategy. **Carina Bailey** reports

Leigh Technology Academy in Dartford, Kent, has been operational for more than 18 months. Built on the site of a former technology college, the academy features an array of energy efficiency methods, such as passive cooling, a sealed façade, earth tubes and bespoke wind turrets.

These approaches were aimed at cutting the school's carbon emissions by 65 per cent compared with the government's 2005 benchmarks.

But is the school, which specialises in sport, business and technology, performing as anticipated? >







The £28m Leigh Academy, above and bottom, is designed as a “creative crescent” around four separate colleges



“It would be too easy to blame the occupants, the operation of the building and the increased energy loads, and walk away.”

> James Warne, BDP’s environmental engineering director, says not quite yet – but they’re working on it. “The results have very positive and negative things to tell us and have taken a lot of time to get to the bottom of. In terms of energy, the good news is the building services are performing well,” he says.

BDP is currently conducting a post-occupancy evaluation (POE) of the academy, as well as an energy assessment that involves analysing energy bills and meter readings.

Overall, Warne says, early indications of these studies point to a well-performing building “with some tweaks required”. BDP is also involved with the Usable Buildings Trust to help improve the school’s energy performance further.

Warne describes the £28m academy as a “creative crescent” that is designed around the four separate colleges of Brunel, Chaucer, Darwin and Da Vinci. Each college is like a school within a school, with links along an internal street. The colleges are paired

around open-plan resource and teaching areas, set as day-lit triple-height winter gardens, which facilitate the natural ventilation of the building.

Orientation

The crescent-shaped academy is south-facing and topped by a curved roof that reaches ground level. Warne says the shape “responds” to the microclimate, and offsets any turbulence from prevailing winds.

Most of the teaching spaces face north, thus reducing glare, while the southern exposed elevation and winter gardens capture low-angle sun in the winter for reclaiming the heat to warm classrooms, while blocking out high-angle sun. The orientation also shields the school courtyard from road noise and enables children to breathe the fresh air drawn up through the earth tubes.

The sealed façade also reduces traffic noise and led to the installation of mechanical ventilation, which uses reclaimed air from the earth tubes to provide





low-carbon heating and cooling throughout the teaching spaces.

Passive cooling satisfies a large part of the cooling requirement and eliminates the need for mechanical cooling. The building takes advantage of exposed concrete ceilings, with the floor void, risers and building structure all used as heat sinks.

Displacement ventilation distributes the air through the floor voids to enable contact with the exposed thermal mass of the building to provide passive cooling.

Additional passive thermal mass transfer is provided using earth tubes buried 1.5 metres below ground running for 40 metres. These draw the underground air – which is warmer than that outside in the winter and cooler in the summer – through the concrete tubes into the teaching areas.

Says Warne: “The earth tubes are providing a large contribution to the cooling of the building, especially in the very warm weather in June [this year], and the natural ventilation through the winter gardens provides comfortable air movement and allows the very heavily serviced ICT [computer and technology] areas to dissipate their unwanted heat to the atmosphere in the summer months.”

Deep-plan, wind-driven turrets are also used in parts of the school with no windows to allow outside air in and to help achieve sufficient air change rates. The passive ventilation turrets also provide natural light. The bespoke wooden light wells, designed by BDP, rise 1.6m above roof level and are 0.8m in diameter at the top.

The fabric of the building has an air tightness of 5.9 cu m/hr per sq m.

Under-performance

However, through their POE investigation so far, BDP engineers have discovered a number of additional areas, typical of most schools in operation, where performance is poorer than expected.

One of those areas is the kitchens, where lights, ventilation and empty refrigeration units are worked very hard throughout holidays, mainly because no one knows they have been left on. Lighting controls in large open communal spaces are also being left on. This has been exacerbated, on occasion, by light switches being placed out of sight, although in most cases at Leigh this is limited by PIR (passive infrared sensor) and presence detection devices.

The prolonged use of the academy’s audio-visual facilities, which include a media editing suite, broadcasting facilities and several large ‘show and tell’ screens, is adding to the energy drain. And the building and energy management system has taken a long time to integrate into the school’s day-to-day energy management.

Moreover, a significant amount of energy is going into the advanced ICT facilities in the school – far more than allowed for in previous Department for Education and Skills or Building Bulletin benchmarks.

Energy drain

And there lies the problem, says Warne. ICT in schools is far more complex and dense than many offices or workplaces, and with large screens and high-powered blade servers there is little to help reduce carbon emissions, especially as the extracurricular activities grow with the success of the school, hours of operation increase and processor power grows. “The success of the school [in its range of activities] is the failure of the energy strategy,” he says.

The ICT spaces were designed to keep cool holistically, with large ICT teaching spaces on open balconies within the building, allowing the heat to rise into the indoor winter gardens where it is recycled in the ventilation system during the winter and dispelled at a high level in the summer, with no need for additional mechanical cooling.

In areas where ICT was in an enclosed space, cooling was provided using heat pump variable refrigerant >

Outcomes

Initial findings

So far initial findings at Leigh Academy include several positive results:

The building services are performing well

The earth tubes are providing a large part of the cooling

The natural ventilation in the winter gardens is providing “comfortable air movement”

Gas consumption for heating, hot water and catering is expected to be lower than industry benchmark figures

But problems appear to lie in certain areas typical to school buildings, including:

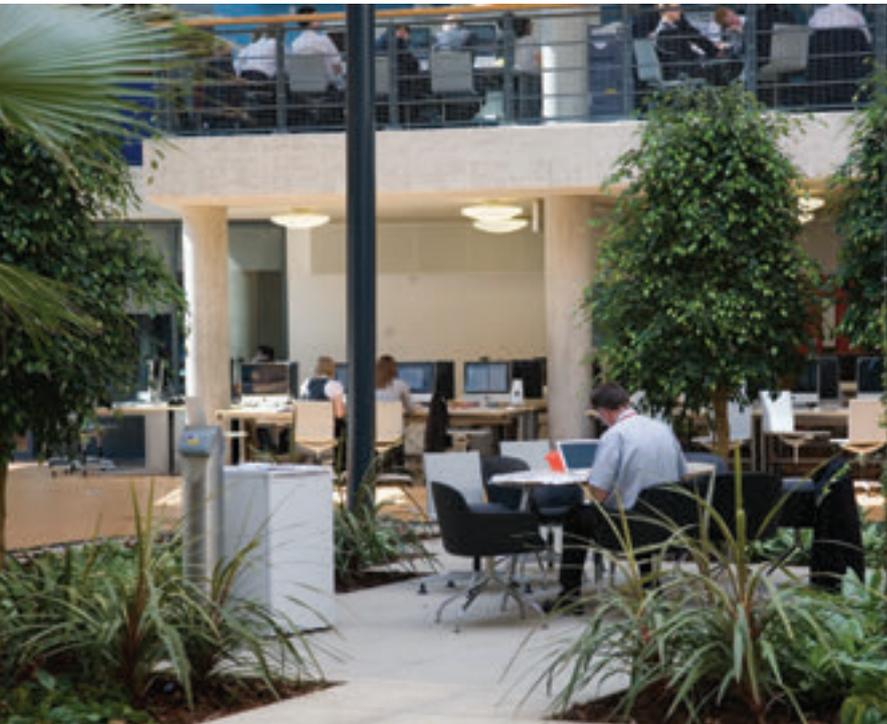
Lights and ventilation are worked very hard in the kitchens throughout the holidays

Empty shelves are kept chilled

Lighting in large communal spaces is left on

Prolonged use of the audio-visual facilities are using more energy than anticipated

Currently the building in operation is consuming energy at a level equal to that of a contemporary new school



> volume units. Here the heat is recycled and used elsewhere in the building when required, providing free heating and much better co-efficiency on cooling loads.

“Currently the whole building, when in operation, is consuming energy at a level equal to that of a ‘contemporary’ new school, which for BDP is a disappointment,” concedes Warne. “It would be too easy to blame the occupants, the operation of the building and the increased energy loads, and walk away.

Future challenge

“Instead, BDP sees the challenge as one of maintaining a role within the new building beyond that of the design team and more as a friend of the school, to help steer them into a low-carbon culture and educate them in how efficiently the building can operate, if managed in line with the design intentions.”

Early indications are that the post-occupancy data, when compiled, will show that gas consumption for the heating, hot water and catering is lower than industry benchmark figures.

However, it will also show that the electrical consumption is higher than the industry benchmark figures for secondary schools, but in line with other new academies, says Warne.

“What is interesting about this upward spiralling trend is that it is in line with Econ19 energy figures for electrical energy consumption of offices, which is related to the common increase in hours of use, levels of ICT and increased small power provision.

“The post-occupancy figures [that are in the process of being gathered] will shed light on what proportion is from small power, lighting, ICT, etc.”

Throughout the project there was pressure on BDP to reduce costs, meaning all decisions had to be tested

The computer and technology facilities in the school presented a challenge in terms of energy drain

“BDP sees the challenge as one of maintaining a role within the new building to help steer the school into a low-carbon culture.”



CIBSE Low Carbon Performance Awards 2010

Now in their 3rd year, the CIBSE Low Carbon Performance Awards recognise and reward proven achievements in delivering carbon savings in buildings. These high-profile awards showcase innovative and inspirational low-carbon solutions and highlight carbon reduction in both the design and management of buildings. Entries are now invited for the 2010 awards. The award categories are:



- New build of the year;
- Refurbishment of the year;
- Product innovation of the year;
- Low Carbon Consultant of the year (only open to CIBSE LCCs);
- Low Carbon Energy Assessor of the year – EPC (only open to CIBSE LCEAs);
- Low Carbon Energy Assessor of the year – DEC (only open to CIBSE LCEAs);
- Client of the year – Energy performance;
- Client of the year – Low carbon operation; and
- Low Carbon Manager of the year.

Make sure your projects get the attention they deserve! Previous winners have included Transport for London, Faber Maunsell (now known as AECOM) and i-prophets, to name just a few.

The deadline for entries is 30 October 2009, with the awards presented in February at a high-profile ceremony at London’s Grosvenor House Hotel. For further information, criteria for entries and entry forms visit: www.cibse.org/awards2010

time and again to see how money could be saved.

But its success has seen it crowned an international exemplar of best practice in school design by the School of Architecture at the University of Sheffield, as well as being announced as winner of this year’s *Times Educational Supplement* Award for Best New or Refurbished Secondary School, and runner-up in the New Build Project of the Year in the CIBSE Low Carbon Performance Awards 2009. In 2008 it won Best of Best in the Building Services Awards, as well as Best Use of IT and Project of the Year.

Since Leigh’s inception, Warne believes funding for sustainable solutions is now available, clients are more aware of the importance of whole-life costs over capital costs, mandatory planning and building control targets are increasing in aspiration, and people are starting to appreciate the value of POE. So, rather than Leigh Academy being the start of something new, Warne says, “perhaps it’s the end of something old, perhaps the future is about to get a whole lot greener – we can but hope”. ●

Check out two more stars for top hotels

Two new 'stars' make life simpler for hotel air conditioning system designers and installers, and make life easier for hotel guests. Mitsubishi Heavy Industries (MHI) has introduced a new duct-connected indoor unit, suitable for left-handed or right-handed rooms served by a central service shaft, and an easier-to-use room temperature controller.

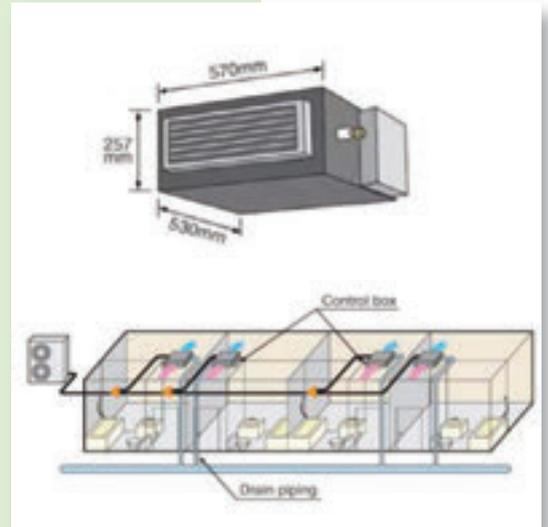


Indoor unit for left-handed or right-handed rooms

The FDUH units, used with MHI's high efficiency KX VRF (Variable Refrigerant Flow) outdoor units, are designed for applications – such as hotels – where services to adjoining rooms are run through central ducting. The new FDUH can be installed with connections on either the left-hand or right-hand side of the unit as required, allowing easy routing of pipework through a shared service shaft. Because electrical cable and pipe runs don't need to loop round the unit, it saves installation time and cost and can be fitted into tighter spaces.

Ordering and stock handling is simpler because only one type of unit is required. The FDUH is available with cooling capacities of 22kW, 28kW and 36kW.

MHI Sales Manager, David Lettis, says: "We are constantly looking for optimum solutions for our customers' applications. The FDUH allows for simpler, quicker and more cost-effective installation and, in the case of multiple units in a hotel project, that means a time and cost saving many times over."



Easier-to-use hotel room temperature controller

The new RCH-E3 controller is a simplified version of the proven RC-E3 model, used with MHI's VRF systems for some time. The special hotel room control panel retains the best features of the existing model, including the easy-to-read LCD display and installer-friendly two-wire installation, but has only the functions needed by hotel guests.

The RCH-E3 allows guests to control on/off, temperature, and fan speed, but users are unable to set excessive temperatures or swings which could reduce system efficiency. Room temperature either remains at the

user's setting or can be returned automatically to a predetermined level by the hotel's Building Management System (BMS). Programmable timer functionality and other advanced functions are also controlled centrally through the BMS.

David Lettis says: "Simplicity and ease of use are high on the list for hotel applications and the new RCH-E3 controller provides these. Hotel guests want air conditioning which they can adjust with the touch of a button; hotel managers want a system for maximum efficiency without users overriding important functionality."



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Special report



Social housing

Sector shows how to cut carbon and slash energy costs



From the editor



A sector that is showing the way

Welcome to this special report on social housing in the UK. At a time when the government is promising to invest more to boost the provision of affordable homes, while at the same time pushing for more low-carbon dwellings, it is appropriate to focus on the contribution that social housing can make to sustainability.

And so our first report looks at the award-winning Clay Fields development, which sets the bar high when it comes to eco-friendly affordable homes. What is particularly striking about this project – in addition to its array of energy saving features – is the use of a variety of locally generated materials, including hemp for the ‘hempcrete’ walls that are said to lock in carbon.

The second report shows how social housing landlords can set an example for commercial developers to follow when it comes to retrofitting existing properties to make them greener. Congratulations to this group of landlords and to the Energy Saving Trust for successfully improving the

properties concerned, and for helping to cut the fuel bills of the residents. Clearly, when it comes to social housing, reducing energy costs is a crucial outcome for those on lower incomes.

As consultant James Honour points out in the third article in this special report, social housing does make

up only a small proportion of Britain’s total housing stock – and so retrofitting this sector will not have such a significant impact on the carbon footprint of the nation’s dwellings. However, he rightly argues that the sector can lead by example – as the other preceding articles demonstrate – and it is particularly well placed to encourage occupiers to adopt more eco-friendly lifestyles

as part and parcel of the process of using renewable technologies such as heat pumps.

We hope you find this special report stimulating, and we look forward to receiving your views on the issues raised in these articles.

Bob Cervi, Editor

bcervi@cibsejournal.com

“ Social housing landlords are particularly well placed to encourage occupiers to adopt more eco-friendly lifestyles. ”



istock/Sean

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The UK public housing sector has shown that it can build dwellings that are both low-cost and sustainable.

Simon Ellery looks at one recent award-winning example.

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What needs to be done to bring sustainability to the social housing sector in the UK, particularly in light of the government’s plans to boost this sector? **James Honour** offers some answers.

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Fabric of the community

The UK public housing sector has shown that it can build dwellings that are both low-cost and sustainable. **Simon Ellery** looks at one recent awarding-winning example

Amid high fuel costs, pressure for greener homes, and communities insisting that new dwellings must blend into the environment, a new UK social housing development has been lauded for its successes in meeting those demands.

This summer the Clay Fields development won the Future Proof Award at the Housing Design Awards for its eco-credentials. It features striking architecture with sustainable construction, including a biomass heat plant that uses local forestry for fuel.

Called Clay Fields, the project emerged through a Royal Institute of British Architects competition, set by Orwell Housing Association, for a new affordable housing development in the town of Elmswell, Suffolk. The engineering consultancy behind the development, Buro Happold, says it produces among the lowest carbon emissions of all similar multi-unit residential projects across the country.

The 26-home development is in a rapidly-growing

Clay Fields

Main project team

Client: Orwell Housing Association

Architect: Riches Hawley Mikhail Architects

Landscape architect: J&L Gibbons LLP

M&E: Inviron

Structural engineer: BTA Structural Design Ltd

Civil engineers: Cameron Taylor

Contractor: O Seaman and Son Ltd.

Quantity surveyor: Hyams and Partners

commuter belt town, and is a response to a lack of affordable housing. The design, by architects Riches Hawley Mikhail, also won a 2007 Housing Design Award and was commended for its “sense of benign local ecology throughout”.

The project used local materials in its construction, and its heating and hot water are powered by local timber.

Dr Ian Pegg, a senior engineer in Buro Happold’s sustainability and alternative technologies team, said the original brief was to provide a low capital cost solution that maximised carbon savings.

“We never attempted to be carbon neutral, but looked for large-scale cost savings. This was achieved first through strict solar design principles and increased insulation, then through the services – such as whole house ventilation – and finally through biomass.”

One of the region’s oldest crops, hemp, is used in the manufacture of hempcrete, which was sprayed onto a timber frame structure with wooden formwork walls. The

material is a hemp and lime mixture that has excellent environmental and thermal properties and literally locks carbon into the very fabric of the building.

“When hemp grows it absorbs carbon, when it degrades it releases methane,” says Pegg. “When hemp is used for buildings it does not degrade. The hemp displaces bricks, which require energy input to make and transport, and this reduces CO₂ further.”

In another nod to the use of natural materials, the insulation is made from local sheep’s wool.

Teething problems

The developers also encountered some snags, explains Pegg: “There were a number of teething problems that needed to be resolved shortly after completion.”

There was a blockage in one of the dwellings’ rainwater tanks, which caused a temporary leak, but water monitoring carried out by the company identified the problem before it caused major physical damage. This problem was resolved by the manufacturer of the tanks.

Buro Happold also had some issues with the maintenance contract, finding that some of the local companies were not familiar with the biomass boiler technology. Again these issues were quickly resolved by finding a new maintenance contractor.

The shape of the building is designed to exploit the area’s famously flat landscape and low-angled winter sun. All houses face south and are grouped so that short terraces of three-storey properties front the backs of two-storey terraces – always to the south, to make sure low sunlight passes over them.

The scheme is described as being organised “on a human scale and rhythm”. It is a staggered vertical section that maximises passive solar gain in winter and minimises overshadowing.

The homes feel well day-lit, especially the kitchens in the two-story houses. The design allows improved day-lighting of living spaces but also optimum solar gain and daylight penetration.

This also means the homes save money by low energy use, are ecological through reducing carbon emissions, and meet architectural aspirations for a scheme that reflects its local environment.

Key measures help keep carbon emissions low, which is also a key factor for low-income tenants. A wood pellet-fired biomass community heating network provides heating and hot water that is fully automated, with each dwelling individually controlled.

There were issues with delivery of biomass in the early months, meaning a larger consumption of gas than initially expected. This was resolved fairly quickly and now there is a regular supply.

Energy usage is “massively variable and not solely linked to construction”, according to Pegg.

“We found that, in the early months, the biomass was only supplying 30 to 40 per cent of the heat, but we are now consistently at around 70 to 100 per cent per month. We will have to review our numbers at the end of the monitoring period.”

Key features

Project uses range of eco-friendly initiatives

Biomass community heating network powered by locally supplied wood pellets

Whole-house ventilation with heat recovery

Controlled mechanical ventilation with heat recovery

Rainwater collection, filtration and usage for toilet flushing and gardens

Use of open, marshy drains to deal with water run-off

Use of hempcrete on wooden walls to ‘lock’ carbon, from locally-produced hemp

Wall insulation from locally-produced sheep’s wool

Modelling of building envelope and glazing ratios to meet lighting and design needs

Ongoing: in-situ monitoring of energy consumption and performance of each dwelling

Source: Buro Happold

Survey

But how did the tenants cope with the buildings’ functionality? A full survey is currently taking place, but the controls are fairly standard, with a timer and thermostat for heating, and instantaneous hot water when tenants turn their taps on.

“The ventilation works in the background with no user interventions, except operating the cooker hood,” Pegg adds. “In summer, the occupants open windows as required.”

The designers say that energy efficiency at Clay Fields is primarily achieved by whole-house ventilation with heat recovery, improved air-tightness and highly insulated walls.

While building regulations demand a U-Value of 0.35 W/sq m K, Clay Fields achieves 30 per cent improvement on this through hempcrete insulation. There is also a 50 per cent improvement in air-tightness.

Clay Fields uses controlled mechanical ventilation and heat recovery. Air is extracted from wet rooms, bathrooms and kitchens, and heat is released to incoming air for living spaces, such as bedrooms and living rooms.

“We have found that energy consumption varies greatly between dwellings, almost entirely due to occupant behaviour. Again, we are looking into this through detailed monitoring and through our [current] survey,” says Pegg.

“We are interested in using our feedback as an intervention to get occupants to reduce consumption. For example, we found that people were heating their houses to high temperatures, including 27 deg C in one case, and had not optimised their usage of timer control.”

The development acknowledges that water is a valuable resource and has a carbon cost. Rainwater is collected in 1,000-litre underground storage tanks, filtered via a sieve and a 35-micron final filter, for use in flushing toilets and watering gardens.

Excluding landscape, biomass and consultancy fees, the construction costs come to £1,300 per sq m, which compares favourably with the housing association’s usual design-and-build cost.

The outside spaces also contribute to a shift to a less carbon-hungry lifestyle. Not only is there a communal allotment where the community can collect compost and grow vegetables to share, but there is also a wildflower meadow, an orchard growing apples locally, and a playing field.

The scheme revives natural techniques to combat the problem of waterlogging in winter, with run-offs going into open, marshy drains. The drains also separate the pathways, play areas and planted areas, while mimicking the pattern of ploughed fields. Local clays, earth and chalk also reflect the English rural vernacular, with no steel and minimal concrete used throughout the site.

This development may have won the future proof award at the Housing Design Awards this year, but the materials and ideas employed are firmly rooted in the local area. ●

■ There were a number of teething problems that needed to be resolved shortly after completion. ■



Fit for the future

Schemes for improving established social dwellings show what can be achieved to cut carbon emissions from Britain's existing housing stock, writes **Carina Bailey**

In a typical residential street in an ordinary English town, something extraordinary has happened: six 1950s homes in the social housing sector have had their energy consumption slashed by between a half and four-fifths. The feat was achieved by an umbrella organisation for registered social landlords, the Building Research Housing Group (BRHG), in partnership with the Energy Saving Trust.

Work on the project began in Kingsley, Hampshire, almost two years ago. At that time, the partnership had ambitions to achieve the Generation Homes standard – an initiative funded by the trust that aims to establish a systematic approach to reducing carbon emissions from existing homes by more than 60 per cent.

However, SAP (Standard Assessment Procedure) software modelled an average cut of 75 per cent in CO₂ emissions for the six properties. And later monitoring of the homes has shown that emissions have been reduced by between 49 and 83 per cent across the homes.

Paul Ciniglio, a BRHG member and sustainability innovation manager at social housing group Radian, which owns the homes, says the properties cost about £23,000 each on average to transform. The project was part-funded through grants from the trust and the

government's Low Carbon Buildings Programme.

The retrofitting programme involved using a mixture of different energy saving techniques and renewable technologies. According to Ciniglio: "It's critical that we always get the basic measures, the energy efficiency measures, right before we start considering the more costly, renewable energy measures."

The energy efficiency measures included filling in cavity walls, fitting lofts with new insulation and switching to low-energy compact fluorescent lamps (CFLs). Air pressure tests were also conducted before and after the refurbishments, which led to some draught proofing being carried out to the fabric of the properties, a mixture of bungalows and houses. A heat recovery ventilation system was also installed.

The addition of a waste water heat recovery system, a >

■ It's critical that we always get the basic measures, the energy efficiency measures, right before we start considering the more costly, renewable energy measures. ■

Legislation

Retrofitting is key to meeting UK target

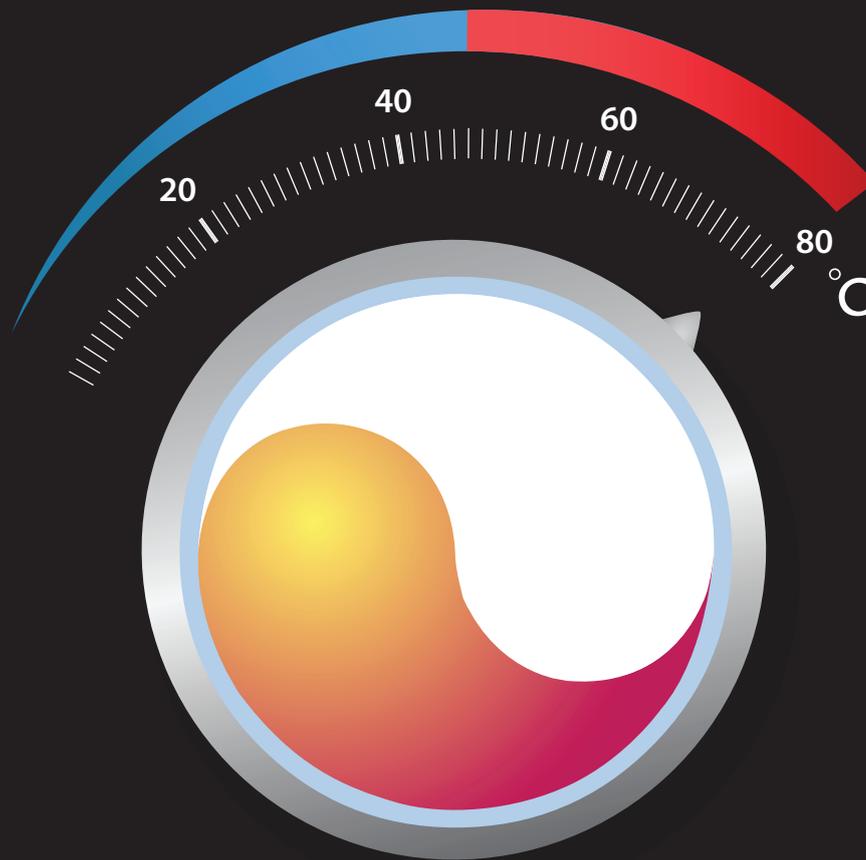
The Climate Change Act, passed in 2008, committed the government to an 80 per cent cut in carbon emissions by 2050

There are about 26m homes in the UK and it is estimated that 27 per cent of the UK's total carbon emissions emanate from buildings

Around 85 per cent of homes standing today will still be in existence in 2050, and in order to meet the government's target of retrofitting 7m homes by 2020 – an ambition cited in the Heat and Energy Saving Strategy earlier this year – more than 500,000 whole-house refurbishments will need to be carried out each year



Social housing properties in Petersfield, Hampshire, run by a Radian housing association, have been improved



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Retrofits of social housing can act as a model for the wider housing sector

BRHG

Push for social housing improvement

The Building Research Group was formed in 1992 as a social housing providers' network, working in partnership with BRE, with the aim of sharing information, experience and documents to save time and costs.

Membership is open to social housing provider organisations, commercial entities providing services to this sector and individuals working for social housing providers through full, affiliated and special membership.

Members have an overall responsibility for more than one million homes, and for expenditure of more than £2.2bn per year on maintenance, management and development.

www.brhg.org.uk

first for Radian, involved removing a section of vertical waste pipe serving the shower and the bath water, and replacing it with a coiled copper heat exchanger. Normally, 80 per cent of the heat goes straight down the drain from this type of waste water, but this system helped to recycle 60 per cent of the heat.

"I think the payback in a domestic situation would be very long but you can understand that this type of technology used in a sports centre [for example] could probably fare very well indeed," suggests Ciniglio.

Renewable technologies used in the project included installing ground source heat pumps and small photovoltaic (PV) solar panels.

Another aim of the project was to cut residents' heating and hot water bills in half, as some were paying as much as £1,300 a year, using open fires and solid fuel. Some residents have reported up to 50 per cent savings on their bills, although others realised no savings at all. Ciniglio attributes this to some residents taking advantage of their new thermal comfort.

Concrete examples

A current project that Drum Housing Association, part of the Radian Group, is working on in Petersfield, Hampshire, involves retrofitting 20 homes that are constructed from precast reinforced concrete panels, known as REEMA buildings.

In these properties the annual heating and hot water bills were up to £1,200. The aim of this project was to not only reduce this figure, but to reach a 70 per cent reduction in CO₂ using energy efficiency measures.

It was decided that three empty houses would have solar technology installed in an attempt to reduce CO₂ emissions by a further 20 per cent to match the government's target to cut emissions by 80 per cent. It is hoped the other properties will be upgraded with PV once more funding becomes available.

Before the project started, the homes were rated in band E in their energy performance certificates.

Nine measures were used in total to make the homes more energy efficient, and were carried out incrementally. The first was to place 100mm of phenolic external wall insulation on the properties. Using SAP software to model the carbon emissions reduction, this reduced the properties' CO₂ emissions from more than 7,400 kgCO₂/yr to 4,800 kgCO₂/yr, potentially taking the properties into a band D energy efficiency rating.

Next, Drum improved the properties' air tightness, which modelling showed should shave about 150 kgCO₂/yr more from the homes' yearly carbon emissions.

Following that, loft insulation was doubled and A-rated boilers were installed, placing the homes into band C and reducing their CO₂ emissions to fewer than 2,750 kgCO₂/yr. The properties stayed in band C while further refurbishments were carried out, including changing the light bulbs to CFLs, replacing windows with A-rated double glazing, and installing heat recovery ventilation and solar thermal water systems. This took the carbon emissions down to fewer than 2,080 kgCO₂/yr using SAP modelling.

The three empty homes then had PVs installed, which took the emissions down to fewer than 1,640 kgCO₂/yr and elevated those properties into band B.

Model examples

The works cost about £25,000 per house, a figure which grew to £38,000 once PV packages were included. In terms of total emissions, all the homes (except those with PV) are modelled to achieve a 67 per cent reduction in CO₂.

One home that was heated by electricity should achieve a 76 per cent drop in CO₂ emissions, according to Ciniglio.

He believes projects like these are important as they can act as examples showing how high carbon savings can be achieved, although he estimates that there are probably less than 100 examples of retrofit homes hitting the 80 per cent target in the country.

Ciniglio says the projects described indicate that it is possible to achieve carbon savings in excess of 60 per cent in existing social housing through energy efficiency measures; and adding renewable technologies can increase this to around 80 per cent. But residents' support is vital to ensure the technologies deliver their potential savings.

Radian spent more than a year educating residents about ground source heat pumps in order to get maximum benefit from them in Kingsley, work which is still ongoing.

But Ciniglio adds that installing technology is not enough: "We're going to have to work closely with residents to influence behavioural change." ●

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A chance for us to lead by example

What needs to be done to bring sustainability to the social housing sector in the UK, particularly in light of the government's plans to boost this sector? **James Honour** offers some answers

Social housing alone clearly can't save the planet: only 4.5m out of 26m dwellings in the UK are managed by local authorities or registered social landlords (RSL).

But the sector does have a vital role to play and can lead by example. The private sector can help by coming on board as soon as possible with the Code for Sustainable Homes' (CSH) targets to bring better supply chains and lower costs. For refurbishment, clearer targets and guidance need to be issued from central government and the Homes and Communities Agency on how we ramp up to achieve the national target of cutting emissions by 80 per cent by 2050 (the C80 target).

Ultimately, new legislation will be required. A new Code for Sustainable Retrofit could help provide a framework. Then, it is likely that each RSL or local council organisation will need to have a dedicated person or team to tackle the sustainability agenda.

With new-build housing being able to benefit from the CSH, existing stock is the real worry now. It has been estimated that four dwellings per minute of every working day from now until 2050 need to be refurbished to a C80 target. The clock is ticking.

Education

Let's put tenants first. They will need to be convinced of the importance of carrying out sustainability works and agree priorities. Many tenants would choose to have their kitchen renewed rather than have slower running showers and smaller baths.

Tenant involvement in sustainability issues needs to be increased, which can lead to behaviour change and, for example, using smart meters. Clear and simple instructions for innovative system operation needs to be given and we must get the technology-versus-resident fit right.

When considering allocation of resources, how much should be invested in sustainability and energy saving, and how much in mitigation works? We need a balance, with funding for micro-generation in properties in a



Retrofitting social housing is important to cutting emissions

medium to high-risk flood plain area, and investing in flood mitigation where possible. Do budgets for re-roofing need to be increased, for example, because specifications need to be upgraded to cope with higher wind speeds?

Profiling

Social housing providers need a more detailed understanding of the risks and status of their stock than is currently held. Some have detailed SAP data, most will probably have cloned data and the benchmark will be the stock average. Stock condition surveys generally do not cover issues such as water consumption, waste disposal and transport. But there is a case for saying that future surveys should have a broader brief to cover some of this data.

Energy Performance Certificates on properties, as they become vacant, will add to the information database; but with a 5 per cent annual turnover of tenants, it would take 20 years to certify them all, even assuming the same property did not change hands more than once.



“ Let's put tenants first. They will need to be convinced of the importance of carrying out sustainability works and agree priorities. ”

Effective operation of an asset management strategy and full stock condition data (including accurate baseline energy ratings) will be essential in order to target the limited resources most effectively to bring about the best outcomes for emission reductions and improved affordable warmth.

As a consequence of profiling, asset management decisions can be taken on possible disposals, redevelopment or investment. More work is needed on life-cycle costing analysis, as the lowest initial capital cost is rarely best value over the life of the asset.

Funding

In addition, grants need to be simple to access, secure and less fragmented. It also needs to be clear what they are for. Grants and incentives should be available to properties of providers who can demonstrate that the impact will be significant in terms of cost, carbon reduction and effectiveness. An innovative and feasible finance package must now be set, to span the next 40 years, to fund the C8o refurbishment programme. It could be a cocktail of funds created from many sources earmarked for a national housing refurbishment fund for expensive whole-house retrofit projects.

It is likely that residents will need to contribute to the investment. It could be useful to have some comparative data on piecemeal works against blitzing an area. But we must not neglect other important social housing issues, such as space standards, security, fire measures and digital access, to name a few. Equally, we must not take our eye off other key environmental issues such as water efficiency, ecology, waste, water butts, cycle racks, recycling facilities, health and well being.

High-tech and micro-generation solutions are causing some concerns. If they become widespread, there needs to be a new breed of engineer working in the sector to ensure that they are properly maintained and serviced and to plan ahead for those costs. The many good pilot examples in social housing need to be rolled out so that learning and experience can be obtained and effective monitoring and review systems put in place. Members of the BRHG plan to share knowledge and findings of what works and what doesn't, for example via databases of performance in use.

Quality and tolerances of work done on site are always important. Better training and apprenticeships are needed to help bridge the new skills gap. Suitably trained and qualified people on site should be recognised for their skills and paid for the pride taken in their work. The good work done by a capital works team must not be undone by a general repairs team. For example, plumbers and electricians may puncture the fabric of an airtight house without realising what they have done. There is plenty to be getting on with. ●

James Honour RIBA is a senior consultant in Housing Enterprise Centre at BRE and manager of the Building Research Housing Group secretariat, which can be contacted via Dolores Kelly at +44 (0)1923 664293, kellydm@bre.co.uk

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Bright ideas for a low energy future



Lighters of the 21st century face possibly the biggest challenge of all – to slash the energy used in the humble bulb. **Carina Bailey** reports on what the industry has to do to create good lighting with less energy

The key to energy efficient lighting lies in the very lamps we use, but focusing on this alone will not be enough to create good lighting. This view was expressed by consultant David Loe at the recent Society of Light and Lighting debate on the topic. Good lighting is about more than its energy consumption, and has three important elements to satisfy: visual amenity, visual function and the health of the people it serves. If any of those points are neglected, Loe argues, the industry is failing its customers.

At least 20 per cent of the UK's electricity is consumed by lighting, equating to 34m tonnes of carbon dioxide emissions. Just over 57 per cent of this 34m tonnes is accounted for by the services sector, 13 per cent by industry, and 30 per cent by domestic use. Loe warns that, if lighting professionals don't think seriously about where this energy is consumed, "silly, limiting" decisions will be made.

Energy-efficiency technologies already available in the UK aren't being used to their full potential, argues Loe. If automatic and manual lighting controls aren't user-friendly or do not enable individual lights to be turned off when they should be, the system will consume much more energy than predicted. "Unless that's seriously thought about in terms of the user requirements, then it will fail," he adds.

Households in the UK currently spend £2.4bn on lighting – about £100 per house. By 2013 it is anticipated that the banning of the filament bulb and a move towards compact fluorescent lamps (CFLs) and other sources will have reduced energy use by as much as 8,000 GWh per year, the equivalent of the electricity generated by one power station.

The latest predictions suggest that, by 2020, useable LEDs should have emerged and, by 2040, incandescents should be completely eradicated, with energy consumption slashed by 90 per cent – dropping from around 18,000 GWh a year now to around 2,000 GWh a year by the mid-2030s.

Brian Jacob, of Philips Lighting, enthuses about the massive carbon savings that could be made using energy-efficient light bulbs: "If [General Lighting Service (GLS)] lamps do go it would save 156m barrels of oil a year, which equates to 38m tonnes of carbon a year – a >

■ **Households in the UK currently spend £2.4 billion on lighting – about £100 per house.** ■



Good lighting needs to satisfy a range of criteria, say experts

“If we’re going to save energy it’s going to cost money, we can’t do it on the cheap.”

– David Loe



the industry knows little about, and one where more research is needed, Loe argues.

New research yet to be published by Tom Cantwell, a senior lecturer at the Dublin Institute of Technology, also claims that the UV risk from single-skin CFLs could be higher than previously thought, which some fear could raise the risk of cancer. But Jacob says that a single-skin CFL lamp secretes a microscopic amount of UV which, if concentrated eight inches away from the skin for one hour, has the same effect as being outside in the sun on a winter’s day.

Another factor which lighters need to consider when designing luminaire systems is daylight, which should contribute to light that people “need, want and enjoy”, adds Loe. Natural daylight became a rationed commodity after the Second World War, when people realised that having lots of windows provided an outlet for heat to escape. But satisfying both won’t be cheap: “If we’re going to save energy it’s going to cost money; we can’t do it on the cheap.”

Loe also suggests that the whole concept of space lighting needs to be reconsidered. He says task lighting could be used more effectively to illuminate a person’s workstation, rather than every square metre of space in the horizontal plane. Loe estimates that doing this could immediately save between 20 and 30 per cent from the electricity lighting load. “You can’t cut [building lighting] out completely, but we just need to reduce it to a lower level; one level on your task, >

> very, very significant 52 medium-sized power stations and the equivalent of planting a billion trees.”

But there is no use comparing a GLS with a CFL bulb in terms of output, stresses Jacob, as a CFL is a diffused light source and so will always give about 10 per cent less illumination: “[GLS] light bulbs have got one source of light and so people see them as being brighter. I don’t think we’ll ever get over that problem, but [CFLs] are great for saving energy.”

Jacob adds that, if every household were to fit three energy-saving light bulbs, it would save the UK enough energy to power all its street lamps.

Light bulbs now come with an energy-efficiency rating, but only those rated A or B will be permitted for use in the future, incandescents will be branded with an E, F or G.

But good lighting with less energy will be hampered if a lighter relies solely on complying with the guides and codes, emphasises Loe: “If you just use the guides, as informative as they are, it will give you a fairly limited idea of the solution.” Loe also criticises the fact that the lighting installed rarely works with the architecture of a building. He says questions a good lighter should be asking include ‘what’s the colour of the lamp?’, ‘can a person do their job in that lamp type?’, and ‘how will glare affect their performance?’.

John Mardaljevic, from De Montfort University, agrees that lighting designed by software simulations alone where today’s compliance targets are being chased, is likely to be worse than that proposed by an expert designer, who has experience and intuition to draw upon. Working strictly to guides and codes alone will also fail to help a designer create lighting that positively affects people’s health. This is an area that

Classification

EU energy label classes for different lamp types

Incandescent
E, F, G

Mains voltage halogen
D, E, F

Low voltage halogen
E

Halogen IRC 50 per cent energy saver
B

Retro LED
B

Compact fluorescent with cover
B

Bare compact fluorescent
A

Banned bulbs timetable

Stage	Date	The following lamps may no longer be put into circulation
1	1/9/2009	Frosted lamps (apart from Energy Class A) as well as clear incandescent lamps of 80W or above
2	1/9/2010	Clear incandescent lamps over 65W
3	1/9/2011	Clear incandescent lamps over 45W
4	1/9/2012	Clear incandescent lamps over 7W
5	1/9/2013	Raising of quality requirements
6	1/9/2016	Lamps with Energy Class C

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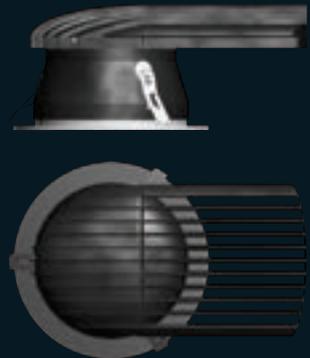
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Timetable

Incandescent bulb phase out by country

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- USA 2012-2014
- California 2011-2013
- Nevada 2011-2013
- EU 27 2009-2012
- Switzerland 2009-2011
- Australia 2008-2010
- New Zealand 2009-2011
- Cuba 2005
- Colombia 2011

Announced

- Canada 2012-2014
- Ireland 2009-2012
- Taiwan 2008-2012
- Turkey 2009-2012
- Malaysia 2012
- Thailand 2012
- Phillipines 2012
- Japan 2012
- Korea 2013
- Sri Lanka 2008
- Brazil 2013
- Argentina 2013

Under Discussion

- Spain
- China
- Singapore
- Pacific Islands
- Mexico
- Chile
- Venezuela
- South Africa

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At a glance: new and emerging technologies

Compact fluorescent integrated

- Electronic HF output at 30 to 50KHz
- Constant, flicker-free, non-stroboscopic light
- UV safe
- Warm up 60 per cent in 60 seconds
- Not affected by switching
- Dimming available
- Good colour rendering Ra 80

Tungsten halogen

- Mains or low voltage
- Excellent colour rendering
- 30 to 50 per cent energy-saving GLS equivalents
- Life two to three times longer than GLS equivalents
- Dimmable
- Clear or ivory finish
- Choice of lamp caps

LEDs

- Good colour rendering Ra 80 (cool Ra 70)
- Warm white available 3,100K
- Very long life (20 years domestically)
- Dimmable
- High energy savings of 83 per cent GLS equivalent
- Choice of lamp caps

OLEDs

- Large area source
- Flat and thin
- Broadband emission from all angles
- Dimmable
- Good colour rendering Ra 80+
- Flexible substrates for future

“About 95 per cent of the energy needed to power a traditional filament bulb is lost through heat, leaving a mere 5 per cent to generate light.” – Brian Jacob

> another level on the surrounding areas.” Users also like the control that task lighting provides.

According to Mardaljevic, a successful daylight design is an elusive optimum that depends on a number of factors, including the design of the building; its aspect; the surrounding context; and the prevailing climate. For him, the answer partly lies in the need for new targets founded on more realistic measures of illumination. These measures are predicted using a technique that he has named climate-based daylight modelling (CBDM). A full year’s climate data is used in the evaluation, rather than utilising a selection or filtering parts out. More work also needs to be conducted into CBDM, including identifying key areas of core or supporting research, and providing guidance on the application. He also believes that useful daylight illuminance (UDI), a relatively new metric for assessing interior daylight, could be a promising candidate for a design target to replace the half-century old daylight factor. But there are issues here too that need to be addressed.

Loe concludes that more lengthy research needs to be conducted by the industry itself, with collaboration from academia, spanning a year, rather than just a day or an hour, to gain a better insight into the “good lighting with less energy” requirement. ●

Tour & Andersson at the hub of balancing technology

The world leading manufacturer of hydronic balancing valves, Tour & Andersson, has launched the TA-H.U.B.[®] (Hydronic User-Friendly Balancing). This is the latest technology for specifiers, offering time (and therefore cost) savings of at least 20% for installation, over 50% for commissioning, as well as significantly reducing maintenance time of waterborne systems due to its single location. The TA-H.U.B.[®] is supported by TA Select 3, software which aids the design and specification of efficient waterborne systems.

The TA-H.U.B.[®] is a completely bespoke system comprising a preinsulated galvanised steel and aluminium unit. Within this is room for up to eight terminal units, complete with drain point, air vent, common measuring point and a flushing bypass. All parts are delivered preassembled and tested by Tour & Andersson at their factory location in Western Sweden.

As a unit the TA-H.U.B.[®] can be specified according to individual project requirements. TA Select 3 is a software package that enables specifiers to choose the right valves for their TA-H.U.B.[®] by inputting the flow and nature of the valve function required and choosing from a selection of recommended valves presented by TA Select 3. In fact, the number of variants of the TA-H.U.B.[®] has been calculated to be over 500 billion. By bundling hydronic balancing hardware into one unit specifying the TA-H.U.B.[®] can reduce the overall cost of a waterborne system. Cost savings are not only related to labour and time spent on installation but also commissioning. The simplified fitting and

commissioning of the TA-H.U.B.[®] means that mechanical contractors spend less time on the job, delivering lower labour costs and helping main contractors to avoid time penalties across a construction project. Because the valves are more easily accessible, commissioning can be scheduled with a lot more certainty, reducing the pressure of handover deadlines and reducing the potential bottlenecks in the process. For the contractor, this means that what were once variable costs can now be fixed.

Recognising that last minute changes occur in 80% of commercial building projects, the additional flexibility afforded by the TA-H.U.B.[®] means that no time is wasted in such an instance. Going forwards the TA-H.U.B.[®] continues to deliver significant cost savings. With trouble-shooting taking place in one location the time normally taken for finding faults and individual valves is dramatically reduced. Meanwhile if there are changes to the scope or use of a building, the valves can be changed



easily because of the flexible connection system afforded by the TA-H.U.B.[®] Peter Rees, Technical Director of Tour & Andersson said: "The TA-H.U.B.[®] really is knowledge in a box. Compiling the technology of balancing a waterborne system into one easily locatable unit, the entire system can be more effectively and efficiently managed. "This in turn has important benefits for the long-term management of the building. When a building is well-balanced there is likely to be less intrusive noise from the system and the indoor environment is maintained at a stable temperature, ensuring the general climate is comfortable for staff. Overall the key benefit has got to be improved efficiency and lower running costs when the TA-H.U.B.[®] is specified and installed."

TA Supplies SWIP Hydronic Balancing

Tour & Andersson has secured an 18 month contract as the main supplier for Scottish Widows Investment Partnership's (SWIP) Exchange Place Development in the heart of Edinburgh's central business district. Under the new contract, Tour & Andersson will supply both balancing and standard line valves, as well as the company's prefabricated TA-H.U.B.[®] solution for the development. The TA-H.U.B.[®] can balance up to eight terminal units and comes pre-insulated from the factory. Designed to deliver significant material and labour savings in installation, commissioning and ongoing maintenance by locating numerous valves in one location and one prefabricated unit, the TA-H.U.B.[®] is also extremely flexible, and offers a completely bespoke range of options for the design engineer. "Tour &

Andersson's depth of product range and technical expertise will prove invaluable in the operation of this contract," comments Graeme Waugh, Tour & Andersson's Regional Sales Manager for Scotland and Ireland. "Also, on a project of this size, the savings that using the TA-H.U.B.[®] make possible can make a significant difference to total costs." SWIP's 18,580m² commercial development, designed by Cre8 Architecture, will occupy a brownfield site on the corner of Fountainbridge and Semple Street, Edinburgh, formerly the location of Edinburgh's Meat Market. The original, 5m high, listed arched entrance to the Meat Market will be relocated along Fountainbridge and will be re-erected between the largest building and the Chalmers terrace facing Fountainbridge. Exchange Place will consist



of three office buildings of 10,459m², 5,496m² and 2,597m². Each building will be of steel frame construction, utilising traditional stone cladding in precast panels and glazing, and finished to Scottish Widows' specifications including ceilings, floors and carpets. The development was completed in Spring 2009.

Essential extras



Neglecting ancillary items such as pumps, valves, pipes and controls can cost a consultant's end-user client dear. That's why it pays to take an interest in the specification of this smaller building services equipment, says **Ian Vallely**

There is a temptation for consultants to concentrate on larger, more energy-intensive items such as chillers, air handlers and fan coil units at the expense of smaller "accessories" when designing a building services system, because the pay-off in terms of energy efficiency can appear bigger. However, items such as pumps, valves, pipes and controls play a crucial part in terms of both energy efficiency and performance – so it makes good business sense to pay attention to them.

As in every other facet of building services, a key issue with ancillary equipment is energy efficiency.

Pump systems are often operated inefficiently in terms of energy, according to the British Pump Manufacturers Association. The reasons depend on the pump application. "But the constant outcome is the cost to industry through wasted energy, which runs into millions of pounds per year, and the cost to the environment through the generation of this wasted energy," it says. More recent developments such as variable speed pumps can help counteract this.

Correctly specified valves also offer environmental benefits. They can, for example, negate refrigerant leaks and their associated environmental costs. But it is not only environmental costs that are affected by apparently minor building services equipment. The financial implications can also be considerable. Pipe-work, for example, can have a disproportionate impact on a project.

Much time can be saved by effective planning, but having products that are quick and easy to install can also reduce labour time on a project dramatically. Over the next two pages, we look at some of the latest products in these vital areas.

Valves

● Pegler Yorkshire is launching a new range of products including press and push connection valves and the Ballorex Venturi static commissioning valve.

The press connection valves are available in bronze to connect to copper, carbon and stainless steel pipe all with leak before press (LBP). There is, says Pegler Yorkshire, no need for different connectors for different materials.

The factory-fitted and tested connectors are designed to suit valves DN15-DN50, and any BSPT or BSPP female threaded valve can be adapted. Connections are to 15mm, 18mm, 22mm, 28mm, 35mm, 42mm, 54mm and reducers.

The company's new push connection valves, meanwhile, have been developed from Tectite Pro and are suitable for copper, carbon and stainless tube. Like the press connections, the push connections are factory fitted and tested and suit valves DN15-DN50. Again, any BSPT or BSPP female threaded valve can be adapted and connections are the same as for the press connection valves.

The Ballorex Venturi meanwhile is described as "the most accurate static commissioning valve on the market" at ± 3 per cent across the entire range (DN15-DN300). The valve is designed to be installed in any orientation and is supported by sizing and pipe loss calculation software.

www.pegler.co.uk

● Reliance Water Controls has a new generation of thermostatic mixing valves to help combat the risk of scalding in domestic and commercial bathrooms. The Heatguard DC2 offers TMV2 approved protection for bathers in the home; the Heatguard DC3 is TMV3 approved and complies with the NHS Do8 healthcare specification.

The Heatguard DC2 is approved by Buildcert to the TMV2 scheme for thermostatic mixing valves in domestic properties and meets the needs of the home bathroom or communal washrooms where users should be protected but are not considered to be an especially 'high risk' group.

www.rwc.co.uk

Pumps

● Wilo UK has launched a service allowing enquiries about pump replacement to be sent simply by texting the old pump details to 07500 041411. The replacement Wilo pump is identified and the name and part number will be with the texter in seconds. The text message will also contain technical data, the part number and information about any adaptors that might be required. This service is available around the clock, 365 days a year.

www.wilo.co.uk

● ITT Lowara has updated its range of wet rotor circulators for handling water in heating, air

conditioning and domestic hot water circuits.

Designed for both residential and commercial applications, the new range of TCLSOL and TLCK circulators can employ alternative sources of energy such as solar and geothermal power, and variable speed versions feature an automatic rotation speed adjustment system that allows power demands to be adapted to system requirements.

The use of permanent magnet motors places this range in energy class A, reducing energy consumption and improving its environmental performance.

www.lowara.co.uk



Pegler is adding to its range of valve products

● Danfoss has launched the BVTS thermostatic valve for use in biomass boilers. It has two primary applications. First, it protects boilers against overheating by preventing water reaching boiling point. Secondly, it prevents back-burning.

The BVTS monitors the temperature in the fuel feed system, and if the temperature rises above 95 deg C, the valve will release enough water to extinguish the fire.

www.danfoss.com

● Honeywell pressure reducing valves are designed to reduce water consumption in domestic, commercial and industrial premises. The valves are also designed to minimise flow noise and protect installations from damage caused by excessive pressure.

Honeywell manufactures a range of brass-bodied pressure reducing valves with DN15 to DN50 (0.5inch to 2inch) compression fittings or screwed connections, as well as flanged valves with cast iron bodies up to DN600 (24inch) diameter.

Cast iron valves are designed to reduce overall water pressure to multi-dwelling buildings and to industrial and commercial premises. The brass-bodied valves can control flows to individual floors or sub units.

www.honeywellukwater.com

“ Much time can be saved by effective planning, but having products that are quick and easy to install can also reduce labour time on a project dramatically.”

Pipe-work



REHAU has a range of pipe-work systems

● REHAU's RAUTHERM and RAUPEX polymer pipe-work systems have been used in the 2,000-seat Usher Hall concert venue in Edinburgh to replace the heating, plumbing and chilled water systems.

The original specification for the octagonal Beaux Arts concert hall was for carbon steel pipe-work, but consultant Irons Foulner Partnership switched to the flexible REHAU alternatives "because they could be installed much more quickly and easily in the curved building services duct".

RAUTHERM pipe-work for the heating and plumbing is extruded from cross-linked polyethylene with a co-extruded EVAL oxygen diffusion barrier. The

oxygen diffusion barrier protects ferrous components within the heating system from corrosion. The pipe-work is fully tested to BS7291 and listed in the WRAS directory.

www.rehau.co.uk

● Polypipe Water Management Solutions (WMS) has launched a product and system selector to guide consultants, engineers, specifiers and contractors through Polypipe WMS's full portfolio of products.

The selector includes in-depth information on the testing and accreditation processes undertaken by Polypipe WMS to guarantee the performance of its products.

www.polypipewms.co.uk

● With its five-layer composite pipe, Uponor says it has developed a product that unites the advantages of a metal and plastic pipe and eliminates the disadvantages of both materials. Advantages are said to include: a diffusion tight aluminium core; prevention of the ingress of oxygen; compensation for "snap-back" forces; and less expansion due to changes of temperature.

The Uponor MLCP consists of a longitudinally safety-welded aluminium pipe with an inner and outer layer of high temperature-resistant polyethylene according to German DIN 16833. All layers are permanently bonded together by intermediate adhesive layers.

www.uponorhousingsolutions.co.uk

■ Uponor says it has developed a product that unites the advantages of a metal and plastic pipe. ■

Controls

● The Climastat, Climapro and Climapro RF ranges of "intelligent" room controls from Glow-worm are designed for use with the company's Flexicom, Ultracom and Ultrapower sxi domestic boilers.

Climastat is a room thermostat that controls temperature and the Climapro and Climapro RF are programmable room thermostats with two channels, enabling the householder to set their hot water and central heating to come on either together or at different times of the day.

Climapro RF has the same functionality as the Climapro, except it "talks" to the boiler by using radio frequency technology.

As the temperature in the room approaches the desired set point, the Climastat or Climapro begins to lower the flow temperature of water supplied to the radiators. A lower flow temperature means that the boiler operates more efficiently in, or closer to, the condensing mode. Energy costs are reduced and

a more stable and comfortable room temperature is achieved, says Glow-worm.

www.glow-worm.co.uk

● The new Honeywell DT90 range of digital room thermostats is claimed to cut fuel bills, be good for the environment and help prevent hypothermia among the elderly.

The Honeywell DT90E and DT92E – wired and wireless versions of the same control – are said to match boiler firing to the load on the system so the boiler operates more efficiently. They are designed to increase boiler efficiency by adjusting firing duration with demand and maintain room temperatures around the set point rather than using simple on/off control. They can be used on any boilers, with radiator and underfloor systems, electric heating and zoned heating systems.

The thermostats are also "intelligent": they have a self-learning facility designed to recognise how the heating system responds to its demand signals. They can then adjust to adapt to the thermal characteristics of the building and the heating system to give better control.

www.honeywelluk.com



Glow-worm offers "intelligent" room control



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Holophane brightens up aeroplane maintenance

Extensive refurbishment of a maintenance hangar at Gatwick Airport has included installation of 112 Prismpack high bay luminaires from Holophane Europe, creating a 17 per cent reduction in energy consumption – equivalent to more than 80,000kWh.

Lighting control and illuminance levels have also been improved. Each of the four bays can be illuminated individually, with lighting switched off completely in unused bays or reduced to allow access through the space.

● Visit: www.holophane.com

Hitachi FSN2: cutting-edge air conditioning

Hitachi Europe has launched FSN2 – a new addition to its Set Free line-up of VRF air conditioning systems, allowing greater functionality, control, and cost savings to meet the needs of modern urban buildings.

The Set Free system is already a favourite among installers demanding hard-working products with all-round efficiencies.

The FSN2 delivers on every level – it's cheaper to commission and install than its competitors and offers an impressive array of easy-to-use features.



This includes: easily interfacing with the building's existing BMS; compatibility with all existing Hitachi System Free indoor units; eliminating cold drafts with the off-coil limitation control of the off-coil temperature to within 1°C; market-leading low-noise levels; and the ability to cut carbon emissions by up to 40 per cent.

● Visit: www.hitachiaircon.com or call the Hitachi sales team: 01628 585394

Carrier introduces New Aquasnap air-cooled chillers with non-ozone depleting puron refrigerant

Carrier Corp., a world leader in the heating, ventilation, air-conditioning and refrigeration (HVACR) industry, has introduced Aquasnap 30RB/30RQ air-cooled liquid chillers and heat pumps, with cooling capacities ranging from 17kW to 160kW, increased energy efficiency versus previous models, non-ozone depleting Puron refrigerant, graphical user interface, and other value-added features. The enhancements are largely based on customer feedback, underscoring Carrier's commitment to customer satisfaction.

● Visit: www.carrier.com



JS humidifies snake rooms

JS Humidifiers has supplied and installed five Neptronic SKR steam humidifiers to the Alistair Reid Venom Research Unit at the Liverpool School of Tropical Medicine.

Installed in the snake rooms, each provides up to 5.5kg of steam per hour to maintain the required humidity for the health and comfort of the snakes. The anti-venoms supplied by the unit help save many lives in west Africa each year.

● Visit: www.jshumidifiers.com, call: 01903 850200 or email: dmarshallgeorge@jshumidifiers.com



Classroom ventilation units

Aircraft Air Handling's 260mm-high classroom ventilation units – silenced to nr25; plate recuperator: 60 per cent efficient; air volume: 0-500 litre/s. Heating: LPHW/ELECTRIC. Cooling: CW/DX. Larger air volumes and bespoke units are available.

● Visit: www.aircraftairhandling.com

Comfort control system

TITAN Products has recently launched its new FCU4/RDU comfort control system.

The FCU-4 has the ability to be used in standalone applications, or with its inbuilt BACnet communications as part of an integrated building management system.

The RDU is available in two versions. The RCU/STD is a flush mounted user interface, while the RDU/CR integrates a hotel card key reader and is designed for use in hotel bedrooms.

● Visit: www.titanproducts.com



Wind farm visitor centre breezes in

The first onshore wind farm visitor centre in the UK is about to open its doors at Whitelee Forest on Eaglesham Moor in Ayrshire. At 55 sq. km, the 140-turbine farm is the largest in Europe and is expected to generate enough energy to power 200,000 homes.

Grundfos Pumps worked closely with contractor James Frew from Stevenston to ensure that the pump solution provided would match the high environmental standards set for the visitor centre,

with a range of energy efficient Grundfos pumps – including the multi-award winning 'A' rated ALPHA2 – and a Hydro Multi-E booster set.

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





Ben Richardson, a graduate engineer working for ENER-G

ENER-G launches graduate programme

Sustainable power group ENER-G has launched a structured graduate careers programme for building services, mechanical and electrical engineers.

The company has a turnover in excess of £90 million and more than 700 employees worldwide, with companies in the UK, Hungary, the Netherlands, Lithuania, Norway and Poland, plus joint ventures in South Africa, Mexico and Spain.

In addition to early experience and the challenges of working for a dynamic international business, graduates will complete an off-the-job development programme covering areas such as health and safety, finance, contractual awareness, leadership, presentation and negotiating skills. Graduates will each be mentored by a senior manager to help them achieve chartered status.

● Visit: www.energ.co.uk or call David Evans on 0161 745 7450

Danlers energy saving time lag switches

Danlers Limited designs and manufactures a range of indoor and outdoor electronic time lag switches for lighting or heating loads. Ideal for saving energy, they can be used in a variety of situations to help reduce costs and carbon emissions in offices, factories, schools, colleges, warehouses, hospitals, stairwells and hallways.



Pressing the button switches the load on, and it switches off automatically after the time lag has elapsed. The time lag settings

are adjustable and, being electronic, are consistent and reliable. Easy to install, they use existing wiring, which makes them suitable for both retrofitting and new builds.

● Visit: www.danlers.co.uk
email: sales@danlers.co.uk
uk call: 01249 44337 or fax: 01249 443388

MHIE adds fine air to fine wining and dining at High Timber

Compact, energy-efficient MicroKX VRF systems from Mitsubishi Heavy Industries Europe (MHIE) provide the perfect air conditioning solution for High Timber, a new City restaurant with Thames-side seating.

MicroKX, supplied by FM Air of Welwyn Garden City, and installed by Adcock Refrigeration and Air Conditioning, creates the right atmosphere. The smallest, most energy-



efficient mini-VRF system available, MicroKX, provides flexibility, control and maximum connectability for smaller applications.

● Visit: www.mitsubishiaircon.co.uk

Delmatic's versatile solo lighting control offers wider choice

The new, versatile Metro One Ten Solo lighting control module from Delmatic offers fast and cost-effective compliance with Part L of the Building Regulations. Upgradable to full addressable control, it delivers a high level of flexibility for a wide range of applications.



Control parameters include presence detection with corridor holding function, emergency test, daylight linking and local switching with 1-10V or DALI dimming options.

● Visit: www.delmatic.com

com, call: 0208 987 5900, fax: 0208 987 5957 or email: sales@delmatic.com



Keston expands to meet customer needs

As part of its policy to constantly improve customer service, Keston has expanded its service division to provide broader geographic coverage across the UK. With a new fleet of fully-equipped service vehicles and a team of highly-skilled engineers – led by Simon Hall, pictured – who are based throughout the UK. Keston aims to improve response times and offer potential and existing customers technical support, both on and off site.

● Visit: www.keston.co.uk, email: info@keston.co.uk
or call: 020 8462 0262



Luxo At Healthcare Estates Exhibition 2009

Luxo will be launching its new energy-saving LHH LED examination and minor surgery luminaire on Stand B25 at the Healthcare Estates Exhibition on 27 and 28 October 2009.

This versatile minor surgery luminaire is now available in an energy-saving LED version with 7xLED and a minimum of 10,000 lux. Its shade neck can easily be positioned horizontally, vertically and laterally, using the spring balanced arm.

● Visit: www.luxo.co.uk, email: office@luxo.co.uk or call: 0208 687 3370

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Revolution colour touchscreen delivers elegant intelligence

Specially designed to be fitted into a standard UK double gang wall box, Philips DYNALITE's DTP100 Revolution colour touchscreen allows users to create and display visually stunning and easy-to-use control pages incorporating logos, buttons, faders, floor plans and diagnostic icons. The LCD touchscreen also enables operators to execute simple and complex conditional logic macros with a tap of the screen.

● Visit: www.dynalite.eu, call: +44 870 608 1101, or email: Paul.Wilmshurst@dynalite.eu

Walter Meier helps Royal Academy reduce energy consumption

In a move to reduce energy and life cycle costs, the Royal Academy of Arts (RAA) in London has replaced ageing air conditioning and humidification plant with Defensor Mk5 humidifiers and Hitachi Samurai chillers from Walter Meier (Climate UK).

The products were specified by consulting engineers Peter Deer Associates Ltd (PDA), in conjunction with the John Ellis, the Royal Academy's Environmental Consultant.



'In replacing the existing direct expansion (dx) cooling system and Defensor Mk3 steam humidifier, which had reached the end of their useful life, we took the opportunity to improve energy efficiency and cost of ownership, as well as increasing the resilience of the system,' explained John Pengilly of PDA.

● Visit: www.waltermeier.com, email: uk.climate@waltermeier.com or call: 0871 663 0664

Rehau authorised partners scheme for renewable energy installers

Renewable energy specialist Rehau has launched an Authorised Partners Scheme enabling installers of its renewable and sustainable energy solutions to benefit from sustained sales and marketing support.

Qualifying companies will be entitled to use a new Rehau Authorised Partners logo in their own marketing, and to access the resources of the global polymer group for both on- and off-line marketing campaigns.



● Visit: www.rehauauthorisedpartners.co.uk



Timoleon first to standardize on A-rated pumps for underfloor heating and cooling

Timoleon is the UK's first specialist underfloor heating company to switch to exclusive use of A-rated pumps for maximum energy efficiency.

'Adopting an A standard for system circulators is the logical extension of our emphasis on low carbon solutions, said Timoleon managing director Darren Trivett (pictured).

'The high efficiency A-rated pumps could potentially save every user up to 30 kg of carbon per year – per manifold!'

● Visit: www.timoleon.ltd.uk/ or call: 01392 363605

Victaulic adds Low-Profile Sprinkler Outlet-Tee to popular Firelock range

Victaulic has added a new item to its popular Firelock range of fire protection products.

Quick and simple to install and approved by Factory Mutual for a wet and dry (oil-free air) sprinkler service up to 300 psi/20 bar, the Firelock Style 912 Low-Profile Sprinkler Outlet-Tee provides a 1/2" outlet for connecting sprinklers directly to 1", 1 1/4", and 1 1/2" piping systems.

● Visit: www.victaulic.com or call Victaulic European HQ on +32 93 81 15 00



Environmental Energy Technology Centre benefits from BG Controls' BMS

BG Controls has recently helped the Environmental Energy Technology Centre (EETC) at Waverley to maximise its green credentials by controlling its natural ventilation and underfloor heating and cooling system.

Built on the site of the redundant Waverley coal mine near Sheffield, the EETC is a modern, low-carbon emitting building designed around renewable energy solutions. Its many eco-friendly technologies include wind turbines, heat pumps, cooling slabs and natural ventilation.

● Visit: www.bgcontrols.co.uk, email: enq@bgcontrols.co.uk or call Duncan Biggins on 01909 517460



Elta builds from overseas seminar programme

Elta Fans, global manufacturer and supplier of fans and air movement products, collected some excellent market information for its worldwide marketing programme following a series of CIBSE accredited CPD seminars on the company's range of car park ventilation products. The tour saw business development manager Dennis Rose, above, visit some 17 cities in New Zealand Australia, the Far East and India in seven weeks, in March and April of this year.

● Visit: www.carparkventilation.com, www.eltafans.com, or call 01384 275 765/6

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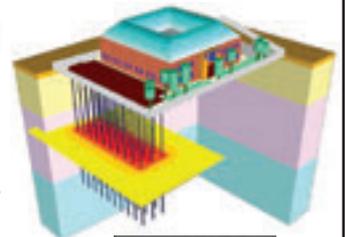
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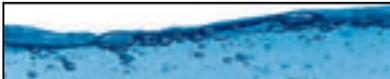
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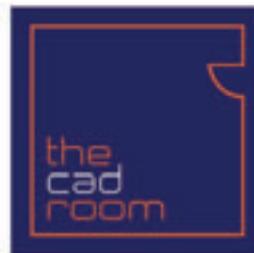
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Sensing the need for demand controlled ventilation

The successful monitoring and control of the quality of room air is becoming increasingly important – particularly as the application of novel building techniques and materials coincide with improved awareness of their effects on comfort and health. This CPD considers the rationale behind demand controlled ventilation systems and the methods used to feed back the demand for that ventilation

Demand controlled ventilation (DCV) is a strategy that attempts to reduce the energy used by ventilation systems while maintaining required levels of indoor air quality (IAQ). Since many buildings will regularly operate at occupancies below the design maximum, the requirement to provide ventilation will also be frequently less than the peak design value. Modern implementations of DCV have overcome earlier problems that arose from inappropriate control and excessively high design system pressure drops. The resulting installations can show significant energy savings resulting most significantly from reduced fan power and reductions in the heating of fresh air. Digital control has enabled systems that, as well as being energy efficient, maintain low noise levels

through the use of both intelligent sensors and purpose made air volume control dampers (see picture, right). This article will particularly consider the need for DCV and the sensors that are used to feedback some measure of air quality.

Demand controlled ventilation

Historically, buildings relied on manual regulation to ensure adequate ventilation. In its most basic form, this would be by the occupant sensing a shift from conditions of comfort (predominantly characterised by people as 'temperature' or 'humidity') and opening, or closing a window^[1]. So, for example, the Victorian and Edwardian classrooms (picture, over page)

cited by Terry Wyatt at the recent CIBSE conference^[2] relied on the teacher making a subjective decision that there was a need

for additional ventilation and then opening a window. Similarly, basic mechanical ventilation systems are controlled by occupants simply switching them as circumstances demand. However, automation allows the monitoring of a condition and the variation of ventilation strategy to satisfy some pre-

set condition that attempts to emulate the human controller whilst, in many cases, minimising the use of energy.

Temperature and humidity are the principal measured and controlled variables in HVAC for traditional systems based on a >



Figure 1 - Specialist DCV Volume Control Damper

> constant volume flowrate, with a combination of cooling and (re)heating to meet design conditions. With the convergence of the 1970s energy crisis and improved control technology variable air volume (VAV) systems that were conceived to alter the volume flowrate to match thermal demand became popular. By regulating the flowrate of air through a properly designed system, (as well as eliminating reheating) significant energy savings could be achieved^[3]. The concept has been developed and refined to produce the modern DCV systems that frequently not only control temperature (and humidity) but also optimise the supply of air volumes, and particularly outdoor air, so that appropriate levels of IAQ are maintained whilst minimising energy costs.

The contaminated internal environment

The continued drive to save energy, together with novel construction techniques and materials in the litigious 1980s and '90s, focused building users and operators on IAQ as 'Sick Building Syndrome' became a household term. The 'contaminants' that actually affect building IAQ are various and numerous.

Both particulate and gaseous matter are likely to be present in the cocktail that makes up the indoor air. Pollutants can be generated through indoor activities such as cooking (particles, carbon monoxide, nitrogen oxides, NO_x) and cleaning (volatile organic compounds, VOCs) while others are emitted from building, furnishing and consumer products such as carpets, adhesives, paints, houseplants and toiletries^[4]. Carbon dioxide (CO₂), as breathed out by people, is frequently included in the list of contaminants.

However, unless it goes above the recommended 1,000 ppm (compared with outdoor CO₂ levels of about 400ppm) it will have a negligible effect on the occupants^[5]. And, of course, pollutants generated outdoors from vehicle traffic and combustion will pass into the space through cracks and openings, mechanical systems, doors and windows. These will include PM₁₀ (particles measuring 10µm or less); fine particles, PM_{2.5} (the size that are manifested as haze in the atmosphere); and the more recently highlighted ultrafine (particles measuring 0.01µm to 0.1µm characteristically associated with diesel engine emissions).

The very mechanism of passing air through poorly cleaned ductwork has itself



A naturally-ventilated Edwardian school

been shown to significantly add to the perception of odours (as measured by the unit of 'decipol')^[6] and hence IAQ.

The occupants themselves will contribute to the cocktail by adding their bio-effluents that will include perspiration, chemicals and gases in their breath. Unless infectious, human bio-effluents are not a health hazard, though CO₂ can build up in unventilated spaces and cause headaches; moisture can raise humidity levels and cause condensation and corrosion; and odour levels may become unacceptable. Since the early 20th century, the general assumption has been that if

■ The effect of non-occupant related, 'building-borne' contaminants challenges previous assumptions. ■

there is sufficient ventilation to control human odours, there will be enough ventilation to control the health effects from other contaminants^[7]. However, the effect of non-occupant related 'building-borne' contaminants (for example VOCs released from materials such as particle board) in modern buildings challenges that assumption. Recent reviews^[8] have shown that far lower levels of VOCs can be sensed

by humans than had previously been thought (hence the long lingering perception of odours from materials used in constructing and furnishing buildings). This olfactory affect, exacerbated at low humidity levels, clearly indicates that the overall perception of comfort may be influenced by factors that are occupancy independent and hence have little or no correlation with the number of people present. The combined effect of all the contaminating influences on human comfort (let alone human health) is difficult to clearly identify, although there has been much research in the area^[9].

Sensors

In buildings where the use is principally characterised by moderate to high occupant densities (eg classrooms, theatres, assembly halls) CO₂ is most frequently sensed to predict the magnitude of the occupancy (and by inference, the IAQ). CO₂ sensors are commonly based on a technology known as non-dispersive infrared detection (NDIR) where the absorption of the infrared red light by the sampled air in the sensor provides a measure of the CO₂ content.

The technology is reasonably mature, having been used for more than 20 years in HVAC applications. However, the sensors are sensitive to temperature and humidity (as well as tobacco smoke, which is now not such a

common concern) and have traditionally been very costly^[10], although recently introduced 'system-on-a-chip' NDIR have significantly reduced costs. Modern implementations of CO₂ sensors use gas permeable membranes to allow the air sample to be analysed whilst keeping larger particulate matter away from the sensor's optical system.

By integrating microprocessor control, sensors can be recalibrated by automatically resetting to the known outdoor air CO₂ levels, frequently (and sometimes erroneously) based on the assumption that the lowest reading of the week is the outdoor concentration. If this assumption is not true, then auto recalibration can drive the sensor into serious error^[11]. Almost all manufacturers certify their sensors for five years or more – and one, notably, provides a lifetime guarantee^[12]. However several studies reported on by Maripuu^[9] have shown that practical implementations of the sensors in the field record significant and unpredictable errors.

Developed from metal oxide semiconductor (MOS) sensors used to sense

“ There's little benefit in saving energy if air quality and occupant comfort is affected. ”

VOCs the technology has recently been applied to determine CO₂ levels. Although the sensitivity to selectively measure CO₂ is traditionally low for MOS technology new semiconductor doping materials have improved this and they are appearing in the marketplace^[9]. It is still a relatively untested technology for CO₂ sensing.

Electrochemical sensors have also been used for CO₂ measurement; however, to date their operational effectiveness is uncertain since they are a relatively recent addition to the HVAC marketplace. They are more resistant to dust and moisture than non-dispersive infrared sensors and quicker to stabilise^[9].

MOS sensors are typically used as 'mixed gas' sensors. The gases in the sample are absorbed by the sensing element's surface so changing the resistance of the surface. By varying the semiconductor material or by operating the sensor at different temperatures and temperature profiles, the response of MOS sensors may be adjusted.

However, they provide a measurement only of the presence of a mixture of gases with no feedback of individual concentration, and so commercially they are used as general 'air

quality sensors'. They are relatively cheap to produce but reports indicate that they need frequent replacement as they drift out of calibration and lose sensitivity. They have been successfully applied in a number of applications as a means of detecting occupancy, including in libraries, and were noted as being particularly successful in areas where there are food odours and cigarette smoke^[9]. Since the sensor output provides an indication of change, rather than a specific value, these sensors are particularly useful where there is a step change in conditions that would signal a change of use of a space requiring a shift in the ventilation regime – for example, a dedicated smoking area at an airport.

Since the installation cost and maintenance requirements of gas sensors may be prohibitive, multipoint space sensing may be used where one sensor is employed to sample many spaces. This uses a network of inert flexible tubing around the building that draws air samples from the different points (that may include the outdoor air) back to a central monitoring sensor. The number of spaces that can be effectively sensed with one sensor is limited by the time needed to draw air from a space and take a representative reading.

Movement detector technology using passive infra-red or ultrasonic sensors are used to determine the presence of occupants and have been widely applied to lighting controls. This can be usefully utilised for ventilation applications (such as classrooms) where there is a known occupancy, but there is some uncertainty as to the periods of use. On detecting occupation, the ventilation systems may be simply actuated or step changed.

Intelligent movement detection is available using infrared sensors combined with advanced tracking and detection algorithms, to count the occupants as they enter and leave a space. This can provide a direct measurement of occupancy (as opposed to the previous inferred methods) and so, if set up correctly, can provide a reliable signal of occupancy levels to the ventilation control system.

Conclusion

The successful monitoring and control of the quality of room air is becoming increasingly important as the application of novel building techniques and materials coincide with improved awareness of their effects on comfort and health.

There is a prerogative to reduce the building environmental impact, but there is little benefit in 'saving energy' if air quality and

occupant comfort is affected detrimentally so that productivity drops, leading to increased operational costs and a potential perverse increase in the carbon footprint. The use of properly-controlled DCV systems can provide improved internal environments while saving operational costs.

© Tim Dwyer

Further Reading

For more detailed coverage of the contaminants see BSJ CPD Article, 'Indoor Air Quality, December 2003 and Chapter 8 of CIBSE Guide A 2006

For an extensive review of IAQ sensing see Appendix A of [9].

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Module 8

September 2009

1. Which of the following were unlikely to have been a key driver for the initial development of DCV?

- A Ability to meet thermal demand while lowering energy use
- B Control of indoor air quality while lowering energy use
- C Increase of outdoor air supply rates to reduce heating loads
- D Desire to reduce the energy employed reheating air
- E Maintaining or improving productivity while lowering energy use

2. What is the level of CO₂ likely to be before it is considered to be a potential concern to occupants?

- A Around 50ppm
- B Around 100ppm
- C Around 500ppm
- D Around 1,000ppm
- E Around 2,000ppm

3. When considering CO₂ detectors the acronym NDIR is short for ...?

- A Non-destructive infrared
- B Non-dispersive infrared
- C Non-dimensional infrared
- D Non-delimited infrared
- E Non-direct infrared

4. Which of these best describes the term 'multipoint space sensing' as used in this article

- A Multiple sensors spread around a building
- B Sensors providing local hot water control for every room
- C An ability to sense many types of gas directly at many locations at one time
- D The use of sensors using MOS technology
- E A single sensor used to provide measurements for several locations

5. The operation of a modern DCV system is likely to be able to perform so that it delivers all of these except one. Which one?

- A CO₂ levels used as an indirect measure of IAQ
- B Reduced lighting loads
- C Controlled room temperature
- D Reduced noise levels compared with early systems
- E Optimised supply air volumes



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Speaker Stephen Matthews, CIBSE's chief executive.

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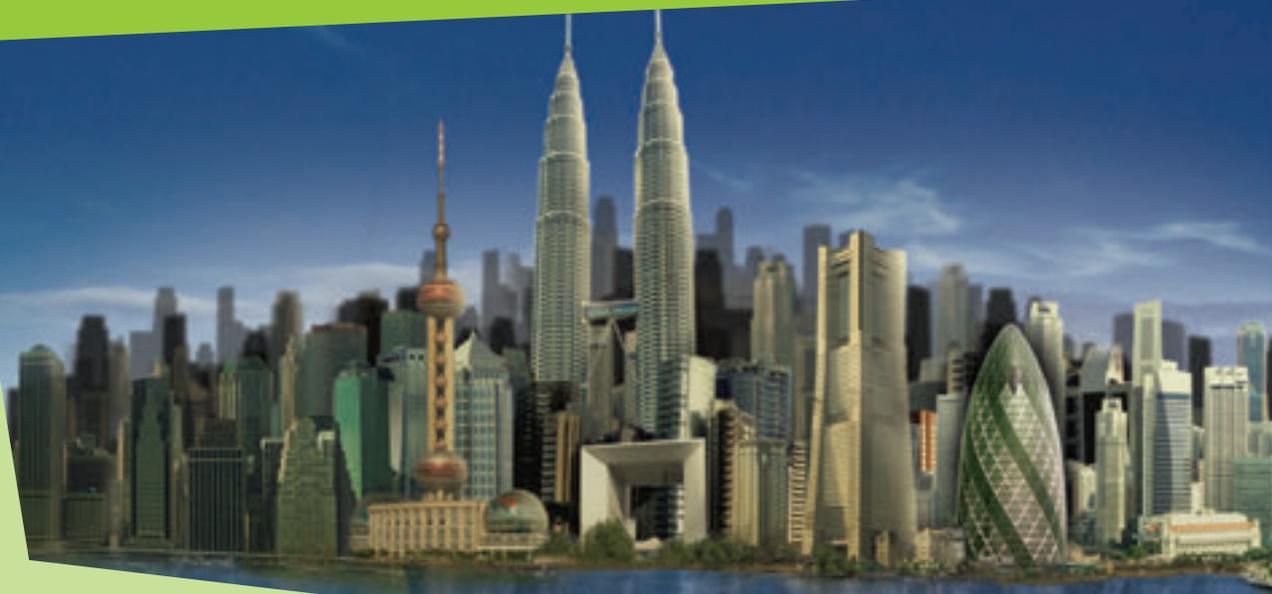
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To do this you will need to be an ambitious and talented individual who has specialist technical knowledge together with exceptional management ability to specify and drive our programmes in these areas. The ability to work as part of a team, exceptional customer core skills and a can do attitude are essential.

In return we are willing to offer all the benefits of joining a top quality company including a generous pension package and flexible working arrangements.

For an application pack, please visit our website: www.barnethomes.org

Please quote reference: BH/260.

Closing date: 18 September 2009.

Barnet Homes is committed to promoting equality, challenging discrimination and developing community cohesion.

We welcome applications from all sections of the community.

We are committed to the Investors in People Standard.

Visit our website at

www.barnethomes.org



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Closing date for all posts: 18th September 2009

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Alternatively, you can call Human Resources
on 024 7688 7814 or email: futures.hr@coventry.ac.uk



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Working within the Department of Estates and Facilities, you will act as the point of contact between the College and outside agencies in relation to energy related emissions and will also be responsible for the renewal/renegotiation of contracts.

You will be educated to degree level or have equivalent experience of energy management, mechanical systems, design, construction or a closely related field. Experience of energy monitoring and targeting software, and writing detailed reports including graphical and financial reports are essential.

Ref: EAS000005 (No agencies please).

Closing date: 18 September 2009.

Interview date: Week commencing 5 October 2009.

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Experience in one or more of the education, health and defence sectors Associate or higher level of accreditation with either CIBSE or IET Degree/HND qualified Proven ability to work as part of a busy team Pro-active approach

In return we offer excellent training/CPD opportunities and a supportive working environment. Emphasis is placed on personal development, training and team building to encourage the growth of informed and motivated staff who are able to view their work as a whole, contributing to the vision and aspirations of all parties. The starting salary will be dependent upon experience and qualifications.

The Practice is also keen to receive applications from suitably qualified and experienced individuals in Mechanical and Environmental disciplines who can contribute to the continued development of the Practice.

To apply please send a current CV to Liz Heighway either at vacancies@edp.ltd.uk or by post to EDP Ltd, Bell House, 30 Bell Street, Romsey, Hampshire SO51 8GW



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County Council vacancies

Principal Energy Engineer

£36,838 to £39,460 a year.

Ref: R00268SH

Lancashire County Council has put energy efficiency at the top of the agenda with a recent restructure of its Property Group. An excellent opportunity now exists for a suitably qualified and experienced professional to lead the Energy Team. With an annual energy bill of some £15M and a portfolio of 2,500 buildings, this is a demanding role and will require the ability to work quickly and effectively towards delivering challenging targets. These will include providing all the County's Display Energy Certificates and working on participation in the Carbon Reduction Commitment.

To be successful you will have a qualification in energy or a related subject, have at least 10 years of relevant experience in the energy field and be able to demonstrate a thorough knowledge of energy management techniques and understanding of the legislation concerning energy efficiency and climate change. You will also need the drive and self motivation combined with experience of managing and motivating staff in this exciting and rapidly developing field of work.

37 hours a week, required October 2009, at Property Group / Energy Team, County Hall, Preston PR1 8RE.

Informal discussion: Chief Engineer, Matthew Tidmarsh on 01772 533243.

This post is covered by the Rehabilitation of Offenders (Exemption) Act 1975. If successful, you will be required to apply to the Criminal Records Bureau for a 'disclosure'. This is an essential car-user's post, set at band 1199cc. However, we may consider you if you cannot drive because of a disability.

Apply online or telephone 0845 053 0008.

Closing date: 25 September 2009.

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Please apply to Rhona Cloherty, enclosing a full CV together with current remuneration details to rcloherty@macdonaldandcompany.com quoting reference 73711. Alternatively call on 0207 318 5865 for a confidential discussion.

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Do your homework...

With jobs becoming scarcer, knowing how to make yourself shine during an interview is vital. **Ben Byram**, specialist building services recruitment consultant at NES, explains how

If you're looking for work, thorough preparation for job interviews is vital. Regardless of your level of seniority, if your interviewer unveils a lack of understanding about the company in question, you're not likely to get very far. Research about the company to which you are applying is essential – and, in this day and age, with a wealth of information at your fingertips, there's no excuse for lack of research.

Most companies will have a 'careers with...' or 'working with us...' section on their website; use this to find out about the culture of the company and identify the traits that would appeal more to the organisation. Do they operate a mentoring policy whereby more experienced workers offer career development support to their less experienced colleagues? Could you demonstrate previous experience of this type of arrangement?

Don't limit yourself to the

company's website/s either; search for news stories and other coverage surrounding the organisation; find annual accounts to familiarise yourself with their achievements; search for their Twitter profile – do what you can to 'swot up' on the business to improve your understanding of how they operate.

During a job interview, you'll need to demonstrate the ways in which you meet the requirements of the organisation – culturally as well as technically. To prepare for this, consider the type of questions that you're likely to face and prepare some answers that highlight your best qualities, skills and experience.

Typical questions could be: How have you made the work of those who have reported to you easier? 'Describe a time that you were the source of information for improving the skills of others.' 'Describe a time that you gave a customer bad news. How did you do this and what was the end result.' 'Give an example of

when you have solved a problem for which initially no answer could be seen.'

It is also a good idea to prepare some questions and have them ready to ask when prompted. For example:

- What plans does the company have for the future?
- What are the objectives of the position?
- What possible training could I receive in this role?
- How would you describe the culture of the company?

With a firm understanding of the employer's requirements and interview style, your recruitment consultant can also offer support and advice to prepare you for an interview. As specialists in their field, building services recruiters can give you tips on how to manage the interview successfully, talking you through an in-depth job description and discussing the relevance of your skills and experience for the position.

For more information contact Ben Byram on +44 (0)161 942 4004 or at ben.byram@nes.co.uk www.nes.co.uk

Email your latest people appointments and role profiles to cbailey@cibsejournal.com

Movers & Shakers



Graham Manly has been elected president of the Heating and Ventilating Contractors' Association (HVCA) for 2009/10. Manly is currently business development manager at Gratte Brothers. He replaces retiring president Gareth Vaughan.



Design and engineering specialist **Morgan Professional Services**

appointed **Martin Brooks** as associate waste and environmental specialist. Brooks was formerly technical director at environment and energy resources consultancy, RPS.



Phil Neary has been announced as new business manager at building services provider, SES, within its west and

central divisions. Neary will be responsible for promoting and developing business relationships within Manchester and the North West. He has previously worked for an engineering, installation and maintenance company in Preston.

CIBSE membership continues to grow

More than 20 new members have joined CIBSE in recent weeks. The new memberships span the globe, with a number from the UK as well as Hong Kong, Beijing, California and Singapore. The institution has also secured three associate members. The full list is:

FELLOW

Roy Andrade	Bath
Nigel Clark	Chelmsford
Anthony Mayo	London
Allan Ranson	Bishop Auckland, Co Durham
Ian Skinner	Sunbury-on-Thames
Mark Tilley	Poole

MEMBER

Chun Fai Chan	Hong Kong
Kwok Kay Keith Cheng	Hong Kong
Tak Pui Chiu	Hong Kong
Isam Elsarrag	Poole
Hong Sheng Fan	Beijing, China
Wai Shan Hung	Hong Kong
Richard Jones	Bristol

Wah Keung Lam	Hong Kong
Ka Chun Lee	Hong Kong
Poh Chuah Lim	Singapore
Jonathan McMullan	Bushmills, Co Antrim
Neill McMullan	Warwick
Colin McNally	Dublin
Fabio Mozzicarelli	London
Harminder Nagi	Nottingham
Michael Owen	Gasquet, California
Richard Piper	Huddersfield
Keith Roper	London
Rafiu Sadiku	London, USA
Matthew Silvester	Passage West, Co Cork
Martin Simpson	Hinckley, Leicestershire
Kamal Taj	Doha, UAE
Michael Valter	Addlestone, Surrey
Yiu Cheung Yau	Hong Kong

ASSOCIATE

Lee Davies	Halesowen
Christopher Leahy	Ballincollig, Co Cork
Mark Ward-Brassington	Stoke-on-Trent

Among the six CIBSE members who have had their membership promoted to Fellow are:



Roy Andrade is currently head of design for M+W Zander UK, part of a global design and management company. He has also been a CIBSE interviewer for the past six years.



Ian Skinner is a senior mechanical associate with Zisman Bowyer and Partners, with more than 25 years experience in the design of healthcare, research and other specialist and complex projects. Ian has an enthusiasm for teaching others that is reflected in his teaching and mentoring of young and graduate engineers.



Nigel Clark is the technical director of Hilson Moran. Having joined in 1988, he has been a member of the main Board since 2005. Based in London, but responsible for their operations in the UK, Europe and the Middle East, he has a strong background in high rise developments and environmentally progressive design.



Anthony Mayo is a project director of Hilson Moran, having been with the practice for 10 years. Based in London, he is responsible for the delivery of the firm's major projects in the UK, Europe and the Middle East, and has been responsible for high rise developments in Abu Dhabi and Dubai.



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For more information on CIBSE online learning visit www.cibse.org/onlinelearning

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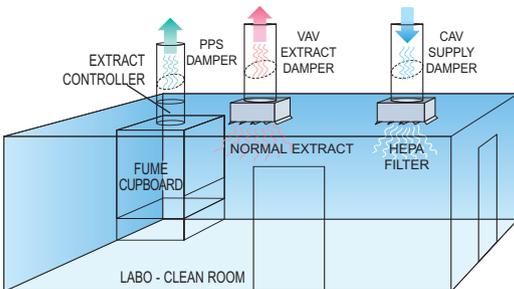


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