

CIBSE

JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

November 2009



Young blood

Meet some of the profession's future leading lights

ENERGY COUNT?

Why DEC's are not being enforced

BUILDING REGS

Advice on revisions to Parts G, J, L and F

SCHOOLS STUDY

Performance data on five academies

RENEWABLES

Pros and cons of solar and biomass



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Contents

November 2009



34



26



42

News

- 8 News**
Top stories include: plan to scrap Olympic venue; mandatory acoustics testing in schools.
- 14 CIBSE News**
The first membership survey paves the way for change; concerns over the EPBD are raised.
- 18 News analysis**
Energy-hungry companies are given a year's financial reprieve under the final CRC Energy Efficiency Scheme.

Opinion

- 22 Letters**
Between the lines of Part G; spreading the EPBD net wider.
- 23 Construction first**
Why now is the right time to lobby political party candidates.
- 24 Legal column**
Another day, another consultation: Part J of the Building Regulations.

Features

- COVER STORY**
- 26 New crop's green ambitions**
Six young engineers who were all shortlisted for a graduate award discuss their future hopes for their careers and the sector.
- 30 Water world**
The implications of the delayed Part G of the Building Regulations are considered.
- 34 On the trail of the inspectors**
An investigation into why no one has yet been prosecuted for failing to produce an EPC or DEC.
- 38 School test**
The post-occupancy evaluations of five academies are scrutinised to identify the difficulties in making secondary schools more energy efficient.
- 42 Renewable solutions**
The heat is on for biomass and solar thermal systems during a thorough examination of the issues.

- 48 Home improvement**
A look at the practicalities of building new homes to Parts L and F of the Building Regulations 2010.

Classified

- 50 Products**
Manufacturers display their wares.
- 52 Directory**
Find the supplier you need.

People & Jobs

- 55 CPD**
Module 10 introduces absorption refrigeration, an alternative cooling cycle.
- 60 Looking ahead**
The Society of Light and Lighting's Centenary Dinner and other events, conferences and training in the month ahead.
- 66 People**
How to survive competency-based interviews and CIBSE's new members.

High-Performance Green Buildings

geometry design geometry
generative components
architecture generative
components geometry
design sustainability
architecture generative
components architecture
architecture design



Image courtesy Hamilton Associates



Image courtesy Foster+Partners

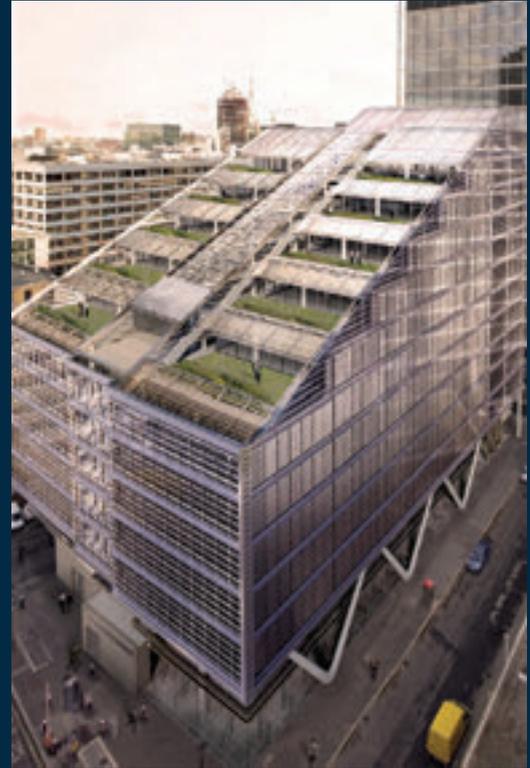


Image courtesy HKR Architects

SOFTWARE FOR BUILDING ENERGY DESIGN, ANALYSIS AND SIMULATION

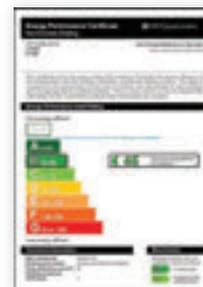
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From the editor



Wealth of green ambition

If there's only one thing you read in this issue (apart from what you're reading now, of course), it has to be our cover feature on new entrants to the profession (page 26). The simple reason is that, as we approach a very uncertain future in 2010 - will the Copenhagen climate talks next month make any significant difference; is a lot more pain in store for the sector before the recession eases; will it be slash and burn in UK public sector projects whichever political party gains power? - the young people represented here give us all great hope. They're well educated, savvy, articulate, ambitious, and very green.

The six young engineers featured were all shortlisted for this year's CIBSE/ASHRAE Graduate of the Year Award. Their final task in the competition was to give a presentation before the award judges and an audience invited from the industry. They each had to argue the case that increasing energy efficiency in buildings is key to creating a sustainable environment.

And between them they conveyed how little has been done so far, and how much needs to be done urgently, to make this happen. In effect, they exposed the barrenness of governments' attempts to cut the massive carbon footprint of the existing building stock.

The messages emerging from these young engineers in our feature also show that their generation knows exactly what needs to be done on the broader sustainability front. Between them they point to the need to develop and integrate technologies for cutting emissions; they are aware that, in an industry that is client-led, clients

will be seeking greater operational efficiencies from their buildings, and are focusing more on improvements in existing stock rather than looking to throw up new structures; and the occupants of buildings must be educated in how to reduce their own energy consumption. In short, building services professionals must push this agenda much harder.

And, as these young people point out, the industry needs much more young blood to take the sustainability agenda forward. Another casualty of the current recession is the intake of building services engineering graduates into sector companies. Building services firms may be

forced to squeeze their staffing levels, but it is surely extremely shortsighted to stop taking in fresh talent, which will be sorely needed by the industry and the individual firms when the recession lifts.

First and foremost, both policymakers and building services professionals must seize the glaring opportunities that exist to make change happen and engage with the public - at a time when energy

efficiency and architecture have gained much wider interest. For young professionals, however, the realities quickly sink in. As one of the six admits in our feature: 'I've found it humbling how quickly the realities of a construction budget have begun to knock some of the sustainable naiveties out of me.' Harsh realities aside, if this small crop of new recruits to the profession is anything to go by, the future could still be very bright and very green.

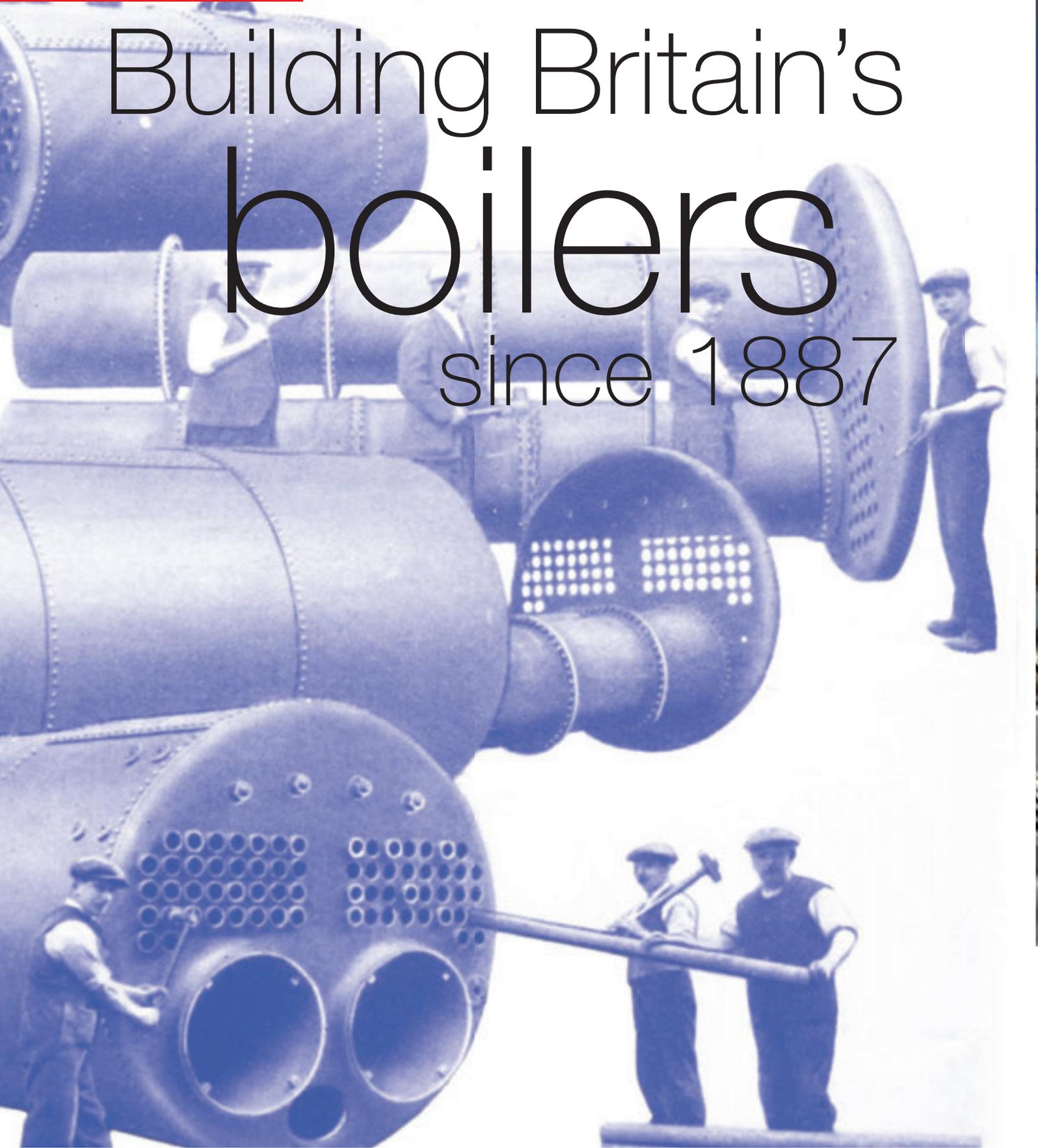
The signs are that this generation of engineers knows exactly what needs to be done to enhance sustainability



Bob Cervi, Editor
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News in brief

No 10 joins CIBSE campaign

The Prime Minister's Office at 10 Downing Street has joined CIBSE's 100 Hours of Carbon Clean Up campaign. The drive aims to raise awareness of actions organisations can easily take to reduce the carbon emissions of their buildings and significantly reduce the cost of their energy bills.

www.100hours.co.uk

Partners for BRE Scotland

The four consortiums that are to build the homes of the future on BRE's Scotland Innovation Park have been announced. Places for People; Powerwall Systems with Lovell Homes; Build ICF and Kraft Architecture will construct six full-scale demonstrator houses, spending more than £2m on new technology investment at the site. The park will build on the lessons learned by BRE's first demonstrator centre in Watford.

NHS tender extended

The NHS has delayed publication of its ProCure 21+ shortlist until 11 November, having been deluged with prequalification questionnaires. After this date, up to 15 candidates will be invited to tender by 19 January 2010. Contracts will be signed by 21 May next year.

HFC ban 'premature'

The Heating and Ventilating Contractors' Association has warned against the proposed ban on the use of refrigerants containing hydrofluorocarbons (HFCs) in 2011. The HVCA says that for the foreseeable future, HFCs have a vital role to play in helping users move to more environmentally benign alternatives.

Housing applications down

New private housing applications have remained low in the third quarter of 2009, despite the reported stabilisation of house prices. Research published by Glenigan revealed that housebuilders are still reluctant to submit new projects for development, preferring instead to build out existing sites.

Schools may turn deaf ear to acoustics tests

Schools could still miss out on the new compulsory acoustics tests recently announced by government if they do not fall under the Building Schools for the Future (BSF) programme.

Peter Rogers, chairman of the Building Acoustics Group for the Institute of Acoustics, believes there is a hole in the plan to test the acoustics in all new BSF schools because not all secondaries and academies fall under this funding mechanism, along with primaries.

He added: 'There is an apparent hole in the thinking unless a clarification is issued soon.'

Acoustic testing will be a contractual requirement for all BSF projects in England, following

an announcement by Children's Minister Delyth Morgan. It will mean that no funding will be signed off for a BSF building project without a commitment to having the £6,000 acoustic test.

It is part of a package of measures to improve acoustics in schools and ensure that all children, particularly those with hearing difficulties, have access to a better learning environment. Prior to this announcement testing was only a recommendation.

According to Rogers, noise systems will need to be checked against the design limits under duty. He said: 'The limits required by BB93 can be very stringent to get the combined noise level from all

sources below the limits, so services engineers will undoubtedly find themselves needing to be confident that the design will work on site.'

The National Deaf Children's Society originally mounted a campaign for compulsory testing, fearing that acoustic designs were not making it through to site, leaving hearing impaired pupils with less than acceptable conditions.

The change comes on top of the Minimum Design Standard being brought into the BSF programme to strengthen the design quality of schools, announced by ministers in May. The standard requires that all proposed designs for BSF sample schools are assessed by advisory body CABE.

First 'whole-house' energy makeovers announced

Up to 90,000 homes are to receive 'whole-house' energy makeovers, the Department of Energy and Climate Change (DECC) has confirmed. It announced the move as part of 'four steps' to help low-income households deal with high energy bills.

The makeovers will be completed on a street-by-street basis in low-income neighbourhoods across England, Scotland and Wales, and should save each household in the region of £300 per year on

energy bills, according to DECC. The improvements are expected to include – where needed – wall and loft insulation, boiler replacements and heating controls.

The projects are part of the £350m Community Energy Saving Programme (CESP) announced in 2008. The first 10 areas to be targeted are Dundee, Glasgow, Swansea, Preston, Knowsley, Birmingham, Walsall, Blacon and the London boroughs of Southwark and Haringey.



Renovated M&S site wins office award

The former headquarters of Marks & Spencer at Baker Street in London has won the Refurbished/Recycled Workplace award for London and the South East region, in the British Council of Offices Awards. Make Architects 'radically' renovated the 1950s office building to minimise environmental impact and optimise energy efficiency. www.bcoawards.org.uk



Paul Willetts

Trip to US awaits CIBSE/ASHRAE graduate winner

Judges have crowned Emma Marshall of RPS Gregory as the winner of the CIBSE/ASHRAE Graduate of the Year Award 2009.

Marshall was presented with her certificate by ASHRAE president Gordon Holness, after making a five-minute presentation to an audience of industry experts and a panel of judges on 'Energy efficiency in existing buildings is key to creating a sustainable environment'. She will be an ambassador for CIBSE, flying to Orlando, America, in January to make a presentation at ASHRAE's winter meeting.

The two runners-up were Chris Pountney of Bristol University and Francis Li of University College London.

See cover story, page 26

Plan to scrap Olympics site is a bad omen, says NG Bailey boss

A proposal to abandon the gymnastics venue in the 2012 Olympic Games to save millions of pounds in construction costs is a sign of things to come, according to a leading figure in the building services sector.

Mark Andrews, chief executive of NG Bailey, says the announcement by the Olympic Board to scrap the new centre on the North Greenwich Peninsula in London and use existing facilities at Wembley Arena signals the start of a series of cuts to public expenditure.

'It's a sign of things to come. I think that whichever party gets into power they know they've got to cut back on public sector expenditure. What I don't think either party has

done yet is get their head around how much will be revenue versus capital expenditure cuts.

'We have to face up to the fact that capital expenditure is easier to cut than revenue.'

Andrews, pictured, said every huge project planned by government is likely to get scrutinised very thoroughly to see whether cutbacks can be made to save money.

He added: 'I hate to continue being the purveyor of doom, but there are some messages coming from politicians that they're trying to maintain expenditure, for example in public programmes like schools and health, and as they get further into it they'll realise they've got some very, very difficult decisions to make.'



Simon Weir

As for the future projects that will survive, he said: 'It's very difficult to believe anybody is going to do anything exciting.'

The Olympic Board's proposal is subject to the approval of the international badminton and rhythmic gymnastics federations. It is hoped final approval will be secured in December.

Task force seeks to tackle domestic heating emissions

A UK Domestic Heating and Hot Water Taskforce has met for the first time to enable government and industry to work together to cut household carbon emissions.

A radical change will be needed to meet the UK's ambitious carbon reduction targets, according to the Department of Energy and Climate Change (DECC), which hosted the event.

Mark Brown, director of the Energy Efficiency Partnership for Homes, which is on the taskforce, said: 'This forum will allow industry expertise to inform policy on heating and hot water, specifically to contribute towards realistic targets being set, and to ensure that a suitable infrastructure is in place to deliver those targets.'

Faster carbon cuts sought

A major acceleration in the pace of carbon cuts must be achieved if Britain is to hit its own target to reduce emissions by 80 per cent in 2050. In its first annual progress report to Parliament, the independent Committee on Climate Change (CCC), which advises the government, says a 'major shift' in the strategy on residential energy efficiency is needed.

This strategy must move away from reliance on energy suppliers-led change to a focus on improving energy efficiency in homes, holistically, and street by street.

The Energy Institute, the professional membership body, and the UK Green Building Council

backed the report, which also argues that, between 2003 and 2007, greenhouse gas (GHG) emissions are falling by less than one per cent annually. They need to be falling by two per cent this year and by three per cent next year.

Project Discovery, an Ofgem report investigating the security and sustainability of Britain's energy supplies over the next 10 to 15 years, has found that up to £200bn needs to be invested in the energy sector to ensure supplies and hit carbon targets. One of the key risks highlighted by various scenarios is that the EU's renewables' target and UK government's carbon budgets are not met or at risk of not being met.

London initiative for local energy

Mayor of London Boris Johnson has announced a package of initiatives to slash carbon emissions in the capital and to boost locally generated energy production.

The moves are part of a drive to provide 25 per cent of London's heat and electricity requirements from local sources by 2025.

The initiatives, drawn up in partnership with the London Development Agency, London First and London Councils, are designed to attract investors while helping developers and borough councils to develop greener local energy schemes.

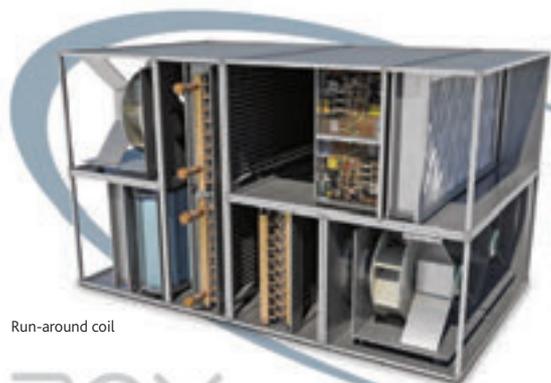
By meeting its target of producing a quarter of London's heat and

electricity from local sources, London's carbon emissions would be reduced by 3.5 million tonnes a year.

The London Development Agency has allocated up to £16m for decentralised energy projects over the next four years.

Launching the initiative, Johnson announced that 19 London boroughs would initially be working with the London Development Agency and London councils to facilitate local energy schemes.

The Renewable Energy Association welcomed the initiative, which, it said, 'underlines and supports the important role of local government in the green energy revolution'.



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International

Atkins scoops award

Atkins was crowned Engineering Firm of the Year in the 2009 Middle East Architect Awards in Dubai. Overall the engineering consultancy was shortlisted as a finalist in three categories, including Young Architect of the Year and Best Completed Project.

www.constructionweekonline.com/meaa

Foster's \$3m gift

Pritzker-Prize laureate and Yale School of Architecture graduate Norman Foster has donated \$3m (£1.8m) to the college to fund a visiting professorship in his name. This will allow students at Yale to be taught by some of the leading international practitioners in the field of architecture.

Capita spreads to UAE

Capita Symonds has opened a new office in the United Arab Emirates capital, Abu Dhabi. It will enable the multi-disciplinary consultancy to concentrate on working in the real estate and infrastructure sectors.

Saudi scheme

Multi-disciplinary consultancy WSP Group has won a contract to project manage a large-scale urban regeneration scheme in Saudi Arabia. The HEC development will be 156sq km, with Phase One covering 28sq km, and should take 30 years to complete. One of WSP's roles is to conduct a master-plan review. WSP has also recently been appointed to advise IKEA Real Estate on shopping centre developments worldwide.

World's greenest homes?

Rick Fedrizzi, president of the US Green Building Council, has declared the post-Hurricane Katrina housing initiative, being built by the 'Make It Right' New Orleans project, the 'largest and greenest community of single-family homes in the world'. The claim was made at the annual Clinton Global Initiative meeting in New York.

New schools still built without sprinklers

New schools are being constructed without sprinkler systems because they are still not a mandatory requirement under the Building Regulations – despite industry tests determining they should be included.

Figures released by Partnership for Schools (PFS), the body which manages the Building Schools for the Future (BSF) programme, revealed that more than a quarter of the 74 brand new buildings built to date have been constructed without sprinkler systems. In total, 127 schools have been rebuilt or refurbished under the scheme.

But Peter Stephenson, principal fire safety engineer at Kingfell Consulting, said PFS had abided by the law: 'It must be remembered that it is not a mandatory requirement to install sprinklers under current Building Regulations, and in most circumstances they are



not installed as life safety systems but more for the protection of the property.

'Ultimately, the decision to install sprinklers should be based on a full evaluation of all risks.'

His colleague David Kershaw-Wright, Kingfell's business development manager, said that another factor was insurance. 'Many schools are not insured

as the risk is too high based on the previous record within a local education authority (LEA), so they are effectively self-insured by the LEA, i.e. the taxpayer.

'A risk-based tool was developed by BRE in 2005 for this very reason. It allowed for many different aspects of design, materials, and arson record before providing a yes/no on whether the school should be fitted with sprinklers. In almost all test combinations the answer was "yes" to sprinklers.'

But a PFS spokeswoman said alternative 'fire engineered solutions' can be installed in very low-risk schools or those where sprinklers are not the most 'appropriate form of fire protection'.

According to Stephenson, the reasons why sprinklers have not been included should be made clear during the decision-making process.

School building now under 'one roof'

The government has awarded Partnership for Schools (PFS) responsibility for managing the £21.6bn worth of rebuilding programmes for all schools up until 2011.

The move makes the PFS responsible for the entire Comprehensive Spending Review (CSR). It follows the announcement in June by Schools Minister Vernon Coaker that all school building and refurbishment programmes would

transfer to PFS from the Department for Children, Schools and Families (DCSF).

According to the DCSF, PFS has already put in place day-to-day management of the Building Schools for the Future (BSF) and Academies building programmes, which are rebuilding or refurbishing all secondary schools in England. Now its remit will expand to include the Primary Capital Programme. It is also now responsible for the

Devolved Capital Programmes for schools, worth almost £7.8bn in the CSR period up to 2011, and the Targeted Capital Programmes, which provides funding for a range of targeted projects, including carbon reduction and school kitchens – almost £2.6bn in the CSR period up to 2011.

It is hoped this will lead to consistent delivery models and standards, as well as better sharing of learning and good practice.



The 'living wall' of China

BDP has won a competition to design a new town square and public park in the historic quarter of Shenzhen in China. The winning design includes a new park shaped by a network of pathways, a lotus pool with associated waterfalls, interactive fountains, a reflecting solar pool, and individual enclosed gardens and expansive lawns that will create a 'living wall' from east to west.

UK political parties line up to promote energy efficiency and win green vote

An incoming Conservative administration would attempt to tackle carbon emissions in the existing housing stock by introducing a Carbon Cooperation Plan, the party's annual conference heard last month ahead of next year's general election campaign.

This would aim to increase the energy efficiency of the housing stock by encouraging employers to 'green up' their employees' homes.

Housing spokesman Grant Shapps announced that a Conservative government would scrap Home Information Packs, which he described as symbolic

of the 'pointless red tape' Labour had introduced into the housing industry.

Shapps signalled that the Tories would ditch Labour's centralised targets for new housing, and instead get local authorities to take the initiative, by providing monetary incentives for new house building. He proposed matching extra council tax revenues from new homes, pound for pound, for six years.

At the Labour Party conference, energy and climate change secretary Ed Miliband unveiled a £10m green neighbourhoods pilot programme in around 20 areas across the UK,

to introduce green technology into households in order to reduce carbon emissions.

In addition, housing minister John Healey reiterated the government's commitment to affordable housing, with backing for housing association new builds, and announcing a second round funding for councils of £180m for 1,200 new affordable homes.

At the Liberal Democrats conference, delegates endorsed the party's Zero Carbon Britain environmental policy. A wide-ranging energy and climate change motion was passed – which, among

many points, called for the EU Energy Performance of Buildings Directive to include high minimum efficiency standards for building components, and a requirement for public authorities to implement the recommendations on Energy Performance Certificates within three years.

It also demanded the removal from the directive of the 1000m² threshold for buildings undergoing renovation.

The Liberal Democrats also committed themselves to a 'Warm Homes' programme, to make all UK homes energy-efficient by 2020.

Britain facing one-million housing shortfall by 2010

The UK is facing a housing supply shortfall of a million homes by 2010, with the gap between demand and supply widening by an expected 150,000 homes in 2009 alone.

The claim is made in a new report by the Town and Country Planning Association, which said the combined impact of the mortgage squeeze and the economic downturn could see as few as 100,000 new housing completions in 2008/09,

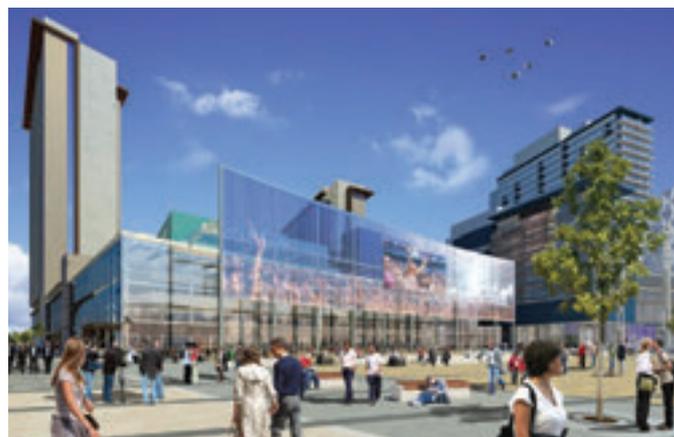
Authors of the discussion paper, *Mind the Gap – Housing Supply in Cold Climate*, found that as demand for housing continues to grow, at least 250,000 new homes will be needed each year just to keep up with annual

population growth. Even more will be needed to replace old housing stock and reduce the accumulated backlog in supply.

The report claims that the under-supply of housing has serious social and economic consequences for the UK, and could impact on economic prosperity.

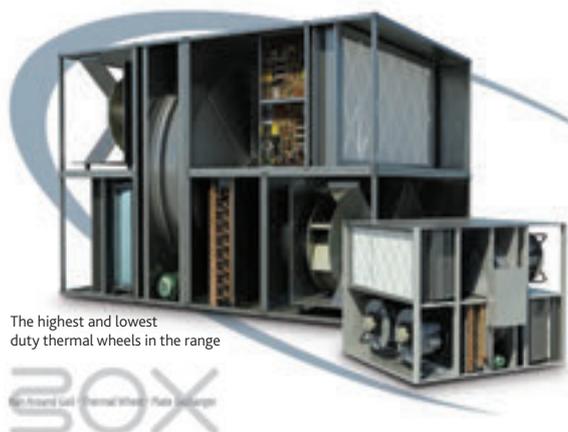
Although house prices may be showing tentative signs of recovery (partly owing to reduced capacity) and could return to 2007 levels within five years, without sustained public intervention it could take seven years for housing production to return to pre-slump levels.

The authors put forward 15 recommendations for the government to consider.



MediaCity sustains a world first

The £500m MediaCityUK development in Salford's historic docks is the first project to be accredited under the new BREEAM Communities scheme. The scheme rewards high levels of sustainability on a project, initially at design-stage but then following through to post-construction. MediaCityUK, which will be the new home for parts of the BBC, uses the resources of the Manchester Ship Canal in a tri-generation system to power, heat and cool buildings on the 36-acre site.



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News in brief

WSP rebrands itself

The WSP Group has rebranded itself WSP Lincolne Scott, two years after the firms merged. The group will continue to design, engineer and manage property, transport, infrastructure, environmental and energy projects internationally.

Climate change ad launched

The first government advert confirming the existence of man-made climate change has been launched as part of the 'Act on CO₂' campaign in a bid to educate people about the dangers. Research has shown that 52 per cent of people don't believe it will affect them. Furthermore, just 18 per cent believe it will take effect during their children's lifetime.

New CEO for planning body

John Saunders has been announced as the new chief executive of the Infrastructure Planning Commission. It is hoped the new planning body will slash decision times and save up to £300m a year. It will begin considering major planning applications from March 2010, but is open now to advise developers of major new infrastructure projects.

University wins green award

Birmingham City University has been awarded the Bronze EcoCampus Award for its efforts to become more environmentally sustainable. It has also signed up to the WRAP (Waste and Resources Action Programme) Halving Waste to Landfill voluntary agreement for the construction of its new city centre campus.

100th birthday celebrations

Air movement products distributor Fläkt Woods has celebrated its centenary. It is 100 years since Maurice Woods founded the fan manufacturing company in Colchester in 1909. Today it employs about 460 workers directly, and several hundred other jobs in the Colchester area are reliant on the company.

Construction 'will not revive before 2011'

The UK construction industry will not see any recovery until 2011, according to the Construction Products Association (CPA).

Despite some encouraging signs that the wider economy may be coming out of recession and that the housing market is beginning to recover, the trade association forecasts that construction output will fall 15 per cent this year and a further two per cent in 2010, before beginning a slow recovery from 2011.

It is anticipated that it could take until 2021 for construction output to reach 2007 levels, according to the CPA.

Michael Ankers, CPA, said: 'The total number of houses expected to be built in 2009 and 2010 will only equal the number built in the year before the credit crunch.'

'Government spending on construction projects in the short term remains strong and, without this, the industry would be in a far worse position.'

'We remain very concerned that any significant cut-backs in capital spending after the General Election will prolong the downturn as it will



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be some time before we expect to see significant growth in private sector commercial projects.'

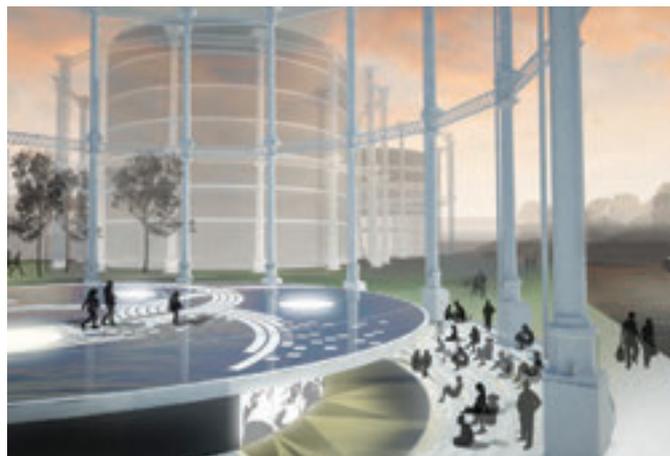
Key aspects in its forecasts include:

- Private housing starts will grow steadily, reaching 148,000 in 2013;
- By 2010 commercial new work is expected to be less than half the size it was in 2008;
- Construction of factories and

warehouses is expected to fall almost 60 per cent between 2007 and 2010;

- Public investment in schools and hospitals is anticipated to fall sharply post-2010; and
- The infrastructure sector is expected to grow significantly, reaching an estimated £10bn in 2013.

www.constructionproducts.org.uk



At the Cross roads

Hilson Moran is part of a team shortlisted in a competition to reinvigorate a redundant gasholder in King's Cross, London. Built in 1851 to supply gas to the surrounding area, a competition with a £2.5m redevelopment budget is under way to revitalise the Grade II-listed

structure. Bell Phillips and Kimble architects proposed a multi-use internal and external events space, with advice on structural engineering, MEP (mechanical, electrical and plumbing) and sustainability from engineering consultancy Hilson Moran.

Revenue down at Waterman

Engineering and environment consultancy the Waterman Group has reported a 10 per cent drop in turnover for the year ending June 2009.

Revenues were down to £122.4m, against £136.4m in 2008. Pre-tax profits have also fallen from £7m in 2008 to £2.6m in 2009.

The fall has been attributed to restructuring and redundancy costs amounting to £2.1m, bad debts, outstanding fees worth £2.8m on a limited number of overseas projects, and a shortage of funds in construction caused by the recession worldwide. Debt has now been reduced to £10.2m, from £12.5m in 2008.

Nick Taylor, chief executive, said: 'The property sector, both in the UK and overseas, has been severely affected by the downturn in the economy.'

Communities challenged on carbon

Communities are being invited to help the UK government shape policy on climate change by bidding for a share of £10m to trial low-carbon technologies.

The government has launched the scheme as part of the Low Carbon Communities Challenge, which offers 20 communities support to pay for specific measures, selected by the residents themselves, to reduce carbon emissions.

These could range from a biomass plant, to retrofitting homes, to electric car charge points.

In return for technical and financial assistance, people living and working in the area will work alongside government and contribute to finding low-carbon solutions from which the whole country will benefit.

Successful outcomes from the project will pave the way for a



shutterstock

national roll-out. The challenge is open to local authorities, charities and social enterprises.

Around a quarter of the UK's greenhouse gas emissions come from heating, lighting and powering electrical appliances in homes.

By 2050 this needs to be almost

zero if the UK is to cut its emissions by 80 per cent, highlighting the importance of local action. The challenge will start in January 2010.

Separately, more than 180 organisations are to share £3.5m to devise innovative plans for low-carbon refits of existing low-rise

social housing. The money will be distributed via a Retrofit for the Future competition, run by the government-backed Technology Strategy Board. This is the first of two phases investigating how to make deep cuts in carbon emissions from social housing.

Gateway to city steps up a gear

Engineering consultancy Hilson Moran has been appointed as M&E consultant for phase one of a £174m regeneration scheme in Wolverhampton. Building the new bus station is the first phase of the Wolverhampton Interchange Scheme, by Neptune Developments, to create a 'gateway' to the city. If further investment is secured, wider plans include a state-of-the-art transport interchange for rail, tram and bus services, mixed use commercial premises for retail and leisure, as well as creating a public space.



WYG debt talks continue

Multi-disciplinary consultancy White Young Green was given more time to continue talks with its lenders after accumulating more than £90m of debt.

Its financial covenant test date was deferred until 31 October while discussions continued.

Paul Hamer, chief executive, said: 'We have made significant progress in the discussions with our lenders. Heads of terms regarding a new financing structure are currently at an advanced stage, though the proposals are subject to further negotiation.'



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Tel: 020 8675 5211 Fax: 020 8675 5449 Email: secretary@cibse.org

President: Mike Simpson FCIBSE, FSLL, FILE, FIET Chief executive and secretary: Stephen Matthews

Training and development

Submissions

The closing dates for annual submissions to be considered at the January 2010 Training and Development Panel meeting is 18 December.

Training submissions and any queries, plus employers' enquiries and applications for approved company training schemes, should be addressed to Rachel Ravenswood, training and development administrator, on 020 8772 3612 or email ravenswood@cibse.org

CPD directory update

To be added to the Directory of CPD Course Providers, contact Olwen Williams on 020 8772 3612 or ravenswood@cibse.org

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

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 whose 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 the CIBSE website 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. If you would like a company visit, contact Bobby Wright on 0208 772 3639 or bwright@cibse.org

First membership survey paves way for change ...

The results are in; CIBSE members have spoken! And we are delighted with what you have to say.

Levels of satisfaction with the membership package, the benefits and the institution are all very high.

But this is not to say that we are resting on our laurels. For an institution with nearly 20,000 members it's inevitable that we're not going to please all of the people all of the time. I've often said that we welcome feedback, and I have to admit that my inbox is pretty full – and not always with happy, positive comments on the institution and its activities.

However, I learned long ago that dealing with complaints and criticism head-on, in a positive and helpful way, often wins the day and is the most expedient method for dealing with the disenchanted. And your feedback has given us a clear

steer on which areas we can work on to do this.

The E-newsletter rated low as a membership benefit, and we are now looking at updating the format to make this a more valuable information tool. We hope to re-launch it in the next couple of months. Some of you also highlighted CPD and keeping records as an area needing improvement. A great deal of work has been done around this area, and we will be launching the online CPD log for members later this month – so you can keep track of your CPD hours, including any training courses completed with certificates, all in one place online.

In terms of training, the message was that you'd like more training events outside of London. This is something which we do try to achieve; however, take-up is often very low, resulting in events not

being able to take place. We will keep working on this, but one alternative now available is the new online learning modules, enabling people to train at a time and place to suit them – no matter where you are. I do commend the online learning to you, it has been developed with some of the leading companies in the industry and aims to give practical and comprehensive training.

We are aware that the institution needs to keep actively engaging with members to help us give you what you need and want from your membership, so we'll be conducting this survey every year going forward.

In the meantime, you can rest assured that we'll be working hard to ensure your institution continues to listen and work for you.

Stephen Matthews
Chief executive

... and reveals a high degree of satisfaction with the institution

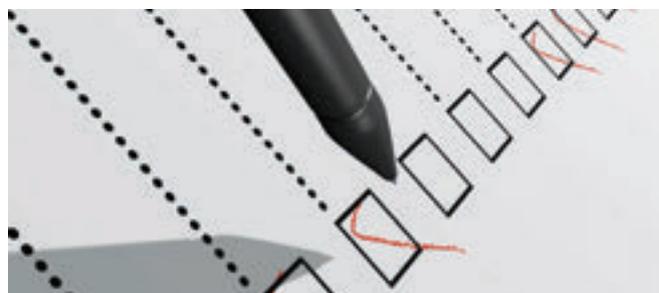
The first CIBSE membership survey has received some excellent feedback, with more than 90 per cent of respondents expressing a high level of satisfaction with the institution.

The survey took place last month and saw more than 1,600 members respond to the questionnaire.

Results show a very high level of satisfaction, with 94 per cent thinking that CIBSE offers reasonable, good or excellent value.

Other top-line results included: 61 per cent of members are planning to progress their membership grade; and 74 per cent of members are quite satisfied or very satisfied with their membership.

The top five benefits of membership were revealed as:



- The CIBSE *Journal* (20 per cent);
- Professional status (19 per cent);
- CPD opportunities (14 per cent);
- Free guides – corporate members only (10 per cent); and
- Publications discounts (eight per cent).

Other results showed that: 87 per cent of members think CIBSE communicates with them 'about right'; only five per cent rated

the E-newsletter as a top benefit, prompting a relaunch in the near future; and 16 per cent of members mentioned that they would like to see a greater regional emphasis based on CPD courses – so, alongside the launch of online learning, where members can complete CPD without leaving their desk, a greater effort will be made to run courses outside of London.

Concerns over EPBD recast and timetable voiced

In October CIBSE responded to the Department of Communities and Local Government (CLG) consultation on the implications for implementing the EU's recast Energy Performance of Buildings Directive (EPBD).

CLG has expressed some concern over the proposed new requirements and the timetable for implementation, and CIBSE was broadly in agreement with its reservations.

CIBSE agreed that serious consideration is needed on a broad framework for a comparative methodology for calculating the energy performance of buildings, asking for a definition of 'cost optimal'. Given experience elsewhere on development of life cycle costs, the challenge should not be underestimated. Alternative energy systems

should be considered before construction starts and this should be incorporated into Part L of the Building Regulations to minimise compliance burden.

CIBSE supported display energy certificates (DECs) for public buildings above 250m² along with energy performance certificates (EPCs) to be displayed where they exist for public buildings, as well as rolling out a requirement for DECs for the commercial sector. CIBSE also supported the proposal that property advertisements should include the building's energy performance indicator.

CIBSE supported improving the advice given in air-conditioning reports, but warned that this may require further significant amendments to the accreditation requirements for air conditioning inspectors, suggesting that the current TM44 report should add

the 'simple payback' calculation section. This will allow the client to have a clear understanding of the best practical way to improve their system.

CIBSE warned of the dangers of imposing 'zero carbon' on the existing stock when it could be more cost-effective and more achievable to have low carbon measures and called for EU member states to retain the ability to introduce incentives for the construction and renovation of buildings which do not comply with the proposed minimum energy performance requirements. The existing stock must be addressed and it should be up to each individual member to state how improvements may be incentivised.

The full consultation response can be found at www.cibse.org/consultation or contact smcdonough@cibse.org

Study building services engineering overseas with Ken Dale Travel Bursary

Are you in the developmental stage of your career? Would you like to spend up to four weeks researching building services engineering overseas?

The Ken Dale Travel Bursary makes awards of £1,500 and £4,000 available to CIBSE members in the developmental stage of their career, who wish to spend three to four weeks outside their own country researching aspects connected to their field of work – and which will benefit

CIBSE, their employer, their clients and the profession. CIBSE is especially keen to encourage applicants to take up the award for research that articulates CIBSE's concern for the environment.

The bursary also offers the candidate the opportunity to experience technical, economic, environmental, social and political conditions in another country and to examine how these factors impact the practice of building services engineering.

Ross French, who won the 2009 Ken Dale Travel Award, visited more than eight countries researching 'Traditional Approaches to Water Management in Levant and their Applicability to Contemporary Development'. Ross presented his findings to the CIBSE Council in October. See Ross' blog of his trip at studytour2009.wordpress.com

To download an application form visit www.cibse.org/bursaries Applications close 31 March 2010.

News in brief

International relations

A delegation from the Hong Kong Institution of Engineers (HKIE), led by vice president Ir Dr F C Chan, visited CIBSE in September to observe the institution's Professional Review interviews for membership and registration. HKIE is currently reviewing its own admission standards and is investigating the qualifying process of its sister institutions. David Hughes, CIBSE's past president and international portfolio holder, conducted the interviews.

Building simulation group stages seminar

On 2 December the CIBSE Building Simulation Group will be holding a seminar entitled The Role of CFD (Computational Fluid Dynamics) in Building and System Design at CIBSE HQ in Balham, London.

www.cibse.org/bsg

Undergraduate Award winner announced

Congratulations to Nicole Jean, from Heriot Watt University, who was presented with the 2009 CIBSE Undergraduate Award at the President's Awards Dinner in October. Nicole won the judges over with her final-year project on Solid Transport and Ultra Low Water Usage. The award is sponsored by Hays Building Services with a first prize of £500 plus one year's free CIBSE graduate membership. Liam Buckley from Brunel University received a commendation prize. Applications for next year's award will open in April 2010.

A lifetime's work is rewarded with silver medal for services to the institution

Grahame Gibbs has been awarded CIBSE's Silver Medal for services to the institution, in recognition of his lifelong involvement within the building services industry.

He received his award at a function held in Sydney in September. Grahame's background within the region stretched back to 1958, when he moved to Australia with Donald Rudd and Partners. Besides forming Gibbs and Associates Grahame established postgraduate diploma

and masters' courses in building services at the University of Sydney, and remained a part-time lecturer until last year. He was a founder member of the CIBSE Australian Region in 1987 and was the current chairman when, in 1992, New Zealand was added as the sixth chapter to form the ANZ Region.

The Silver Medal and certificate were presented to Grahame by Peter Kinsella, the current ANZ regional chairman, together with the chapter chairmen.



Grahame Gibbs receives his award.

More new titles

CIBSE stocks a large number of publications by other key publishers in the building services field. New additions include:

- **BSRIA Building Services Job Book** £64 (members)/£80 (non-members)
- **BSRIA Soft Landings Framework** £16 (members)/£20 (non-members). *The Soft Landings Framework* is also available to purchase as a package with CIBSE's TM31: *Building Log Book Toolkit*, priced at £90 (members)/£170 (non-members)
- **ASHRAE GreenGuide: Design, Construction and Operation of Sustainable Buildings** £44.76 (members/non-members)
- **ASHRAE Datacom Equipment Power Trends and Cooling Applications** £28.78
- **ASHRAE Design Considerations for Datacom Equipment Centers** £28.78
- **ASHRAE High Density Data Centers – Case Studies and Best Practices** £28.78
- **ASHRAE Thermal Guidelines for Data Processing Environments** £28.78

For more information visit www.cibse.org/publications or call 020 8772 3618.

New CPD tool

CIBSE has designed an annual online recording tool to enable members to record their Continuing Professional Development (CPD) throughout the year.

The tool allows members to update and evaluate their progress easily. CPD is a long term commitment that aims to broaden knowledge and skills, put into practice new competences year after year and, ultimately, help members invest in their future. All members are required to maintain their professional competence throughout their career.

CIBSE firmly believes that professional development is not limited to attending formal lectures and seminars. This is reflected in the titles of the categories used to classify CPD included in the new online records. Access to the online CPD tool will be through the members area of www.cibse.org and members will be informed when this is available.

The CPD panel will be monitoring CPD returns and will provide relevant feedback to members.

Election to the board and to CIBSE council

The board is the governing body of the institution. It is made up of the seven officers of the institution (president, president-elect, three vice presidents, honorary treasurer and immediate past president) and five elected members. Vacancies arise at each AGM, and the Board is required under By-Law 58 to nominate candidates for all the forthcoming vacancies.

The board has also agreed that elections should be held for membership of the council of the institution, a much larger consultative body that exists to advise the board on institution policy.

The board has accordingly made the following nominations to fill vacancies arising at the next AGM in May 2010:

President elect: Andy Ford.

Vice presidents: Terry Dix, Peter Kinsella, David Fisk.

Honorary treasurer: Nick Mead.

Members of the board: George Adams, Paul Hardy.

Members of council: *fellows, members and associates:* Chris Northey, Geoff Smyth.

Short biographical notes for candidates will be found in the members' section of the CIBSE website at www.cibse.org

Members of the institution are entitled to nominate additional candidates for election according to the rules set out below:

Fellows, members and associates may submit nominations for the offices of president-elect, vice-president and honorary treasurer and for members of the board. Only duly qualified individuals who have been supported by 10 nominations from fellows, members and associates will be added to the lists.

Fellows, members and associates may also nominate individuals from those grades for membership of council. Licentiates, graduates, companions and affiliates (including students) may nominate individuals from those grades for membership of council. Only duly qualified individuals who have been supported by five nominations from members in the appropriate grades will be added to the lists.

Any such nominations must be made in writing to the chief executive/secretary, and must be received at CIBSE headquarters by 31 January 2010. These nominations must be accompanied by the written

consent of the nominee to accept office if elected. The names of those making nominations will follow the name of the candidate on the ballot paper.

The qualifications for each position are as follows:

President elect:

Fellows of the institution who hold, or have held, the office of vice president.

Vice president:

Fellows, members or associates of the institution who are, or have been, members of council (at least one vice president must be a fellow).

Honorary treasurer:

Fellows, members or associates of the institution who are, or have been, members of council.

Members of the board:

Members of all grades may be nominated (at least three of those elected must be, or have been, members of council, and at least three must hold membership in the grades of fellow, member or associate).

Members of council:

Must hold the appropriate membership grade for the category in which nominated, i.e. fellow/member/associate or licentiate/graduate/companion/affiliate (including students).

An 'illuminating' annual lecture

More than 300 people attended the 2009 CIBSE Annual Lecture at the Royal Institution of Great Britain, to hear experts explore the relationship between science and art in lighting.

Hosted by the Society of Light and Lighting, scientists Dr Bryson Gore and Dr Frank James gave demonstrations from the Royal Institution's collection, which saw Dr James power a light bulb using a Tesla pile and his mouth, while lighting designer Jonathan Speirs explored the creative aspect of a project, from inception to delivery. Watch the webcast at www.cibsewebcast.com



Dr Frank James demonstrates a Tesla pile.

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Avoiding the double whammy

Energy-hungry companies and public organisations that are liable to pay for carbon allowances from April 2010 are being given a financial reprieve – a move welcomed by the building services sector. **Carina Bailey** reports

The UK-wide Carbon Reduction Commitment (CRC) policy was introduced to bring larger companies and organisations into a carbon-allowance scheme of the sort that had already been applied to the energy-intensive industrial sector.

Under the CRC, those firms and public bodies that consume at least 6,000MWh of electricity a year will buy carbon allowances upfront, for the year ahead, initially at a cost of £12 per ton of CO₂, which can later be traded with other organisations should the need arise.

Originally the Department for Energy and Climate Change (DECC) had intended to make those involved pay for their 2010 carbon allowances retrospectively, as well as paying ahead for their 2011 allowances. But when DECC released its final version of the policy last month, it not only renamed it the Carbon Reduction Commitment Energy Efficiency Scheme, with the aim of emphasising its key purpose, but it also brought in a one-year financial reprieve for those affected.

Under the change, from April 2010 for the first year, carbon emissions will only have to be reported, rather than allowances bought and traded, to ease the burden on cashflow. This will mean that participants will only have to submit details of their emissions during 2010 and 2011. At the end of each trading year those who have made, or are continuing to make, energy efficient measures

will receive a sum of money back, known as a 'recycling' payment.

The scheme will be introduced in two phases. During the introductory phase, an unlimited amount of allowances will be sold by the government during the sales period in April 2011 and April 2012. The second phase will begin in 2013 and will see the full CRC scheme introduced and the amount of allowances available will be capped. About 5,000 organisations are expected to participate.

David Farebrother, environmental director at property group Land Securities, believes that the reprieve will help companies like his, which

“What we really want to do is see the final regulations – all they’ve done is hinted at what they’re planning”
– David Farebrother

falls under the scheme. However, he points out that guidance for participants is still awaited from DECC.

‘Although DECC has said it wants to relieve the burden in terms of people paying two lots of allowances in one year, what it’s effectively done is put the thing back a year,’ he says.

‘It’s clearly helpful not to have



The Carbon Reduction Commitment encompasses companies such as property developers and retail chains

to shell out two lots of money, but it’s come a bit late – it’s created unnecessary work already. It would have helped if we’d been given a heads up a little earlier.’ But John Field, director of carbon management at Power Efficiency, an energy management company, describes it as a very important move: ‘It hasn’t delayed payments at all because the payment for the first year was always going to be moved to the end of the year, but it has avoided the double whammy of the first payment in April 2011. I think it’s welcome and quite sensible.’

Richard Hipkiss, a principle consultant, and sales and marketing director at energy company i-prophets, also welcomed the scrapping of the double payment. ‘It was quite ludicrous. It was being viewed as “well, what’s the point other than to build up the government’s coffers?” I think that’s a positive step forward to get people to buy into the scheme.’

Another change that Field applauds is DECC’s decision to allow large subsidiaries consuming at least 6,000MWh to take part separately from their organisational group. This should enable two very different arms of the same company to participate in the scheme in their

own right and enter the league table independently. The league table is the ‘public face’ of the whole scheme, says Field. It will not only affect an organisation’s reputation, but also the repayments they receive according to their ranking.

Farebrother agrees that this could be of great help to Land Securities, which is a mixture of offices and retail outlets, but he adds: ‘There isn’t clarity about whether that would apply to Land Securities – density of energy usage is very different for offices and shopping centres. If you’re treating them as one whole scheme, there is a potential for imbalances between certain types of properties.’

‘What we really want to do is see the final regulations. All they’ve done is hinted at what they’re planning to do. It still needs clarity and definition.’

Farebrother says Land Securities was eager to see the league table split into different sectors, such as transport, property, small industry and so on, and the issue is now the company’s biggest disappointment.

‘Government has turned round and said “Mummy knows best and we’re not doing that,” which I feel is patronising,’ argues Farebrother. ‘They should have split them up. The way they’re doing it is blatantly unfair. What’s the point of a



consultation exercise if they don't listen?'

Farebrother adds: 'Broadly speaking our company certainly supports the idea of a trading mechanism, but it has to be one that's workable and cost-effective. It remains to be seen whether CRC will be that mechanism.'

However, according to the report, the government considers splitting the league table into sectors 'inappropriate', claiming it would give it less impact and also make it more difficult to understand.

For Hipkiss, the name change is one of the most significant developments. 'It really is a positive step. In my mind, it grasps the concept of what it's all about. There is a perception that CRC is, and

always has been, simply a tax.'

Field believes it's basically a way for the government to cover all angles: 'It's saying it's getting you to save yourself energy and costs, and at the same time you'll reduce emissions and help us – the government – meet our targets and save the planet. It'll fend off any accusations that it's just a burden on industry – the last thing you need in a recession.'

Other changes include giving recognition to those companies that use onsite renewable energy, for example from wind turbines or solar panels, by publishing the carbon they have saved using such measures.

Field adds: 'Basically you get a small benefit from installing renewables – but they haven't pumped that up at all by including it in the league tables. The reason for that is it's an energy efficiency scheme, not primarily a carbon reduction scheme.'

'It's not got any simpler, but it has resolved some of the problems. There is the opportunity to make actual significant savings from it, and the lesson is that you want good advice and support to get the best out of the scheme.'

However, Field stresses that government must make sure that loopholes are prevented and that the system is policed rigorously, otherwise its credibility will be questioned. 'Once the capped stage comes in 2013, everything will change and I think the savings will start to be raked in.' ●

CIBSE is holding a one-day conference on 'Practical tips for building services engineers to prepare your business for the CRC Energy Efficiency Scheme', taking place on 3 December 2009, CIBSE, London. For more information visit www.cibsetraining.co.uk/conferences

The next steps

Autumn 2009: Guidance for participating organisations set to be released, about a month or more after the government's policy on CRC was published.

April 2010: Introductory Phase begins and lasts until 2013 but, for the first year, organisations only have to report their carbon emissions to help ease the burden on cash flow.

April 2011: First sale of allowances for the year ahead – sold by government to participating organisations at a fixed price of £12 per tonne of CO₂ emitted. Retrospective payments for 2010 carbon allowances are no longer required.

2013: Auctioning of carbon allowances begins – sales are no longer based on the fixed price.

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Classroom Carbon Dioxide Monitoring

The SACO2 panel has been designed to monitor the Carbon Dioxide level in classrooms in accordance with [Building Bulletin 101](#). The panel can be used just as a monitor to advise when the Carbon Dioxide level is high. The system can also control mechanical ventilation in order that the rate of air change can be controlled depending on the occupancy level of the room to cut heat loss in winter.



Kitchen Ventilation

The VGPS-K is designed for use in the kitchen to ensure that any mechanical ventilation is operating whilst the gas appliances are being used. The system also ensures that there are no gas leaks on the gas fuelled cooking appliances. The system is also available as the VGPS-K-CO2. This system monitors the Carbon Dioxide level in the kitchen and ensures that the ventilation rate is adequate at all times.

Refer to [BS6173/2009](#)

[HSE catering sheet 23 R1 & IGE UP/1A](#).



Letters

Between the lines of Part G

So Part G of the Building Regulations has been delayed because of various comments from the EU (News, September, page 11). Amongst the comments is one that Part G 'creates serious barriers to trade'. Reading between the lines, I wonder if this refers to the regulations' restriction of wholesome water usage to 125 litres/person/day? This limit impacts heavily on the use of items such as drencher-head/multi-head showers and luxury baths.

If the Code for Sustainable Homes is also complied with, the allowable figure per head comes down even lower. This means that manufacturers' recommended flow rates for many fittings are not acceptable as they will be too high to achieve compliance with Part G and the code.

The only 'legal' ways round this, it seems to be are to:

- Design out high flow rate showers/large capacity baths (which discriminates against certain manufacturers and hence restricts trade); and
- Use harvested rainwater/recycled grey water for high flow rate showers/large capacity baths at a future date by upgrading treatment standards – although consumers, including myself, might resist this.

Bruce Latimer, CEng, CEnv, MCIBSE, MCIWEM

Recast the EPBD net wider

Recasting the Energy Performance of Buildings Directive should mean looking to widen the types of building that need Display Energy Certificates – not just public authority buildings, and not just those with public access, but all buildings over 1,000m sq (News, September, pages 7 and 14). This could be the step change we need to get emissions from the existing stock under control. At the very least let's drop the bit about public access that allows government back offices and Ministry of Defence estates to go unmeasured.

Phil Jones

London South Bank University

Back to basics in schools

While as engineers we get excited about heat and cooling and renewable energy systems ('Learning curve', September, page 26),

it is important to recognise that the most important environmental design decisions in schools are those that deal with the basics – high levels of good quality daylight, efficient and controllable ventilation at all times, good conditions all year round (with the environmental issues driving the architectural



The carbon footprint of schools is mainly down to electricity consumption
– Mike Entwistle.

design), and ensuring that unnecessary energy usage is minimised through effective but simple control. In modern schools, electricity consumption normally constitutes by far the lion's share of energy bills and CO₂ emissions, and reduction of this is where attention must first be targeted.

Dr Mike Entwistle

*MA (Schol) (Cantab), CEng, MEI, MCIBSE, MASHRAE
Associate director, Buro Happold*

Challenge the micro-gen myths

I would like to take issue with Keith Moss on the vexed subject of domestic and other micro-generation proposals (Letters, October, page 22). Thermodynamically and economically they make so little sense that it comes as no surprise that they have been embraced by politicians and the large power generators,

keen to head off any viable way of reducing their profits. Feed-in tariffs are another way to squander scarce resources, ensuring that the least effective way to reduce power consumption receives the greatest subsidy.

To pundits and decision-makers with little technical background micro-generation sounds attractive, but members of CIBSE are better placed than many to make an unbiased and accurate assessment. I feel we should not be in the business of perpetuating a folly in the name of encouraging householders; solid technical reasoning is our strength and the way we should contribute to the debate.

Peter Hill, MCIBSE

Population growth the key

The October *Journal*, like all editions in the recent past, rightly contains much about the need to combat climate change. But how much can we as engineers actually do to influence events? The global population is predicted to grow from its current 6.5bn to around 9bn by 2050. The world is on an unsustainable path, and in the context of climate change population growth is the main issue for world leaders to tackle. Of course, let us continue with the very worthwhile task of improving the performance of the built environment here in the UK, but set against the factors affecting global warming in the years ahead, it is peripheral.

John Menzies, FCIBSE

Editor's apology

On the October letters page we wrongly described John Moss as being technical director of ICOM Energy Association. That post is in fact held by David Hughes. We apologise to both Mr Moss and Mr Hughes for this error, and for any embarrassment caused to them.

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

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

Construction first

With the forthcoming general election the time is ripe for building services professionals to lobby party candidates on the value of a strong industry, argues **Graham Watts**



The savage economic downturn of the past 18 months has already seen massive cutbacks in privately-funded construction across the board in the UK – in housing and in commercial, retail and industrial buildings. An unprecedented period of sustained, steady growth over many years has been replaced by the most dramatic collapse of private investment in the built environment. The rapid rate of decline and the predicted length of the recession mean that it is likely to take until 2020 to get back to the 2007 level of construction activity.

The government's financial stimulus and continued public spend has prevented the industry from teetering over the precipice completely – although it may not seem that way for some. It's now widely anticipated that next year's general election will be followed by draconian cuts in public expenditure. If this happens before the private sector is strong enough to recover and before the banks are able to function as they should, then the resultant 'double-dip' recession will be calamitous.

So this is a time when the industry needs to proclaim loud and clear the vital role it plays in the economy. The business case for construction as a quick and effective economic stimulus is immense. Recent research by the CBI shows that for every £1 spend on construction, up to £5 of other economic activity is stimulated. In an economic system that is short of capital, other countries have done more to use construction as a means of creating jobs quickly and boosting generic economic activity, and seem now to be better placed to come out of recession. The significant levels of UK government debt coupled with the arbitrary deadline for the next election mean that we in the UK may fail to grasp this opportunity.

If the nation is to deliver on the UK's carbon commitments, now enshrined as legally binding targets within the Climate Change Act, then it will be a NEW construction industry and NEW jobs that will have to achieve these goals. The current Business Secretary, Lord Mandelson, has recognised

this by setting up an innovation and growth review of the sector to see if it is fit for purpose in delivering a low carbon economy. But we are not going to get anywhere near 40 per cent reduction, let alone 80 per cent by 2050, without completely re-engineering our economy to value carbon more than money. So, carbon-reduction skills must become the primary focus; and who will deliver these skills? Bankers? Accountants? Lawyers? I think that construction professionals – and engineers in particular – are much better placed to change the world.

The forthcoming general election provides a timely reminder that construction is the major hidden employer in every parliamentary constituency with thousands of people involved in designing, building, managing and maintaining the buildings and infrastructure that sustain the nation's economy and living standards. Investing in the built environment creates jobs, provides a major contribution to the nation's climate change commitments and will result in a legacy for generations to come.

These points and many more are pressed in the Construction Industry Council's 'Manifesto for the Built Environment', which was presented at the recent political party conferences and which will be issued to every prospective parliamentary candidate for the coming election. Members of CIBSE can play their part by sending a personal copy direct to their candidates, both to demonstrate how important construction is locally and to seek their support for the main messages within the manifesto. To obtain a copy, please contact cmolloy@cic.org.uk or smcdonough@cibse.org ●

 **The construction industry needs to proclaim loud and clear the vital role it plays in the economy** 

Graham Watts is chief executive of the Construction Industry Council. CIBSE is a member of the CIC.

Fuel for thought

A consultation has been published on proposed amendments to Part J of the Building Regulations, covering combustion appliances. **Hywel Davies** examines the implications



Part J of the Building Regulations for England and Wales covers 'Combustion appliances and fuel storage systems' – boilers and water heaters that burn oil, gas or other combustible fuels. It sets out requirements for the supply of air for combustion of the fuel, and for safe discharge of the exhaust gases. Proposed changes in energy efficiency provisions in Part L include higher standards of air tightness in new homes. Guidance on air supply currently in Approved Document J (ADJ) assumes that there is uncontrolled ventilation from cracks and leaks in the building fabric. Air supply provisions in ADJ have been reviewed to ensure that combustion appliances can operate safely in very air tight homes.

There is a lack of agreement on the way to achieve this, and so the Department for Communities and Local Government (CLG) has commissioned research to explore this issue more fully and gather evidence. The project will initially undertake a desk study to be incorporated into a wider public consultation. This will be followed by an experimental study to test assumptions about the effectiveness of uncontrolled ventilation for combustion of open flue appliances. This will consider the effects of different building construction methods and types and the influence of different internal or external pressure differences and external wind speeds, for a variety of appliances and fuels. Meanwhile the proposed changes to ADJ ignore uncontrolled ventilation for homes with an air permeability of less than $<5.0 \text{ m}^3/\text{hr}/\text{m}^2$, pending the research findings and comments on the consultation document.

Biofuels guidance

Government's response to the recent Biomass Task Force report committed CLG to review how Part J regulates biomass boiler installation. The existing regulations and guidance do not take account of flue location and size requirements, nor reflect all biomass technology, so are therefore a cost burden and barrier to biomass use. Revised guidance on solid fuel appliances takes account of the much wider range of appliances and technologies now available, with a more flexible approach that does not require some protective measures for some appliances.

Carbon monoxide alarms

CLG commissioned research to examine availability, costs and benefits of detectors. This concluded that it would not be cost effective to provide CO alarms in all homes. But it may be cost effective to require provision of CO alarms where solid fuel appliances are first installed.

Building Regulations can only require CO alarms when an appliance is first fitted. But alarms only last six years, and hazardous appliance faults are more likely after that. CLG specifically wants to know the views of respondents on whether this will reduce the benefits of alarms. Room sealed appliances are considered a much lower risk than traditional open flued appliances, so CLG is seeking views on excluding them from the requirement to fit an alarm.

Concealed flues and plumbing

A Health and Safety Executive investigation found a significant number of homes built with gas flues installed and concealed in ceiling voids without appropriate access for inspection, so CLG proposes a requirement to provide adequate inspection access. Condensing boilers can produce a white plume or discharge from the flue terminal, due to the flue gases being cooler than flue gases from non condensing boilers, which cool down further from the terminal and dissipate differently. This can result in neighbour disputes and health concerns, so new advice on location of flue outlets is included in the draft.

Bundling of oil tanks

The consultation seeks evidence on the need to bund all domestic oil storage tanks and requests alternative approaches to reducing risk of pollution from oil leaks. The cost benefit analysis carried out for CLG suggests a blanket requirement for bunding would not be cost effective and, unless evidence to support the case is submitted, it is unlikely to be introduced. ●

Hywel Davies is technical director of CIBSE.

More research has been commissioned by CLG on how to ensure the safety of combustion appliances in very airtight homes

New Mini VRF has Max Coefficient of Performance

Top of the CoPs



It's the smallest, most energy efficient mini-VRF system available – and the new KX6 Compact from Mitsubishi

Heavy Industries (MHI) provides all the "big system" air conditioning benefits of flexibility and control for smaller office, retail or residential applications of two to eight rooms.

MHI Sales Manager David Lettis says the KX6 Compact fills a significant gap in the market. "Until now compact VRF systems have either been too expensive or too restricted in flexibility. The KX6 Compact now brings the benefits of VRF for about the same price as a good split installation. And benchmark tests show it out-performs every competitor in Coefficient of Performance (COP)."

The KX6 Compact achieves its best-in-class efficiency performance by combining a number of developments and innovations. These include new vector inverter control and a new twin rotary compressor, coupled with a heat exchanger redesigned for high efficiency and an advanced refrigerant return control system. In addition, the all-new DC fan motor is 60% more efficient than earlier models.

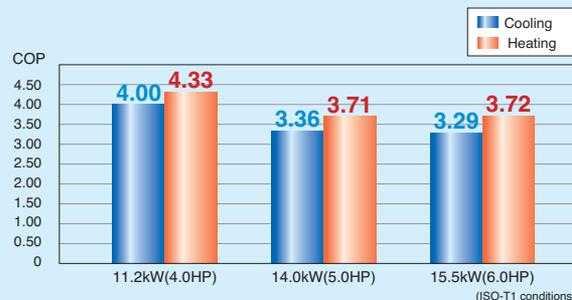
Weighing in at just 19kg, the new twin rotary compressor in the MHI KX6 Compact is 20% lighter than comparable units. Yet it achieves higher efficiency than other twin rotaries, and is significantly more efficient than scroll compressors. As a bonus, the single or three-phase 4hp, 5hp, and 6hp (12kW, 14kW, and 16kW) outdoor units are just 970 x 370 x 845mm – significantly smaller than earlier systems. In addition, the KX6 Compact has new high speed Superlink II control logic, based on easy-to-install two-wire connections.

The whole MHI KX6 Compact solution allows far greater flexibility in installation than the previous system. As well as larger permissible pipe-runs, the maximum height difference between indoor units is up from 4m to 15m. The maximum connectable capacity is up from 130% to 150% – which means that the 6hp / 16kW system can serve up to 9hp / 21kW of indoor units. There is a complete range of KX6 indoor units from cassettes to ceiling suspended, wall mounts and floor standing units.

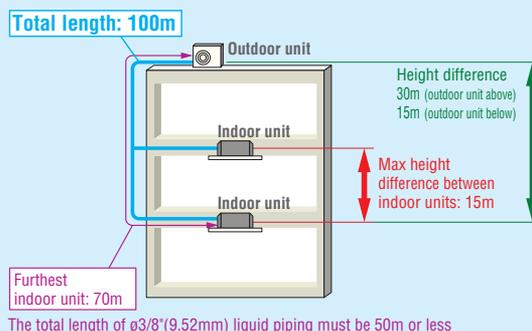
David Lettis says the KX6 Compact will satisfy the most demanding of requirements for economy and energy efficiency. "It can deliver significant savings in energy consumption with industry leading energy efficiency statistics: the 12kW (4hp) outdoor unit for example produces a COP of 4.33 in heating mode and 4.00 in cooling mode – for every 1kW of energy consumed the 12hp unit produces 4.33kW of heating or 4kW of cooling."

It out-performs competitors in Coefficient of Performance

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Friendly foes... The six finalists of the CIBSE/ASHRAE Graduate of the Year Award pose together before competing for one of the prizes in London last month. Each candidate gave a five-minute presentation to the assembled judges on the theme: 'Energy efficiency in existing buildings is the key to creating a sustainable environment.' Emma Marshall took first prize, winning a trip to the ASHRAE winter meeting in Orlando, US, in January. Chris Pountney (furthest right) came second, winning £500, and Francis Li (second from right) third, £250.

New crop oozes green ambition

Six young engineers were shortlisted for this year's CIBSE/ASHRAE Graduate of the Year Award. They tell **Carina Bailey** about their hopes for their careers and for the future of building services engineering

Emma Marshall, graduate engineer at RPS Gregory, Newcastle



Emma Marshall has always had an interest in the built environment, but she says it wasn't until an open day at Northumbria University that she discovered building services engineering. 'My personal ambition is to make a difference in the construction field in terms of sustainability, and to become a low-carbon consultant in the future, as I feel this will help me to make significant improvements in the way we design and operate buildings, both here in the UK and internationally,' Marshall says.

'I hope to excel in the field of building services engineering and boost the image of this engineering discipline, encouraging more young people to choose it as a career path. The number of women within the field has increased over the years but I would like to be able to encourage more young women to get into the profession.'

And despite only recently joining the profession, she has some clear ideas about where problems in the industry lie, including: too few incentives for the industry to make significant improvements in building design; too high costs leading to value engineering; and not enough support from government for the necessary change in energy consumption.

Marshall believes that economic recovery in building services is not likely to be for some time yet. 'The industry is still in decline and I fear it will still be a number of years until it is fully operational once again.'

Chris Pountney, graduate engineer, sustainability – building engineering, at AECOM, St Albans



Chris Pountney knows the value of showcasing practical engineering to students, having been one himself when he was first introduced to it. 'The application of theoretical knowledge to practical, real-life problems is an exciting prospect.

Seeing that put into practice by the engineers I met as a sixth-form student inspired me to pursue a career as an engineer.

Pountney's personal ambition is to continue developing technical solutions to the problems caused by climate change: 'Currently we have a lot of independent technology used by different people, at different stages in the life of a building. The key to a better built environment will be the integration of these technologies, along with comprehensive, practical engineering experience.'

As regards the recession, Pountney believes the reduction in graduates as a result will continue to 'show itself over the coming years', with fewer young engineers being employed and the training and development of those in work continuing to reduce.

'As an industry, it is vital that our skills base continues to increase so that we are properly equipped as the economy recovers in the longer term,' he says. 'We have been fortunate that public sector new build work has continued, although whether this is sustainable beyond next year's general election is unclear.

'The legislative pressure driving us towards a low-carbon economy continues to generate more and more work for the industry, both in existing and in new build, which despite differing from more traditional work streams, needs to be adopted and encouraged.'

Francis Li, engineer at Buro Happold, London



Francis Li has been interested in solving problems and making things since he was a school kid. His interest in architecture and urban development grew as he got older and he realised that engineering could offer him a career that combines many of his interests.

His personal ambition is to run his own design practice, but he recognises that the future of the industry is dependent on new blood: 'I would like to see more young people entering engineering and construction. Without new talent, the British engineering profession >

"I would like to be able to encourage more young women to get into our profession" – award winner Emma Marshall



.....
 'The industry is still in decline and I fear it will still be a number of years until it is fully operational once again'
 Emma Marshall

.....
 'The application of theoretical knowledge to practical, real-life problems is an exciting prospect'
 Chris Pountney

.....
 'Without new talent the British engineering profession could easily become an endangered species within a generation'
 Francis Li

.....
 'I've found it humbling how quickly the realities of a construction budget have begun to knock some of the sustainable naiveties out of me'
 Matt Gitsham

> could easily become an endangered species within a generation.'

The recession has already led to tighter fees, shorter programmes, fierce competition for projects and more UK consultants looking internationally for new work. But Li wouldn't bet on market conditions in the UK changing anytime soon: 'British consultants will need to find new niches to exploit in the domestic market and/or take their skills overseas where they are still in demand.'

Liam Buckley, consultant with IES Ltd, Boston, US



Liam Buckley's passion for engineering developed at an early age when he was inspired by his 14-year-old brother's project to make a model of a water mill that powered the lighting of an associated building. 'I was intrigued by the renewable aspect of the project and wanted to figure out how it worked.'

His personal objective is to reduce carbon emissions from buildings: 'In the US, there is huge potential for energy reduction. The daily challenge faced is not just to educate architects and engineers alike, but also to educate building occupants about the operation of the building they live and work in.'

'I feel that working with IES in North America, I

am in the right place to fulfil this ambition.' As for his future aspirations, some here in the UK may consider them controversial: 'I would like to see the LEED Green Building Rating System become legislation, internationally. With some development, LEED could offer a "level playing field" and allow comparisons between nations, not forgetting to mention competition between nations.'

The recession has already had a huge impact on the industry, and Buckley sees it affecting the different types of work available to the sector in the future: 'I can see a shift of focus towards existing buildings, because energy consumption and associated running costs are being scrutinised more than ever.'

'Since the overwhelming majority of construction emerges within existing buildings, reducing operating costs can make all the difference for commercial survival or even increased profits.'

Vincent O'Brien, research student at University of Ulster, Northern Ireland



Engineering is challenging, which is why Vincent O'Brien likes the building services sector. Through his career, O'Brien hopes to build on the achievements of the previous and current generations of engineers so that 'I can make a significant contribution in this challenging and



.....
 'I think that the current popularity of energy efficiency and renewable technologies is the perfect opportunity for the industry to engage with the public and make ourselves known'
 Vincent O'Brien

.....
 'The daily challenge faced is not just to educate architects and engineers alike, but also to educate building occupants about the operation of the building they live and work in'
 Liam Buckley

dynamic industry and to help in creating a sustainable, energy-efficient future for the built environment'.

He believes one of the biggest challenges facing the profession is its low profile among the general public: 'The engineers working in our sector do a tough and increasingly challenging job, yet only a very small percentage of people know what a building services engineer does.'

'After I've explained to someone what it is we do, and once their inevitable glazed expression has passed, the usual response is: "Isn't that what an architect does?"'

'I think that the current popularity of energy

efficiency and renewable technologies is the perfect opportunity for the industry to engage with the public and make ourselves known.'

The recession initially made it difficult for O'Brien to find employment earlier this year: 'Most of my graduating class have now found employment here in Northern Ireland but are finding the work slow and there is a lot of uncertainty over how long they can stay in their positions. These are tough times for everyone.'

Matt Gitsham, mechanical building services consultant at Arup, Bristol



Green issues and the love of maths and physics are what drove Matt Gitsham into building services engineering. His aspiration is to 'move my career gradually towards a more sustainable focus – I'm desperate to make a lasting difference', he says. 'In my personal life I do all I can to reduce my impact – from eating meat only once a week to leaving the plug in when I shower so I can use the water to flush the toilet! I would love further opportunities to show the same commitment in my work.'

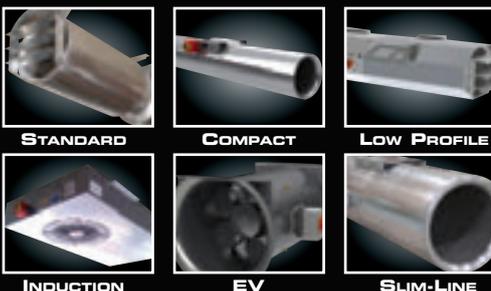
Currently he is heavily involved with the Building Schools for the Future programme in Bristol, which has had a profound effect on his ideals: 'I've found it humbling how quickly the realities of a construction budget have begun to knock some of the sustainable naiveties out of me.'

In the future, he believes, engineers need to become much more determined during the design stage: 'As the service engineer's role continues to widen and building regulation becomes stricter, I'd like to see us become much more resolute during the design process.'

'If we are to reach the government's legally-binding CO₂ targets, our designs are going to have to become much more important to a project, and we cannot let them be eroded by an overly precious architect or the value-engineering process. I also see a large shift towards renovating and drastically improving existing buildings, which is usually a more cost-effective and sustainable option than rebuilding.' ●

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Water world

Changes to Part G regulations on water supply in buildings have been delayed until April – which gives readers more time to digest their implications. **Brian Whorlow** analyses what's in store

Water quality

As rainwater harvesting systems and recycled 'grey' waste water systems grow in popularity, it is only sensible that the new requirement G1 of Part G of the Building Regulations should clarify that only 'wholesome' water (that is, safe to drink) is supplied to washbasin, bidet, shower or bath used for washing, and any sink used for food preparation.

Recycled rainwater or treated grey waste water will now be allowed only as an alternative supply for WCs, urinals (sanitary conveniences), washing machines and irrigation systems.

The new Part G classifies water in simplistic terms as being 'wholesome' or 'non-wholesome'. However, as the Building Regulations will now encompass water safety aspects, it might seem odd to some people that there is no mention of the need to ensure that artificially softened water does not supply sink taps used for culinary purposes, drinking fountains, ice machines and other terminals where the water is used specifically for ingestion.

Conservation

A new requirement to be introduced will impose a maximum average daily demand of 125 litres per person for new dwellings based on an assessment method. This will require the careful selection of fittings with emphasis being placed on aspects such as:

- Taps and mixers which incorporate water-saving features;
- Baths which do not have excessive water volumes; and
- Washing machines and dishwashers having a good water-efficiency rating.

The performance of the proposed water fittings will need to be documented on a water calculator that can be downloaded from the Department for Communities and Local Government (CLG) website. This is essentially a form designed to assess whether the installation meets the target water consumption value. The original calculation process, issued in May, has been superseded by a version released in September.

The water calculator will steer industry towards the selection of terminal fittings that have one, or a combination, of water-saving features such as flow limitation (preventing excessive flow rates), click stop

user controls (usually consisting of a two-position lever, where the first position provides the user with a low flow option), shower heads and tap nozzles with an aerating design (which deliver an air/water mixture) giving the impression of a plentiful supply. Where high-use water fittings are required by the customer, this can be offset by the use of recycled rainwater or treated grey waste water.

The requirements will mean that 'contract quality' brassware will no longer be adequate in basic housing projects, and specifiers will need to add terminal flow restrictors to projects or select alternative reduced flow taps in order to meet the regulations. The new guidance to support requirement G2 states that a record and statement about the water efficiency of the installed sanitary appliances should be provided for the householder, so that users are encouraged to maintain the performance of the installation.

The water conservation legislation is only applicable to new dwellings or existing buildings where one or more dwellings are created by a change of use (such as the conversion of a warehouse into apartments). In a situation applicable to an existing dwelling, where the sanitary appliances and the domestic water services are being totally replaced, there is no legal requirement to apply water conservation measures, even though the work will need to comply with all other current Building Regulations and Water Regulations.

Bathroom safety

The provision of thermostatic protection for baths is only required in new dwellings, or for existing buildings where one or more dwellings are created by a change of use.

Therefore, where an existing bathroom in a house is being totally stripped-out and replaced with new sanitary appliances, there is no legal requirement for the replacement bath to be provided with thermostatic protection.

Maintenance, or lack of it, could become an issue. In a domestic application, thermostatic mixing valves should be inspected and tested annually, but standard plastic bath panels are not designed for regular removal.

Education will also affect the maintenance aspect, as householders may not be aware that they have an important safety device installed under their bath.



■ **New Part G classifies water in simplistic terms as being either wholesome or not** ■

There is no longer any mention of competent installers in the regulatory text

> the hot water distribution system includes a central thermostatic mixing valve wherever any primary heat source is capable of raising the domestic hot water temperature to above 80°C during normal operation. This would principally apply to domestic hot water vessels that are heated by some types of solar systems or solid-fuel systems.

Unvented hot water systems: competency

The new Part G has 'softened' the references to competent installers. There is no longer any mention of competent installers within the regulatory text, although the guidance advises that installers should be competent. The requirement to inform building control of the identity of the installer when notifying them of an unvented hot water installation has been revoked.

Some installers may be certified as competent in unvented hot water system (UVHWS) work, but may not be registered with a competent persons scheme (CPS). It should be noted that, in order for an installer to be exempt from giving notice to building control or providing full plans in respect of an unvented installation, he/she must be competent AND belong to an approved CPS. There is a list of CPSs on the CLG website.

Connecting unvented systems to sanitary discharge stacks

The new Approved Document acknowledges that discharge pipes from unvented systems may connect to a sanitary discharge stack. This has proved extremely successful since about 2004, especially when designers are dealing with multi-storey apartments and commercial buildings, where the installation hitherto has been based on BRE guidance, *Self-sealing Waste Valves for Domestic Use (2007)*, for the HepVo self-sealing waste valve.

Although the new ADG has sensibly avoided naming a commercial product, it has simply stated that a device with a 'mechanical seal' should be used. But this could open the door for inferior gadgets – it would have been more prudent to state that the device should be a self-sealing waste valve that has been independently certified for the application. The list of provisos included in the associated text also fails to mention some key requirements for a reliable installation, including:

- The self-sealing waste valve must be installed in the vertical position;
- A PVC-U sanitary discharge stack should have a traditional open vent (for example, it should not be fitted with an air admittance valve or be a stub stack);
- The tundish should not be located in a position that is unlikely to be seen by the user on a regular basis; and
- The tundish should not be located lower than the spill level of the lowest sanitary appliance connected to the stack.

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.



Plastic discharge pipes for unvented systems

The new ADG accepts that suitable plastics may be used for 'D2' pipes, and recommends the use of polybutylene or PE-X to BS 7291 – a flexible piping in which the water flows under pressure. It is difficult to understand how this piping could be considered to be 'best practice' for conveying emergency discharge by gravity flow because:

- The flexibility of the piping increases dramatically at high temperatures, therefore maintaining a continuous gradient whilst discharging boiling water would require very careful installation
- Bends take the form of 90 degree 'knuckle' elbows, whereas the normal convention for a pipe operating as a gravity drain is for any bends to have a swept radius at an 87.5 degree angle to facilitate correct gradients and minimal flow resistance.

The new text advises that plastics pipes 'may' have a different bore to copper pipes, and that the maximum discharge lengths given for D2 pipes should be adjusted accordingly. The bore of a 22mm plastics pipe is about 18mm and will produce a significant reduction in gravity flow compared to a copper pipe. Although reference is made to BS 6700, there is no guidance on how this reduction can be calculated and installers (and building control) will not know how to assess this point with confidence. ●

Also see Legal column, *Journal*, September, page 22

Brian Whorlow is a consultant and CIBSE Mid-Career College presenter

Contacts

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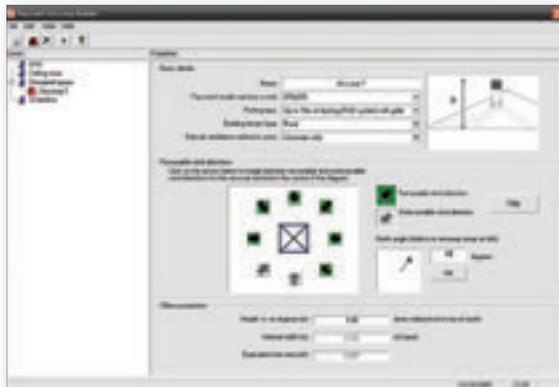
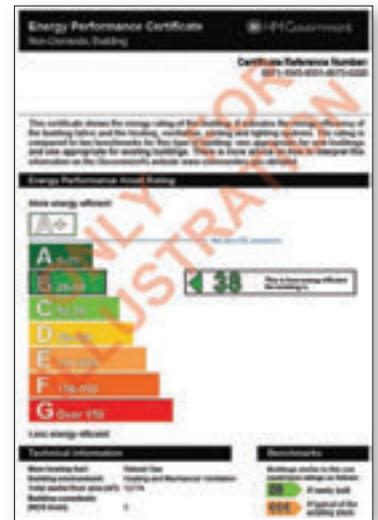
Introducing Passivent Airscoop Builder

WHAT IS IT?

Passivent Airscoop Builder is a new utility for modelling Airscoop roof-mounted ventilation terminals and their benefits to building performance. It has been developed by Environmental Design Solutions Ltd (EDSL) and Passivent for use with Tas software.

WHAT IS TAS?

Tas is a building thermal analysis tool commonly used for calculating energy consumption and assessing peak summer temperatures. It is approved by the CLG for Part L calculations and for producing EPCs (energy performance certificates). The positive impact of Airscopos on room ventilation can easily be incorporated into these calculations and Tas has a long history of modelling naturally-ventilated and mixed-mode buildings to a high degree of accuracy.



WHAT DOES THIS UTILITY DO?

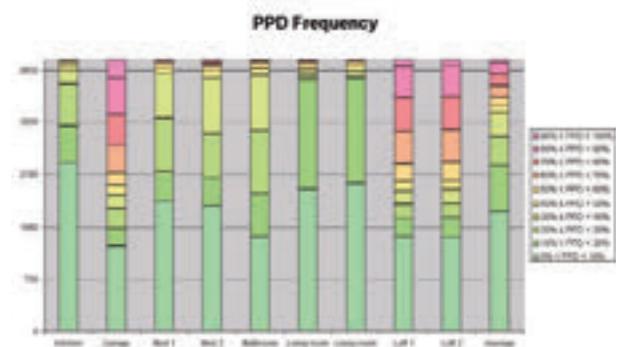
Developed in cooperation with Passivent using real test data and experimental results obtained by an independent Research Institute¹, this new utility allows Passivent Airscopos to be modelled accurately in Tas by using the measured performance data for each model of Airscoop. It is not only accurate but also provides a quick way of assessing many Airscoop options. Rather than modelling the Airscoop manually using Tas 3D Modeller, it automatically provides Tas Building Simulator with the geometry, construction materials and performance parameters specific to the selected Airscoop model.

¹A.D. Shea, A.P. Robertson, G.J. Levermore, N.M. Rideout, "The performance of a wind-driven ventilation terminal". *Proceedings of Institution of Civil Engineers, Buildings and Structures*, In press (2010).

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On the trail of the inspectors

Energy certificates for buildings have been mandatory for two years, yet no one is believed to have been prosecuted to date for failing to produce an EPC or a DEC. **Juliet Davies** investigates the reasons why

The introduction of energy performance certificates (EPCs) and display energy certificates (DECs) are supposed to have heralded a new era in building efficiency. Their goal is to show building owners and tenants how energy efficient their properties really are and how efficiently they are operating them. Compliance with these regulations is needed to ensure carbon targets are achieved. But there are indications that EPCs are being relegated to the end of the marketing or sales process, and no one has yet been prosecuted for failing to comply.

So exactly who is enforcing the use of these energy certificates? The Energy Performance of Buildings Regulations in England and Wales gives local authority trading standards officers a remit to police compliance with the EPC/DEC regime. But John Field, a director of energy management consultancy Power Efficiency, says enforcement – ensuring that an EPC exists when required by law – has been policed, not by the authorities, but by the property industry's lawyers and agents.

'Properties for sale or let with no lodged EPC were seen to be sub-standard,' he explains, 'and so the sale was delayed or compromised until the EPC was lodged – the lack of EPC could trigger further price negotiations, which were very unwelcome.'

Property agents are involved via their letting and sale departments, which are directly involved in transactions, and their property management departments, which commission the EPCs to prepare for possible sale or letting. 'In 2008 some larger property groups carried out EPCs on a pre-emptive basis to prepare for possible sale or letting,' says Field.

'This approach may have been spurred by the economic problems and the need for quick sales or letting at that time. The EPC market is now, in our experience, almost wholly transaction driven – that is, on-demand when a sale or let is imminent.'

Official government websites for DEC and EPC instruct homebuyers or public building users to report missing documentation to trading standards. However, property and energy efficiency are specialist fields, requiring knowledge outside the remit of many trading standards officers (TSOs), it is argued.

So how often are trading standards actually brought in, and what have they done when they are called? Says Field: 'As a company, to date we have had no experience of inquiries or enforcement intervention of any sort by authorities such as trading standards.'

The Trading Standards Institute (TSI) says some of its members have had properties reported to them for having no EPC, but there is currently no requirement for this information to be reported or recorded centrally. TSI's property lead officer, Lucia Smeraldi, says: 'Where EPCs are for the sale of domestic properties, they are contained in a home information pack and enforcement is more straightforward.'

'However, with EPCs relating to the rental of domestic properties, or to the sale or rental of commercial properties, the situation is quite different. In these cases the responsibility for the production and supply of the EPC sits with the landlord or owner of the property.'

While it would be good practice for an agent marketing these properties to hold the EPC and make it available for prospective tenants and purchasers to





Enforcement might be better in the hands of another body entirely, according to Richard Hipkiss.

> see, the law permits a fallback position which means that, so long as the tenant or purchaser receives a copy before contracts are signed, the agent is considered to be in compliance with the rules.

'This is very late in the day indeed,' Smeraldi points out, 'and not really supportive of the spirit of the original directive that brought in the requirements for EPCs, the European Performance of Buildings Directive (EPBD).'

'Furthermore, despite the requests of the profession, poor provision has been made for TSOs to be able to require information enabling the identification of these landlords and owners, which causes difficulties.

'The Institute highlighted these difficulties and others during the initial, and very brief, consultation that preceded the EPC regulations. Since then, we have continued, with LACORS, to feed back on the practical difficulties of enforcement.

'As the Energy Performance of Buildings Directive is due to be revised, the institute and associated bodies continue to push for an improved system that will make compliance simple; bring timely information to prospective tenants and purchasers; minimise burdens on businesses and local authorities; and enable effective enforcement against those flouting the law.'

Consultancy i-prophets assists clients to improve the sustainability of their premises through compliance solutions. Richard Hipkiss, marketing director, admits that he has been in situations where it would have

been useful to call trading standards, but did not do so because: 'To tell tales when trying to extract an order from a client is not great!'

He would, however, like to see trading standards have a bigger role in enforcing the certificates. 'Or an alternative body. One of the main weaknesses of the EPBD is enforcement – there is none. There is no recorded case of a penalty issued for the lack of a DEC, EPC or air conditioning inspection (AC). Hence the plan does not work.'

TSOs should be helped to come up to speed with ACs, DECs and EPCs, he says. 'What is the incentive for an already under-resourced trading standards department to enforce the rules? If the Department for Communities and Local Government is serious about driving the enforcement of DECs, EPCs and ACs, then a specialist organisation should be engaged to deliver enforcement.

'Trading standards are not property, building services or energy specialists, so are they best placed to enforce? Could accreditation schemes pick up some of the enforcement, other than maybe assessors who know the requirements better?'

One TSO, who wishes to remain anonymous, says that he has had a lot of involvement with estate agents as part of a regional project, and found reasonable compliance. He'd had calls from people complaining that their HIP was inaccurate, and had also been involved in some inter-estate agent arguments, with some marketing of homes before their EPC was undertaken, but these have been dealt with by advice.

'But if they were repeatedly doing this we'd consider further action,' he warns. 'We would take stringent action if advice was disregarded. Most estate agents just want fair competition.'

He suggests that TSOs have bigger priorities to deal with, such as rogue traders or underage drinking, leaving EPCs to fall to the bottom of the list.

'We have to direct our resources where they are most needed,' he adds, 'which is at the biggest problems, and in this case that was not a priority.'

Stuart Bowman, energy and sustainability consultant at engineering consultancy hurleypalmerflatt, believes

Displaying energy performance

EPCs:

An EPC is an Energy Performance Certificate, which all non-public sector properties must have when they are sold, built or rented. They took effect fully last October. The EPC records how energy efficient a building is by rating it from 'A' (most efficient) to 'G' (least efficient). It also includes a report giving recommendations for improvement. Each improvement includes the indicative payback period and carbon impact. The rating is based on the performance of the building and its services, for example heating, rather than the appliances within it. This is known as an asset rating.

Source: www.businesslink.gov.uk

DECs:

A DEC, or Display Energy Certificate, shows the actual energy consumption, or energy performance, of a building in terms of the carbon dioxide produced. It uses a rating score between A and G to show how well a building is performing based on gas and electricity meter readings. A supplementary report is also supplied with the certificate suggesting ways in which the energy performance of building could be improved. Currently DECs are only required in public buildings above 1,000 sq m, and need to be publicly displayed.

The certificate is valid for one year, while the accompanying report is valid for seven.

that increased and improved training for trading standards would make them more effective arbitrators. 'We have been involved in validating EPCs where there has been a disparity between two surveys. Similar buildings can have quite different EPCs, caused by the 'default' position of the system – trading standards could have an independent stance policing this if they were to have the knowledge.'

East Sussex Trading Standards is one authority that has adopted a proactive approach towards enforcement of EPCs and DEC. TSO Paul Taylor is on a two-year fixed contract to ensure compliance levels are high within the county.

'This has included assessing the present level of compliance, responding to complaints and enquiries, and carrying out a comprehensive programme of trader education, while also raising community awareness through the local media and presentations,' explains Taylor.

'For retailers who continue to breach the legislation, robust enforcement action will be considered. To

“To date we have had no experience of enquiries or enforcement intervention of any sort by authorities such as trading standards” – John Field

date, this has been unnecessary due to the industries involved taking on board the advice and ensuring their operating practices are meeting the requirements.'

Taylor has created relationships with all organisations that require DEC. To ensure advice and education can be given to assist them in identifying their requirements and provide continuing support. 'Projects have been carried out with regard to commercial properties and this has identified poor levels of compliance,' he says. 'This has therefore highlighted the need for further work in this area to increase awareness – and, if needed, enforcement action will be carried out.'

The authority believes its work towards promoting the message that non-compliance with EPC and AC requirements is not an option is achieving the desired results – increasing the awareness of energy efficiency in buildings.

Indeed, CIBSE is soon to embark on its own campaign to raise awareness of EPCs, DEC. and AC among TSOs and to offer training courses to improve enforcement. It is hoped this initiative will help TSOs nationally to take a much more active role in the enforcement of the regulations.

It is conceivable that the slump in the housing market may be limiting the number of resultant problems, which could see more referrals to trading standards made in the future when sales pick up. But only time will tell if this will lead to more prominent policing of the energy certificate market. ●

CIBSE campaigns on EPCs

A campaign to help train and educate trading standards officers (TSOs) in the enforcement of rules on EPCs, DEC. and air conditioning systems is being launched by CIBSE.

Factsheets have already been created by the institution on all three topics, which include what the regulations are in England and Wales, why they have been introduced and how they affects TSOs. The factsheets also include what powers TSOs have, what to do if a person is non-compliant, and the appeals process.

Jacqueline Balian, managing director of CIBSE Services, says: 'CIBSE has provided guidance for TSOs on the type of buildings that are likely to need air conditioning inspections and on how to interrogate the Landmark register to see that buildings have the appropriate EPC or DEC.'

More details on the campaign will be issued soon.

Manchester town hall... Local trading standards officers are to be targeted by a new CIBSE campaign.



istock/Matthew Whittle



School test

Post-occupancy evaluations of five similar academies highlight the difficulties in implementing energy efficiency measures in secondary schools – and the need for continuing assessment, writes **Ian Pegg**

Accurate feedback on the true performance of buildings, with full data on energy consumption, is key to delivering energy efficiency. In order to calculate the true effects of any design changes we must first be able to estimate energy consumption accurately. But, while modelling and estimating carbon emissions of buildings is a simple task, producing accurate data can be enormously difficult – energy use is affected by the actions of many stakeholders in a building, from the design team to the contractors through to the end-users.

Assessing the performance data from the operations of new school buildings can be particularly challenging. But the data can also provide some valuable lessons for designers. A post-occupancy-evaluation (POE) study by global multidisciplinary engineering consultancy Buro Happold, of five new academy schools built in Britain during 2002-05, offers some useful insights. The measurements were carried out over 14 months between September 2005 and December 2006. They provided monthly energy data and looked at issues such as overheating in summer and winter ventilation rates.

The academies – one each in Bristol, Liverpool and Nottingham, and two in London – had more or less the same requirements and operated with similar constraints and budgets. This makes it much easier to compare the findings and determine what causes the differences in performance.

The initial challenges faced by the designers involved with these schools can be summarised thus:

- How can ventilation and acoustics be managed in classrooms?
- How was mechanical cooling to be avoided, while still allowing each student to have their own PC in classrooms?
- How complex can a school get before maintenance budgets become unmanageable? and
- How can an academy have greater functionality, with better environmental conditions, and still have low carbon dioxide emissions?

The five buildings in the study used a variety of approaches to tackle these issues. Some techniques were common – all the schools had high thermal mass

in at least some of the classrooms. In one academy this was coupled with an automatic night-cooling strategy.

In an attempt to avoid cooling, cross-ventilation was applied in four of the academies. This worked well with clerestory vents on the first floor of one building although, when coupled to a central atrium, some acoustic problems did arise.

Mechanical ventilation was deployed only when road noise was too great to enable openings in the façade. In some cases this was done by using standard constant-volume air handling units serving a number of zones with tempered air.

In an attempt to save fan power, one building used a single air handling unit and concrete ductwork to serve 17 classrooms. Each classroom had a damper controlled on room occupancy. The speed of the fan was determined by the number of classrooms in use. All five buildings used full-height circulation or atrium zones. Two of the schools had a significant need for mechanical cooling; in one academy, fan coil units were used for internal zones.

Logging

One of the academies specialises in information and communications technology (ICT) and provides one laptop per student. It was recognised that the criteria in Building Bulletin 87 could not be achieved passively, so chilled beams were installed. Combined with natural ventilation on the north façade of the school, this approach enabled higher cold-water flow temperatures and free-cooling for most of the summer.

There was a concern that the school would use the panels for comfort cooling rather than peak lopping, but the data logging has shown this not to be the case. The logging involved applying loggers to different electricity circuits, split between HVAC, lighting and small power. On-off loggers were also applied to light to identify overuse and temperature logging was carried out during summer and winter months.

Figure 1 shows the energy consumption for electricity and gas for all five academies, compared with Department for Education energy benchmarks. >

“ Designers need to argue that the energy benefits may justify higher capital costs and a different approach to design ”



Similar schools can show very different energy-efficiency outcomes. Occupancy and usage of facilities are key to these discrepancies.

This revealed that gas consumption for heating was quite good – a consequence of using high-efficiency condensing boilers, compensated circuits, optimum start-stop controls and reasonable to good U-values.

The electricity consumption is surprising – especially when compared with the benchmarks. However, the results were comparable to more recent monitored data. For example, two schools were both reported to use around 65 Wh/m², without some of the acoustic constraints and levels of ICT provided in the academies. However, the high levels certainly warrant explanation.

Figure 2 shows the electrical breakdown by end-use. Data was gathered using electrical profiling equipment in the low-voltage panels and distribution boards.

Lighting consumption in academies A, B and E was up to four times higher than academies C and D. While installed loads were equivalent, the major difference was control. Figure 3 shows the control of manual lighting in school B and automatic lighting in school C over one month. The simple use of passive infrared sensors saved 30 to 40 per cent, compared with manual switching.

Subsequent investigation showed that manual control of circulation lighting in school B was particularly bad – a characteristic that was repeated to varying degrees in schools A and E. The schools with large, connected atriums had the highest lighting energy consumption for the following reasons:

- Nobody ‘owned’ the atrium spaces and therefore no-one took responsibility for switching off the lights;
- The spaces were well day-lit, but in school B some of the finished spaces were dark. Without lighting on during the day, the teachers complained of a gloomy feel to the spaces, although overall they enjoyed the openness of the school;
- The occupancy of the schools was complex and varied on a daily basis and between school terms. This meant that lights were not switched off outside core hours; and
- The 24-hour security required lights to be on for security cameras and for walk-rounds.

The base load drove the energy consumption in all schools. After lighting, the fans, pumps and controls caused the highest consumption. This was partly due to poor time control of systems.

Interestingly, school C has ventilation equipment that defaults to ‘off’ when the spaces are not occupied. Even though the academy had the highest proportion of mechanically-ventilated spaces, it had the lowest electrical consumption data for fans, pumps and controls.

Design lessons

Clearly, some schools with low-energy features may produce more carbon dioxide, not less. So what can we learn from this? The data showed that all the IT functions, such as computer use, servers and other equipment – can represent as much as 20 per cent of a school’s electricity consumption, a proportion that will become more significant as other equipment becomes more energy-efficient.

The likelihood is that the student/computer ratios will rise. We need to be aware of this and influence the ICT consultants on our projects to procure the most efficient equipment.

Schools of the past were expected to be entirely free-running from April to October, with many rooms either noisy or hot. New schools come with a higher set of expectations. However, designers must review the standards and determine their effect on energy. The key lesson is: only provide high standards when they are required, and not as a default state.

School buildings are now used for a variety of purposes, particularly during out-of-school hours, such as adult classes, community events and after school lessons. This is raising the run-times of central plant and lighting systems, and needs consideration at design stage.

Buro Happold’s research showed that the default is usually full power at all possible times that the school could be occupied. This is one of the key reasons that school C performed so well – all defaults stated were

either off or low power. It's clear that lighting in schools should have a default-to-off setting.

Decentralising heating, ventilation and air conditioning systems and zoning the building can make default-to-off easier to achieve. However, this may have knock-on effects on capital cost and space needs. Designers need to argue that the energy benefits may justify higher capital costs and a different approach to design.

It is often said that high energy consumption is caused by the behaviour of building occupants. However, others have shown that decisions regarding energy consumption are highly influenced by assumptions of occupant behaviour. This is why designers should close the loop between design expectation and reality, if schools are to become truly low-energy.

In order to improve the internal environment to ensure passive design features work properly, schools are incorporating automatic windows and solar shades that respond to internal and external conditions. A certain level of expertise and experience is required to operate and maintain processes such as passive solar gain and natural ventilation.

This study showed that in all five academies

“ The facilities managers often felt they were not well prepared to operate the building management system ”

surveyed, the facilities management staff had little relevant experience with building services. Only three of five facilities managers interviewed were able to operate their building management system. In the other two schools the systems were not optimised to respond to changing requirements. This led to plant overruns and less than optimum internal conditions.

Designers need to advise their clients on the likely operational and maintenance implications of the schools they are designing. If complex controls are unavoidable, they should at least ensure that the client is well-prepared.

The facilities managers often felt they were not well prepared to operate the building management system. If these buildings are to perform as intended, provision of training and suitable documentation must be improved.

Overall, the POE studies of the five schools highlight the need for an evaluation of such buildings' continuous occupancy and usage. This process provides ongoing feedback to designers, which helps them learn quickly about how client requirements change – and which improvements can be made to genuinely reduce energy efficiency and create truly low-carbon buildings. ●

Ian Pegg is a senior sustainability consultant at Buro Happold. www.burohappold.com

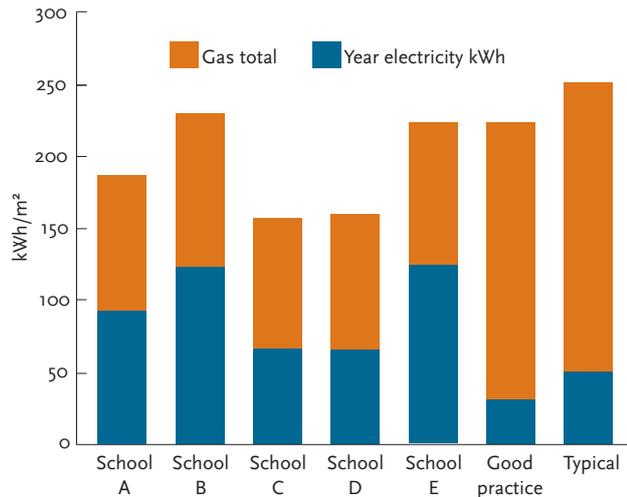


Figure 1: Headline gas and electricity consumption figures for five academies.

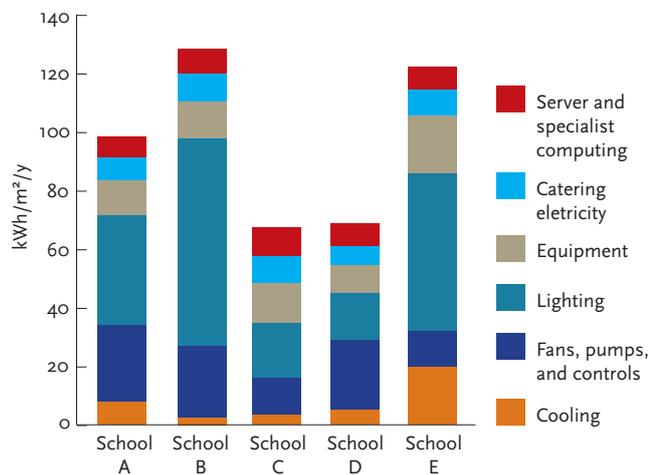


Figure 2: Breakdown of electricity consumption by end-use in the five case-study academies.

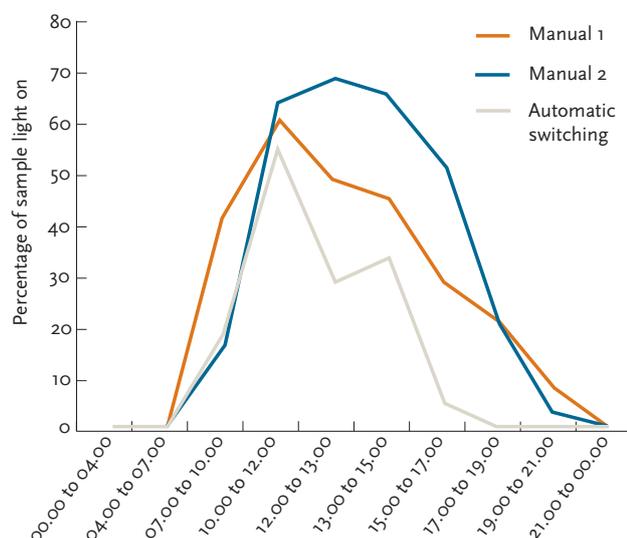


Figure 3: Lighting frequency for manual and automatic switching in two case-study buildings.



Renewable solutions

Biomass and solar thermal systems are increasingly being specified as renewable heating facilities. But, asks **Ian Vallely**, what issues do engineers need to consider when specifying them?

Solar thermal and biomass heating systems each have their advantages and drawbacks, and which (if either) the consultant specifies inevitably depends on the application. However, how often are they able to adopt the 'best' solution?

Reginald Brown, head of energy and environment at BSRIA, says: 'In reality, the design of heating and cooling for new buildings is increasingly driven by the exigencies of planning and building regulations, rather

than a holistic view of what might be good for both the client and the planet.'

For Tom Lelyveld, sustainability consultant at AECOM consulting engineers, deciding which technology will work best starts with examining the project drivers.

He says: 'Is it planning, building regulations, meeting a target set by the Code for Sustainable Homes or BREEAM? Or is it due to a need to reduce running costs, to meet corporate social responsibility commitments, to respond to the carbon reduction commitment, or reduce carbon emissions, or make better use of an available waste stream?'

The type of building(s) planned, and local site constraints, also have a bearing on the heating technology – and, says Lelyveld, all these factors should feed into an assessment of feasibility.

'There may be site-specific constraints – only shaded roof areas, air quality control or limited access, or

Case study School pool benefits from solar system

Abbots Bromley School for Girls in Staffordshire – a private boarding and day school with around 300 students aged between four and 18 – has installed a Buderus solar thermal panel system to provide heating for its swimming pool complex.

Vale Heating & Plumbing of Pershore specified 32 solar panels in two fields, each of 16 panels. A range of Buderus pump stations and accessories allow for individual fields of between 10 and 50 solar panels to be installed. Multiple fields of panels, and split systems, are also possible for bigger commercial installations.

According to Stefan Gautsch, technical design engineer at Buderus: ‘Solar comes into its own in commercial installations where there is a large demand for hot water, for example, frequent showering in hotels, heating of swimming pools and/or where better building insulation of roofs and windows reduces the load on the heating system. It is also particularly effective with underfloor heating systems because of the low, even operational temperatures.’

Although the solar system in this installation meets the usage pattern of the pool without the support of a separate boiler, a particular feature of the Buderus controls platform is the intelligent solar optimisation function, which enables integration with Buderus boilers.

Each flat plate collector is constructed from translucent 3.2mm toughened solar safety glass (said to be 15 per cent more effective than window glass in optimising light capture). The panels use a continuous meandering copper pipe to circulate solar fluid through the system. This arrangement is said to help to eliminate hotspots across the field of panels by providing a more even temperature



Solar future... Abbots Bromley School for Girls, Staffordshire.

distribution, which in turn creates fewer pressure losses and reduces the need for ancillary solar pumps.

Buderus supplies two types of collector – the SKS range and SKN range – each incorporating its own daylight absorption technology to capture as much natural solar energy from the sun as possible. For a correctly sized system, the heat required for hot water preparation between April and September can largely be provided by the solar collectors. With such yields across these six months, up to 60 per cent of the annual hot water requirement can be heated by the sun, the company claims.

SKS collectors are hermetically sealed and filled with inert dry argon gas. This is designed to ensure that no mist, condensation or corrosion forms inside the collectors. It also protects the absorber from the ingress of dust, moisture and airborne pollutants. A vacuum-applied PVD coating is said to minimise heat loss from the absorber and enable up to 97 per cent of light irradiation to be captured and converted to useful heat.

“ I am uncomfortable about extensive use of biomass in built-up areas because of potential air quality problems ”
– Barry Johnston

drivers such as a low-cost supply of biomass, which will drive the decision-making process between renewable heat options.’

Of course, the choice may not simply be between solar thermal and biomass. There are, according to Lelyveld, circumstances where both could be applicable: ‘The key area for combined solar thermal and biomass would be in very low-energy housing, where the future occupant is also the client-developer and, as such, has an interest in lower fuel bills.

‘In such a situation, the specification of solar thermal will reduce the biomass fuel costs and potentially mean that the biomass boiler can be switched off over summer months – the ideal time for annual maintenance checks. This can be applicable to individual systems and larger developments.’

For Barry Johnston, head of Solar Twin Ltd, a mix of renewables can work in some circumstances: ‘Solar and either ground source heat pumps or biomass can work well together, provided the systems are

specified appropriately at the beginning. This may mean avoiding heat pumps where mains gas is being displaced, since the carbon and energy benefits of doing so are marginal. The picture improves where coal or oil are being saved. Also, heat pumps only operate efficiently at low temperatures.’

He believes that biomass and solar can also work together. However, he adds: ‘I am uncomfortable about extensive use of biomass in built-up areas because of potential air quality problems from particulates and nitrous oxide emissions. Coupled with solar thermal, biomass boilers have a pleasantly limited job to do throughout the summer, so a large heat store, with several days of storage, may be required to avoid short periods of operation.’

The big challenge facing the solar market is not linked to technology but to skills, according to James Parkinson, brand marketing manager at boiler maker Vaillant: ‘The rate of market growth has slowed during the downturn, but it has not stopped and the potential >



Biomass boilers can offer a big return on the energy needed to obtain the fuel, according to experts.

> is huge for when the economy as a whole picks up again. The building services engineering sector must be ready to deal with a surge in demand at some point in 2010 and that means having large numbers of skilled people in place.

‘We do not want to create a new industry and we certainly don’t want to let unskilled and unqualified companies in through the back door,’ adds Parkinson. ‘Solar thermal, in particular, is an ideal technology for skilled heating engineers to add to their repertoire. The technology is tried and tested and this is not a “black art”; it only requires up-skilling for already competent installers through BPEC training, for example.

‘The best way to grow this market and to ensure solar systems perform as they can is to make sure they are installed by engineers who understand heating.’

Cutting carbon emissions is not the only environmental advantage of biomass, according to Mark Northcott, director of commercial products at manufacturer Remeha: ‘Emissions are also a key consideration and, here again, biomass wins out. A well set-up, clean wood chip/pellet boiler compares favourably with natural gas – it produces less than 120 parts per million of carbon monoxide, less than 95ppm of NOx, and negligible amounts of SO₂.’

For Northcott, one of the best things about biomass production is the big return on the energy needed to obtain the fuel: ‘If you put 1kW worth of effort into creating woodchips you get 20kW of heat back – you get 20 times as much back as you put in.’ Nonetheless, says Andy Owens, biomass technical sales manager with manufacturer Hoval, anyone thinking of specifying biomass must look beyond the basic engineering design that would accompany any heating system to

evaluate the day-to-day practicalities of living with a biomass system.

‘The first stage is to understand the range of heat loads through the year and to design as much as possible for continual load with minimum cycling. For example, when there is only a demand for domestic hot water, will it be worth firing the biomass boiler at all during these periods? And would a suitably sized buffer vessel help the operation of the boiler? Or an additional small gas-fired boiler – or perhaps solar thermal – may prove to be valuable additions to the project.’ >

CIBSE guide to solar energy

KS15 Capturing Solar Energy provides an overview of the available domestic and non-domestic solar system solutions, technologies and applications. It also highlights some of the main design and installation issues, commissioning and maintenance requirements, and regulations and costs information.



Although primarily aimed at the designers of building services, it will also help clients, building owners and facilities managers to understand the possibilities of using solar technology in their buildings. *KS15* is available now priced at £23 for members and £46 for non-members. For more information or to purchase, visit www.cibse.org/publications or call 020 8772 3618.

The Ultimate Solar Package



Marvel Flat Plate Thermal Panel

Thermomax Vacuum Tube Panel



Perfect in Solar...

Kingspan Solar, part of Kingspan Group plc, provides both domestic and commercial markets with Solar Hot Water packages, custom designed for each application. All system designs are carried out by CIBSE certified design engineers and carry comprehensive professional indemnity insurance cover.

The solar package comes with either Flat Plate Thermal or Vacuum Tube Thermal solar collectors and all the required components for complete installation. To make life easier for the installer, 1st and 2nd fix kits are packed separately.

An appropriately sized high performance Range Tribune HE Duplex stainless steel unvented solar cylinder also forms part of the package.

The cylinder can be an Indirect or Direct version, dependent on the auxiliary heat source available.

Kingspan Solar offers the highest level of support from initial advice through design and installation to final commissioning. The solar package features a 20-year anti-corrosion guarantee, 10-year flat plate panel & 5-year vacuum tube performance guarantee with 2-year guarantee on other system components.

With a 25-year guarantee on the Range Tribune HE Duplex stainless steel unvented cylinder, the complete system is designed to offer the specifier, installer and end user the ultimate solar package.

> George Fletcher, technical sales manager for woodboilers at Viessmann, believes the advantages of biomass in commercial applications are particularly meaningful in off-gas areas where, he says, an installation can offer a lower total cost of ownership as well as a reduction in carbon footprint.

He adds: 'In industrial situations, where wood is processed – for example, kitchen and joinery manufacturing – the benefits of biomass are huge as the waste can be used to heat the factory. This reduces or eliminates the heating bill, reduces landfill costs, and reduces transport. However, for the domestic market, I believe that the only viable route for biomass is to install district heating schemes.'

'As fossil fuel costs rise, which they will do, then biomass boilers will become more appealing. During the next 10 years we would expect to see many more pellet boilers installed in larger and also in older domestic properties.'

As to what the future holds for solar and biomass, Brown says: 'Technical developments will be in intelligent controls and integration solutions to allow

different renewable technologies to work effectively with each other and with conventional plant.'

He adds: 'Some boiler and heat pump controllers already allow for easy integration of a solar thermal contribution.'

Combined heat and power will be important to biomass, while solar thermal systems could become combined with photovoltaic ones, according to Lelyveld: 'These combined panels could make more efficient use of limited unshaded roof area, but have generally lower efficiencies than their standalone, uncombined counterparts – PV and solar thermal.'

Alan Hogan of Kingspan Renewables believes that, over the next five years, solar-driven air conditioning will become more the norm, using absorption chillers: 'In domestic applications, we will see more solar-assisted heating systems. With current research and improvement of compact storage materials, such as zeolites, silica gels and other thermo-chemical materials, the performance of solar-assisted heating systems will greatly increase without having to use large-volume thermal stores.' ●

Our sector must be ready to deal with a surge in demand for solar thermal systems in 2010 – James Parkinson

Case study Carbon-neutral biomass heating for National Trust

As part of its drive to reduce carbon emissions across its estate, the National Trust has replaced two oil-fired boilers at Sudbury Hall in Derbyshire with a pair of 150kW STU wood pellet biomass boilers, manufactured by Hoval.

First, the existing oil boilers and oil tank were removed from the designated cellar space. Working with installer Instatherm, which also supplied the pellet feed system and underfeed stokers, Hoval took a turnkey role in managing these works through to the commissioning of the new boilers.

The pellet hopper, located adjacent to the boilers, is manufactured from a special fabric and mounted on a steel frame. The fabric is designed to allow air to pass through while retaining dust, so the hopper does not need to be vented during filling.

At Sudbury Hall, the wood pellets are delivered pneumatically into the fabric storage silo, which holds around seven tonnes of wood pellets. Pellets are transferred to each of the boilers via a dedicated auger in another cellar room adjacent to the fuel store area, where they are fed into the respective transfer boxes of each stoker.

The stoker automatically adjusts the fuel feed to match the boiler load. Continuous oxygen gas monitoring of the flue gases is designed to ensure close control of combustion, as the air supply is adjusted to match the fuel feed.

The Hoval boiler comprises a welded steel shell with a water jacket surrounding an oval combustion chamber. A dedicated delivery auger meters wood pellet fuel into the boiler at the desired rate. It collects wood pellets from a hopper mounted at the rear of the boiler.



Biomass boilers are installed at Sudbury Hall, Derbyshire.

The level of the pellet feed within the transfer box is regulated to maintain a break or gap between the delivery auger at the bottom and the fill system, which transfers pellets from the fuel store to the top of the transfer box via a separate auger or pick-up.

The delivery auger is also fitted with two separate safety thermostats to protect against fuel burn-back.

Combustion air is supplied from one of two fans fitted to the boiler. The forced draught fan is mounted on the floor adjacent to the delivery auger and has a motorised damper arrangement fitted to its inlet. An induced draft fan is fitted in the ductwork at the outlet of the boiler, which draws secondary combustion air into the furnace of the boiler as well as assisting with the flow of the products of combustion through the boiler.

Air supply is regulated (via a lambda probe mounted in the flue ductwork) to match the fuel feed into the boiler. Any incombustible material or ash collects on a hearth and requires removal – typically, every other week.

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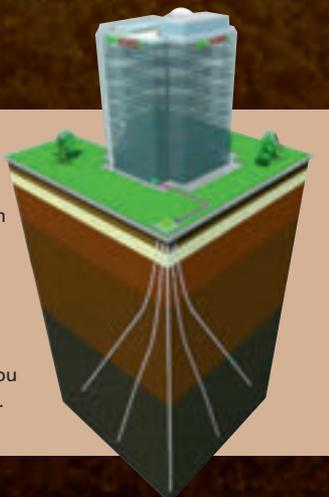
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Home improvement

With Parts L and F 2010 of the Building Regulations due to be implemented next autumn, designers and developers need to be planning now for new-build homes. **Alex Hole** offers a rundown of the key improvements that will be needed

Next year all new houses will have to be built to a much higher level of energy efficiency – but what does this mean in practice, and what will they look like? Parts L and F of the Building Regulations are going through the first of three significant step-changes en route to making all new houses carbon-neutral by 2016.

The first stage, planned for October 2010, will see a requirement for a 25 per cent improvement in energy efficiency, compared with the current Part L. Midland Energy Services has been investigating the effect this will have on the design and specification of new homes to meet next year's proposed changes, and the findings make interesting reading.

SAP (Standard Assessment Procedure) will still be used to assess all new dwellings, although it is being updated to better reflect the true performance of the home. In practice, houses will have to increase insulation in walls, floors and roofs, incorporate higher performing windows, be built more air-tight and often include renewable technologies such as solar panels or mechanical ventilation and heat recovery systems.

For some time now it has been a mandatory requirement of the Code for Sustainable Homes (CSH) to achieve a 25 per cent improvement in carbon emissions to meet Level 3, but next year it will be required for all new homes. This does not mean that all new houses will have to be assessed under CSH (a common misconception) – just that Building Regulations is coming in line with Level 3 of the Energy (Ener) part of CSH.

The starting point is to design energy efficiency into the new home by keeping the external surface area to a minimum and orientating the property so the building benefits from passive solar gain. An 'H' shaped property, for example, would lose out to a square building due to

its larger envelope. A house with mainly south-facing windows will also benefit from solar gain, even in winter, but a designer must bear in mind that too many south-facing windows in a highly insulated, air-tight house can lead to overheating issues in the summer months.

This balance is very important. However, summer overheating can be reduced by incorporating overhanging shades to block out the high summer sun. Deciduous trees also act as a natural summer shading system, but allow sunlight through in the winter when the leaves have fallen.

Following this, consideration should be given to the thermal envelope – and, next year, higher levels of insulation in floors, walls and roofs will be necessary. Perhaps up to 400mm of roof insulation, wider and fully filled cavities and the use of the highest performing thermal blocks will become more common. Blocks that are laid with thin joints will also help to reach the 25 per cent efficiency improvement, as will highly insulated timber framed houses. Thermal bridging could also be reduced by using Accredited Construction Details



“ It is likely that the proposed changes next year will require developers to actually prove they have reduced thermal bridging ”



New homes are due to come under the sustainability code.

Good Homes Alliance



(ACDs), or better still, Enhanced Construction Details (ECDs). These are fairly simple ways of reducing the transfer of heat out of the dwelling and make a significant improvement in SAP results.

Our experience is that many developers are not aware of ACDs but, in fact, already incorporate many of the requirements to reduce the likelihood of thermal bridging. It is likely that the proposed changes next year will require developers to actually prove they have reduced thermal bridging. Further information can be found on the Planning Portal website (www.planningportal.gov.uk).

Air leakage testing of new buildings has been a Building Regulations requirement since 2006, and we are discovering that the vast majority of our clients find it fairly easy to meet the basic requirements (achieving about a 98 per cent pass rate). Next year's requirements, however, will encourage house builders to not only meet the regulations but to significantly improve on them by reducing air leakage to levels below 5cu m/sq m.hr@50Pa. This would represent a 50 per cent improvement in today's maximum leakage rate.

With low air leakage rates comes potential ventilation issues, and Building Regulations may require houses to be built to very airtight standards to incorporate mechanical ventilation systems with heat recovery. It's also likely that a higher proportion of low-energy lights than the present 25 per cent will be necessary. For those not keen on the compact fluorescent types, LEDs offer an alternative, low-energy solution.

Finally, on a number of new houses, low or zero-carbon technologies could be needed to help achieve the 25 per cent carbon emission improvement. Solar panels, heat recovery systems, biomass boilers and heat pumps will all start to appear more regularly. Although we have

seen many self-build projects incorporating renewables for a number of years, they will become much more mainstream.

There are also lots of proposed changes to the way new houses are actually assessed through SAP. The way it's set up at the moment, it is much more difficult for a small flat, for example, to achieve a 25 per cent improvement compared with a large detached house. This is mainly due to the fact that flats are already inherently energy efficient, leaving less room for improvement. The government proposals will hopefully remedy this anomaly.

At present, party walls between dwellings are not accounted for in the energy calculations as it's assumed both properties are heated to the same level and therefore there is no heat loss. However, research has shown that there can be a significant amount of heat loss through the cavity of a party wall, and this will have to be accounted for.

The 'fuel factor' may also be eliminated in next year's assessment process, which at present makes heat pumps an easy way of achieving a 25 per cent efficiency improvement. At present, lower fabric standards are required for dwellings with electric heating systems compared with gas and oil, and this may be tightened to bring the various fuel types more in line with each other.

The proposals to amend Parts L and F provide further challenges to house builders in the drive to reduce energy use and emissions from new homes. Those working in this sector will need to keep up with proposals over the next few months. ●

Alex Hole is the managing director of Midland Energy Services.

www.midlandenergyservices.co.uk

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Big in oil and small in gas – Kellogg

Following an in-depth assessment of heat demands and system

requirements for contractor M.W. Kellogg's impressive nine-storey London head office, three Buderus SB 615 640kW stainless steel condensing boilers were chosen to completely replace the failed boilers, with reliability and longevity being key factors.

The Buderus SB range of stainless steel condensing boilers were deemed highly competitive on capital costs and offered excellent potential for fuel cost savings.

● For further information, please visit: www.buderus.co.uk.



Commercial hot water cylinders from Dimplex

The Dimplex range of SCx unvented water cylinders includes commercial size stainless steel cylinders from 450 to 4,000 litres, designed for multi-occupancy dwellings and commercial properties like sports clubs.

Each cylinder is bespoke, the customer choosing the type and number of fittings and the coil, allowing the cylinder to be integrated with solar thermal water heating, heat pumps and other renewable solutions, as well as gas.

● For more information, email: marketing@dimplex.co.uk call: 0845 600 5111 or visit www.dimplex.co.uk



Crane FS launches new DZR ball valve range

Crane Fluid Systems' new D171A DZR brass ball valve series for water, heating, ventilating and air conditioning, is WRAS-approved, can be used from -10°C to +120°C and will cover eight threaded sizes from 0.25 to 2.0 inches and six compression sizes from 15 to 54mm.

A number of design improvements add strength, improve leak resistance and reduce the risk of damage through over-tightening during installation.

● For more info, email: SShand-Brown@crane-ltd.co.uk or call: 01473 277434.

Sarkozy visits CIAT, pioneer of eco growth

French President Nicolas Sarkozy recently visited the innovative CIAT Group at its biggest industrial plant in Culoz before making his speech announcing conditions for the implementation of the carbon tax in France. CIAT is a leading French manufacturer of heat pumps, centralised air conditioning, air handling and heat exchange, which has been investing heavily in sustainable development – and, in turn, creating employment.

● For further information visit: www.ciatozonair.co.uk or contact Roy Nutley, General Manager, CIAT Ozonair Ltd, Unit 5 Byfleet Technical Centre, Canada Road, Byfleet, Surrey KT14 7JX.



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

● Visit: www.aircraftairhandling.com

Grundfos out in front with CUE

The Grundfos CUE range of wall-mounted frequency converters with e-pump functionality has recently been added to the government's Energy Technology Product List (ETPL). This encourages businesses to invest in energy-saving equipment by offering UK taxpaying businesses 100 per cent tax relief on qualifying equipment in the first year. Visit www.eca.gov.uk for more information on what is included, and how to claim.

The CUE family can operate with centrifugal pump types in new and existing application areas in a broad power range, and offers a whole array of features including easy plug-and-pump installation and set-up wizard function that significantly cuts commissioning time compared to similar offerings.

● Enquiries to Grundfos Pumps Ltd, Grovebury Road, Leighton Buzzard, Beds LU7 4TL, email: uk-sales@grundfos.com com tel: 01525 850000.



Hattersley hooks up The Cube

HVAC Compact Hook-Up units from Hattersley are being installed in Birmingham's new showpiece city centre building, The Cube. The £100 million, 23-storey building is the final phase in Birmingham's Mailbox development of apartments, offices, shops, a hotel, restaurants and car parking.

Compact Hook-Up flow management modules from the Hattersley FlowMaster range will be used to connect HVAC terminal units such as fan coils and chilled beams.

● For more information email: SShand-Brown@crane-ltd.co.uk or call: 01473 277434.



Holophane shines at Short Wood school

A range of Holophane exterior and interior luminaires have helped Short Wood primary school in Telford,

created from the amalgamation of a newly built school and a neighbouring refurbished sports complex, achieve high energy efficiency with low carbon emissions. The outdoor lighting for external circulation areas and car parks creates a common visual theme across both sites to reinforce their unity.

● For more information, visit: www.holophane.co.uk or call: 01908 649292.



Honeywell compact valves awarded Waterwise Marque

Honeywell compact pressure reducing valves have been awarded the Waterwise Marque, for products that reduce water wastage or raise awareness of water efficiency.

The Honeywell valves, of which more than 30 million units are installed Europe-wide, maintain a constant ideal water pressure irrespective of supply pressure, so less water flows to waste if taps are left running. A lower pressure also reduces leaks, corrosion and damage to appliances.

● For more information, email: water.control@honeywell.com, call freephone 0800 7833 824, or visit: www.honeywellukwater.com.



Pegler Yorkshire launches into the commercial valves market

A new range of Pegler commercial valves will incorporate the company's latest advances in innovative push-fit and press-fit end-connection technology, with product compatibility assured, no matter what valves or pipes are selected.

Now competitively priced screwed, press-fit, push-fit, threaded, compression, flange- and weld-ended connectors will all be available under one roof, confirming the Yorkshire firm as a 'one-stop shop' for all commercial valve requirements.

● For more information, visit: www.pegleryorkshire.co.uk.



EPDM bellows, no-tie bars and simple element renewal

Safeflex EPDM Kevlar reinforced bellows from Supaflex, a division of Interflex, have a hard steel 'non pull out' rim, rarely needing tie bars in large sizes, with minimal elongation under pressure. The interlocking split flanges allow simple element renewal.

Kevlar reinforcing, far superior to nylon, is also superior to steel cord, which corrodes and fails. Research shows constant temperature to 121°C and intermittent 170°C, is possible.

● Tel. 01223 874234 www.supaflex.com
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OGI lift-off radiator valves

A new OGI radiator valve transforms ordinary radiator valves into lift-off valves, allowing radiators to be removed without draining, saving replacement inhibitor, reducing labour and mileage costs and ensuring automatic compliance with B.S. 7593.

Retaining inhibitor leads to cleaner systems, more efficient water circulation and fuel burn, plus longer life for radiators and pumps. Second fix is reduced to lifting sealed radiators on and off the wall.

● For more information, visit: www.lift-offradvalves.co.uk.

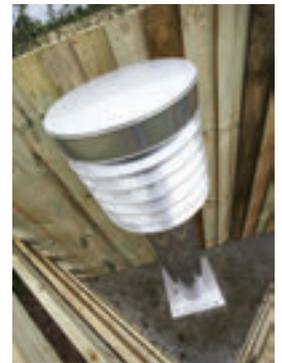


Rehau Awadukt thermo ground-air heat exchanger

ADM Systems has used the Rehau Awadukt Thermo ground-air heat exchanger system to maximise the efficiency of a whole-house mechanical ventilation and heat recovery unit at a large, new build property in North Yorkshire.

The Rehau renewable energy system, which draws fresh air through a network of polypropylene pipes laid 1.5m underground, was used alongside a conventional heat recovery unit to improve its performance and maximise its efficiency.

● For further information, email: Jo.Price@rehau.com or call: 01989 762600.



Remeha biomass boiler installation at Sainsbury's Dartmouth

A Remeha biomass boiler is boosting the carbon saving credentials of a new Sainsbury's supermarket in Dartmouth.

The store's principle source of renewable energy – through the combustion of wood pellets made from trees in managed forests – the 450kw boiler incorporates highly sensitive controls that allow excess heat production to be reduced to a minimum, and cuts out the need for a buffer vessel to store excess/waste heat.

● For further information, call: 0118 978 3434.



Samsung wall-mounts encourage healthy refreshing sleep

Stylish new Vivace and Neo Forte wall-mounted air conditioners from Samsung are designed to ensure a healthy and comfortable environment for living, working and sleeping. Models of both types are compatible with Samsung's RAC single split systems, FJM multi splits and DVM Plus III (VRF) systems. With similar internal specifications but dramatically different fascias, Vivace and Neo



Forte models range from 2.2kW to 7.1kW.

● For more information, visit: www.samsungac.co.uk or call: 01932 455000.

Thorn Lighting crowned Britain's best factory

Thorn's Spennymoor factory near Durham has been named Factory of the Year for 2009 by Cranfield School of Management and *Works Management* magazine. Thorn was commended for its attention to quality, cost and delivery, as well as its customer focus and performance.

The modern purpose-built lighting factory also scooped the Best Electronics & Electrical Plant and Best People Management awards, and was highly commended for the Innovation award.



● For more information, email: hugh.king@thornlighting.com or call: 020 8732 1927.

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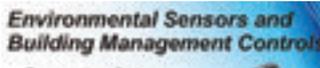


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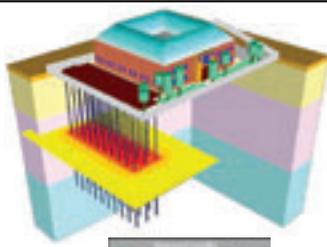
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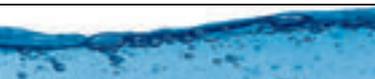


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CIBSE Journal is pleased to offer this module in its CPD programme. The

programme is free and can be used by any reader. It is organised jointly by CIBSE Journal and London South Bank University, and will help you to meet CIBSE's requirement for CPD. It will equally assist members of other institutions, who should record CPD activities in accordance with their institution's guidance.

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Absorption refrigeration

This article introduces the reader to an alternative cooling cycle to the familiar vapour compression cycle, in the form of the absorption cycle. The article will explain the basic principles of the cycle and applications for its use. In fact, the absorption cooling cycle was invented before the vapour compression system in the 1850s, but for various reasons, including cost and low efficiency, did not capture the refrigeration market.

Looking at Figure 1, the absorption cycle is very similar to the vapour compression cycle, in that it uses a circulating refrigerant, an evaporator, a condenser and an expansion device. The difference is that the compressor of the vapour compression cycle is replaced by a chemical absorption process and generator, with a pump to provide the circulation and pressure change.

The vapour compression cycle is described as a *work-operated cycle* because it uses a compressor that requires work in the form of electrical energy to operate. The absorption cycle is referred to as a *heat-operated cycle* because most of the energy required to operate the cycle is heat energy. This immediately opens up options for its application and use, over an electrically driven cooling cycle. Absorption cooling is worth considering if any of the following factors apply:

- For a CHP unit where there is spare heat available, or when a new CHP plant is being considered;

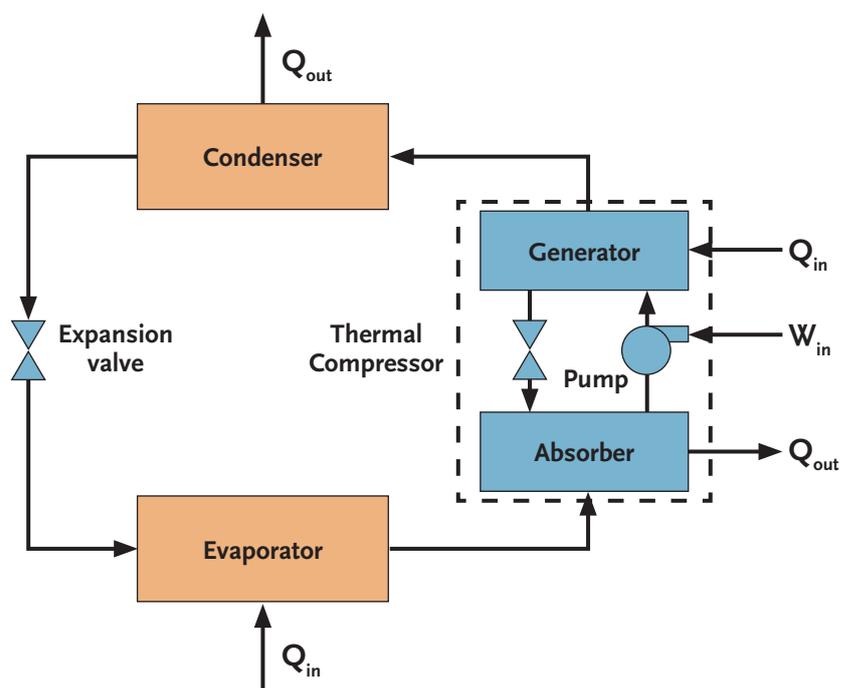


Figure 1 Basic absorption cycle

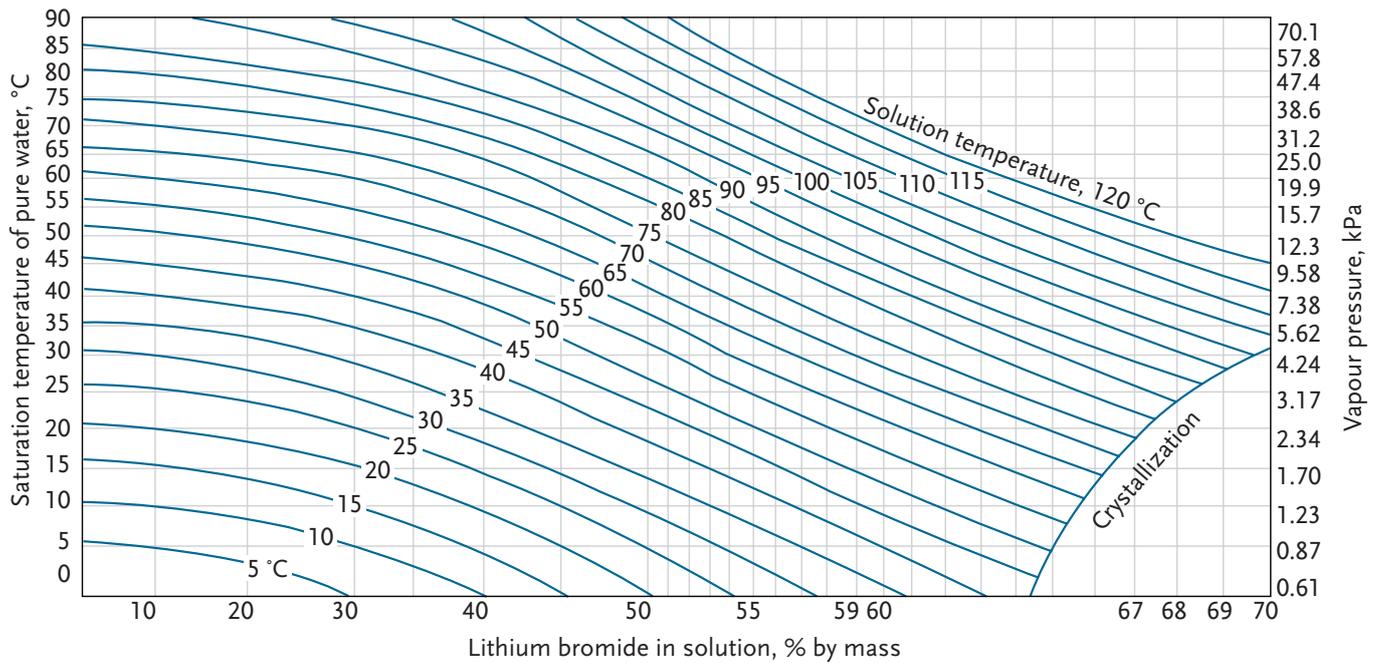


Figure 2 Temperature/ pressure/concentration data for lithium bromide solution

- Waste heat is available (eg, exhaust steam);
- A low cost source of heat is available (eg, landfill gas, geothermal);
- An existing site has an electrical load limit that would be expensive to upgrade;
- A site is particularly sensitive to noise and/or vibration; and
- Solar energy can be harnessed.

Absorption cycle theory

As well as a refrigerant, an absorption system needs an absorbent solution and various pairs of fluids are available. For air conditioning applications operating with evaporating temperatures above 0C, lithium bromide solution is the absorbent, while water is the refrigerant. Below 0C, the most common pairing is water as the absorbent and ammonia as the refrigerant. In this article, only the air conditioning case is considered.

Lithium bromide is a solid salt crystal that readily absorbs water vapour (it is used to keep electronic equipment like cameras free of moisture), eventually becoming a liquid solution of lithium bromide and water. This solution exerts a water vapour pressure that is a function of the solution temperature and concentration. These temperature/pressure/concentration properties are shown in Figure 2 for lithium bromide/water solutions.

For example, a lithium bromide solution at 50 per cent concentration and 25C would have a vapour pressure of 0.87kPa. This is a typical condition for the solution in the absorber vessel in Figure 1. Connected to the absorber is the evaporator, containing water as refrigerant, which we would like to be at a saturation temperature of 5C for producing

chilled water at say 7C. If the evaporator temperature starts at 7C, its vapour pressure as pure water is 1.0kPa and for equilibrium between the evaporator and absorber to be achieved, water would have to evaporate in the evaporator and condense into the solution in the absorber. Provided that a fresh supply of lithium bromide solution at 25C is continuously available, the process could go on indefinitely and the water in the evaporator would evaporate until its vapour pressure drops to about 0.87kPa, and a temperature of 5C, cooling the chilled water. The lithium bromide solution acts like a compressor in drawing off “refrigerant vapour”, in this case water, from the evaporator, causing the pressure and saturation temperature to reduce to the required cooling temperature. This process is the basic principle by which the absorption cycle operates.

To complete the cycle shown in Figure 1, the ‘weak’ solution in the absorber is pumped to a generator, where external heat is applied to boil off or vaporise the water from the solution. This results in the water (refrigerant) vapour leaving the generator and being condensed in a water or air cooled condenser, back to a liquid. Its pressure is then reduced before feeding back into the evaporator to continue the cooling process. Meanwhile, the now ‘strong’ solution in the generator is fed back to the absorber, also reducing in pressure as it goes and continuing the absorption process.

The energy flows in Figure 1 indicate:

- The cooling duty heat input is to the evaporator; and
- Heat is generated by the absorption process and this heat has to be removed.

- The heat input at the generator will be the heat source selected; and
- The heat rejected from the condenser produces the condensation of the refrigerant (water).

The only electrical input is for circulating pumps (see figure 3) and control valves. Note that the removal of heat from the absorber and condenser can be by ambient air in small absorption units and are available as air cooled, air cooling units up to about 80kW cooling duty. Perhaps the most common absorption application since its conception has been in domestic refrigeration, where a system has been developed that has no electrical requirement and the system is driven by gas. In building services applications it is more common to find large capacity absorption plant, chilling water and rejecting heat through water cooled condensers and absorbers by cooling tower/ dry cooler water, passing through the absorber first, then the condenser.

For maximum heat exchange contact in the evaporator, the refrigerant pump sprays refrigerant water over the chilled water tubing – similarly in the absorber, where solution is sprayed over the heat rejection tubing. The heat exchanger improves the efficiency between absorption and generation.

It should be noted that heat rejection from absorption systems will be greater than that for an equivalent vapour compression system, because of the cooling required in the absorber – about 2.5 times the cooling capacity, for air conditioning applications, which means larger heat rejection equipment.

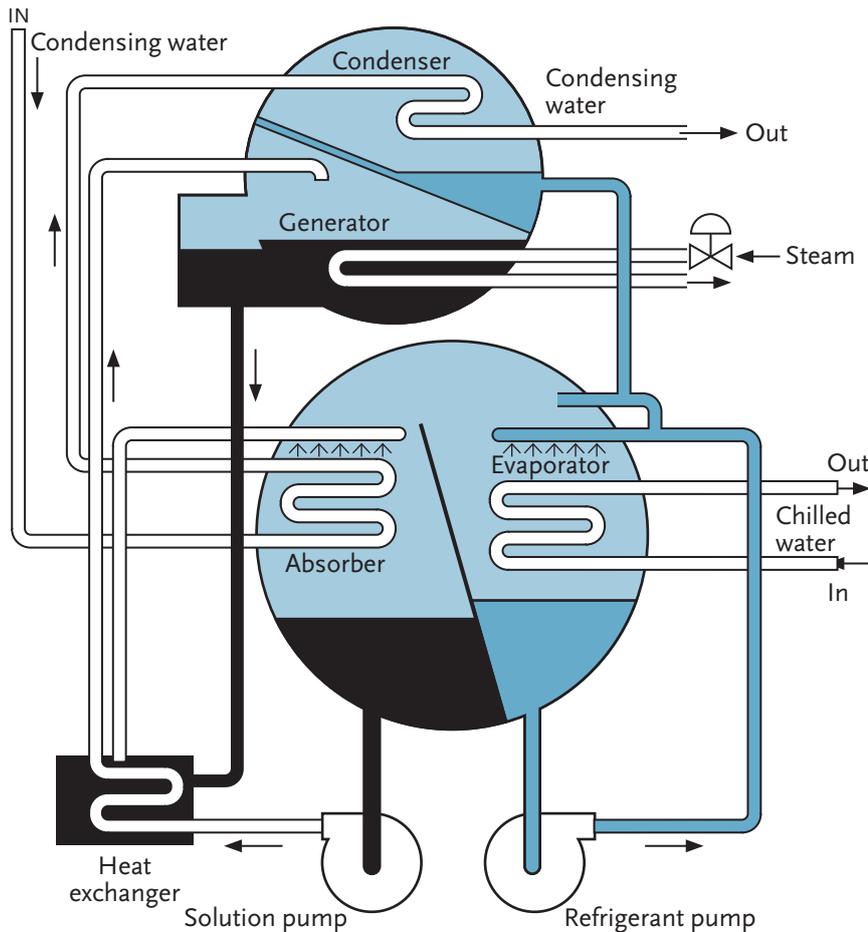


Figure 3 Components of a two shell lithium bromide water chiller

Operation and performance

In a typical absorption system producing chilled water, the evaporating temperature might be 5C, chilling water to about 7C, and a condensing temperature of 40C. The absorber will be at a temperature of about 25C. The solution is pumped to the generator, where heat is supplied at a temperature ranging from 80C to 140C, say 100C, driving the refrigerant from the solution to the condenser. The interesting feature of using water as the refrigerant is the low pressures within the system. In the evaporator and absorber the pressure will be 0.87kPa for an evaporating temperature of 5C. In the condenser and generator the pressure will be 7.38kPa corresponding to a condensing temperature of 40C. In other words the whole system operates well below atmospheric pressure. This means that any point of leakage in the components will result in air being drawn into the absorption system, which will reduce cooling capacity or at worst stop the process altogether.

The Coefficient of Performance (COP) for an absorption system is defined as:-

$$COP_c = \text{Cooling Duty(kW)} / \text{Generator Heating Duty(kW)}$$

The ideal, theoretical Carnot COP_c is:

$$Tr(Ts - Ta) / Ts(Ta - Tr), \text{ where:}$$

Tr is the evaporator refrigerant temperature;

Ts is the generator temperature;

Ta is the absorber temperature.

From the above example the ideal COP is 2.8.

Compare this with the Ideal Vapour Compression COP, operating at the same temperature difference, of 7.9.

In practice a typical COP for an absorption cycle in air conditioning would be about 0.7, compared to about 3.5 for a vapour compression system. It appears that absorption systems require about five times more energy than vapour compression, but of course, the energy for absorption is heat energy, not work (electrical) energy. Heat energy is cheaper than electrical energy and in some applications this heat energy is free, or is waste heat from another use, such as waste steam, hot water, gas, solar energy etc., which makes it advantageous to use absorption.

Note the performance characteristics of absorption systems:

- The higher the heat supply temperature to the generator, the greater the COP.
- The higher the refrigerant evaporating temperature, the greater the COP.
- The lower the ambient temperature (air

or water) for heat rejection, the greater the COP.

- Enhanced absorption systems that use double and triple effect generators have improved COPs of 1.2 and 1.7.

With regard to capital and running cost comparison between absorption and vapour compression, as a very general estimate, figures for a 800 kW cooling plant showed that absorption plant capital cost was 30 per cent higher than, but annual running costs were 10-15 per cent lower than vapour compression plant.

A potential selling point for absorption chillers is that they do not use global warming fluids such as HCFC, or HFC refrigerant fluids found in vapour compression systems. This is an important advantage of absorption units, but it is clear that the environmental effects of refrigerant leakage on ozone depletion and global warming is minimal compared to the effect on global warming of CO₂ generation from the energy production required to operate the system. Absorption chillers are also marketed as environmentally friendly because their power input is not primarily electricity, but a heat source. This would appear to produce lower CO₂ emissions than vapour compression systems, but this will depend on the energy source for generating the electricity used in vapour compression systems. If the electricity generation for vapour compression is from fossil fuel, then overall CO₂ emissions may be lower from a gas powered absorption system. However, if greener electricity is produced, say from hydropower plants, then vapour compression systems will have lower CO₂ emissions than gas fired absorption. The situation is fairly complex and each application would need to be considered with all the relevant data.

From an environmental position, considering primary energy requirements only, today's absorption systems can be effectively applied for use with integrated energy systems such as waste heat or Combined Heat and Power(CHP).

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Module 10

November 2009

1. Which of the following is not a principle component in an absorption system?

- A Compressor
 B Absorber
 C Evaporation
 D Expansion device
 E Generator

2. A good application for considering the use of an absorption cooling system is

- A Accessible "green" electrical supply
 B Waste heat unavailable
 C An existing site with an electrical load limit that would be expensive to upgrade
 D No CHP unit available
 E No gas supply on site

3. What will be the concentration of a lithium bromide solution at a temperature of 50°C and vapour pressure of 12.3 kPa?

- A 67% D 62%
 B 52% E 45%
 C 58%

4. The heat rejection capacity for a typical chilled water lithium bromide absorption unit is approximately

- A 1.5 times the cooling capacity
 B 2.5 times the generator heat input capacity
 C 2.5 times the condenser capacity
 D 2.5 times the absorber heat rejection capacity
 E 2.5 times the cooling capacity

5. Which of the following is not a performance characteristic of an absorption system?

- A The lower the ambient temperature for heat rejection, the greater the COP
 B The lower the refrigerant evaporating temperature the greater the COP
 C The higher the ambient temperature for heat rejection, the lower the COP
 D The higher the refrigerant evaporating temperature, the greater the COP
 E The higher the heat supply temperature to the generator, the greater the COP

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The evening will start with a champagne reception with piano accompaniment, followed by a



The Criterion is as important to the SLL as its anniversary date.

welcome speech from SLL's Stephen Lisk, and dinner. Places are restricted, so guests of members are required to pay the full rate of £85. It costs £65 for members. For multiple bookings, contact Veron Williams on 0208 772 3613 or sll@cibse.org

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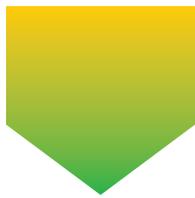


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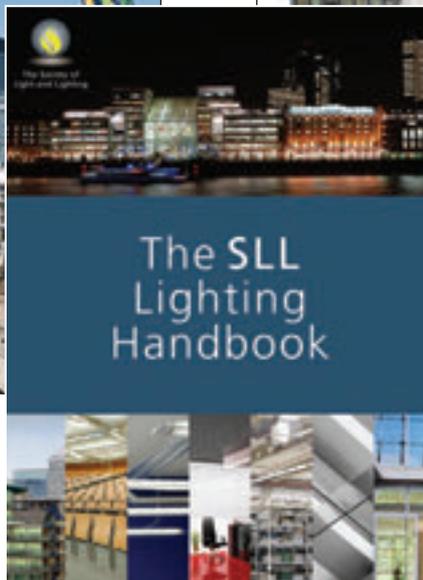
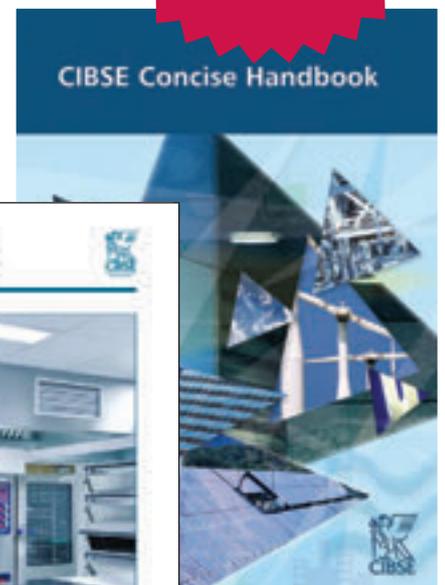
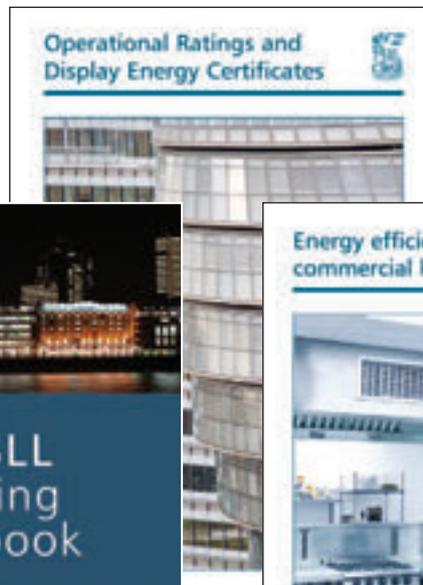
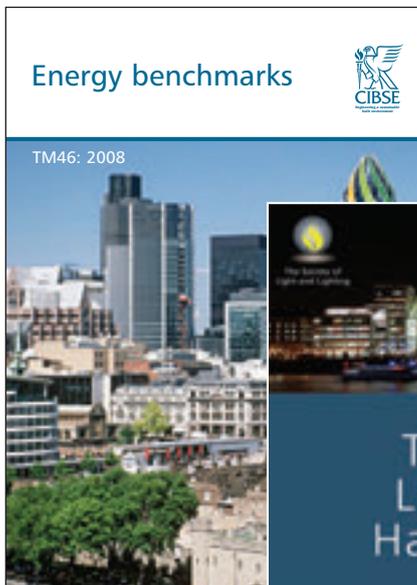


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Questioning competency

Mike McNally, business director at Hays Building Services, offers some tips for competency-based interviews

From the moment you read the job description to leaving the interview room, your functional competencies – your ability to do the job – will have been thoroughly tested.

Competency-based interviewing (CBI) has now become the most commonly used method of interviewing and is a comprehensive way of establishing whether or not the jobseeker has the right technical engineering and interpersonal skills to succeed in the job.

Every advertised position has a set of core competencies that jobseekers have to meet in order to be considered a suitable match – the current climate has only reinforced the need for these to be closely aligned to the person specification. These will typically be categorised as either ‘essential’ or ‘desirable’, and employers will look for evidence of these skills as soon as they receive your CV and application form. The reason for using CBI is that the applicant, and potential future employee, is more likely to succeed if they have already demonstrated the right skill sets in

their previous work experience. Past performance is deemed to be the best indicator of future success.

Once you have secured an interview, your thoughts should turn to preparation, and a major focus of attention should be predicting the likely questions you will be asked and how you actually go about structuring your answers. Questions usually take the form of: ‘Give me an example of a time when you ...’

In the current climate of cost efficiency, commercial awareness is one of the core competencies for building services jobs – so, if you are applying for an estimator role, you might be asked: ‘Provide an example of how you saved your company money on materials, equipment or labour.’

Leadership and management skills are also highly sought-after in the industry, so a typical question could be: ‘How did you ensure staff development needs were met effectively? Describe the steps you took to ensure any needs were addressed promptly.’

The way to tackle these questions is to describe the

situation, the tasks you had to carry out and any challenges encountered along the way, the actions taken and, crucially, the impact on the bottom line. Should your mind go blank, ask the interviewer if you can come back to this particular question at the end.

You will have already done a lot of the work when you submitted your original application, perhaps without realising it, so it’s really a case of rehearsing your lines. An effective technique is to write down examples next to each competency and devise possible questions – a role reversal, as if you were the one interviewing. Or get a friend to put you through your paces. When the big day finally arrives, you’ll be in a far stronger position to sail through the interview, with the self-doubt removed.

Remember that the interviewer is not trying to catch you out – just answer all the questions and always relate back to the outcomes and the difference that you made on any particular project.

For further information, contact Mike McNally on 0191 222 0044 or visit: www.hays.com/buildingservices

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

Movers & Shakers

Christopher Seymour has been made managing director and general manager of ARCADIS Gulf, the international consultancy, design, engineering and management services company. He will be responsible for overseeing and growing building consultancy operations in the region.



Design, engineering and project management specialist, Morgan Professional

Adrian Reynolds, has appointed **Adrian Reynolds** as its business development executive. Reynolds joins from specialist construction consultancy ADBL, where he was a business development consultant. He will now be responsible for developing new business across the north of England.



Building services and sustainability consultants, Synergy BSS Ltd, has two new

directors. **Ian French** BEng(Hons) and **Simon Hunt** BSc(Hons) CEng MCIBSE are appointed mechanical technical director and electrical technical director, respectively.

CIBSE's new fellows, members and associates

Six members have been promoted to fellow this month in the latest round of moves at CIBSE. This is on top of the 30 new members who have joined the institution, as well as its most recent associate. The full list is:

FELLOW

Simon Barrows	Woking
James Brougham	Chelmsford
Owen Everall	Knutsford
Philip Newell	Alton
Geoffrey Robinson	Bath
Anthony Wilson	Dunstable

MEMBER

Joseph Armstrong	Tunbridge Wells
Christopher Bingham	Belfast
Giorgio Buffoni	London
John Burke	Navan
Chunli Cao	Bracknell
Wing Leung Chan	Hong Kong
Yat Hon Chiu	Hong Kong
Richard Clibbon	London

Matthew Collin	Gravesend
John D'Arcy	Dublin
Benjamin Freck	Solihull
Eszter Adel Gulacsy	Huntingdon
Vladan Hasecic	Dubai
Chi Pui Ip	Hong Kong
Siu Lam Li	Hong Kong
Kok Keung Lee	Hong Kong
Sau Fan Lee	Hong Kong
Tak Moon Lui	Hong Kong
Chi Chung Anson Mak	Hong Kong
Lai Lap Man	Hong Kong
Chi Wai Ringo Mak	Hong Kong
Michael Lap Wo Mui	Hong Kong
Hon Keung Ng	Hong Kong
Charalambos Oikonomidis	Athens
Si Ki Po	Hong Kong
Kwok Wai Ethan Poon	Hong Kong
Tsui Wing Sang	Hong Kong
Cameron Grant	Horsham
Michael Taylor	Belfast
Sui Wing Wong	Hong Kong

ASSOCIATE

Ramesh Krishnasamy	India
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Members who have been promoted to fellow this month include:



Owen Everall is the site engineering and facilities manager for Syngenta. With more than 20 years’

experience in the maintenance and operation of pharmaceutical, research and production facilities, he now specialises in energy management.



Jamie Brougham is the site operations manager for Hyder Consulting Middle East. He is responsible

for the commercial and contractual management of the site construction teams for projects in the UAE. He also has a keen interest in conflict resolution and is

a member of the Chartered Institute of Arbitrators.



Ant Wilson is a director at multi-discipline consultancy, AECOM. He started with Oscar Faber in

1979 and has been actively involved with many CIBSE activities, such as the Society of Light and Lighting, and helped set up the Society of Façade Engineering. He is also a CIBSE low carbon consultant and is passionate about making our building stock more sustainable.



Simon Barrows is a group director of McLellan and Partners Ltd with more than 25 years’ experience in

the building services industry. He is responsible for the UK and overseas operations.



Essential courses for Building Services Engineers

CIBSE and Mid Career College run hundreds of events each year for the benefit of those within the Building Services industry. Upcoming 2009 highlights include:

Building Regulations Part G (2009) Explained

Training Course | 24 Nov | London

This course will include worked examples of calculations, practical applications and information about related emerging technologies.

Mechanical Services Explained

Training Course | 25 – 27 Nov | Leeds

This three day course is an excellent introduction to building engineering systems from water supply, plumbing and drainage, heating and ventilation and air conditioning.

Running Projects Effectively

Training Course | 2 Dec | London

This highly practical course will equip you with knowledge that you can utilise when running projects and it will explain how to strategically plan as well as practically execute.

Metering Strategies for Existing Buildings

Conference | 24 Nov | London

Metering and sub-metering of energy use and equipment operation is critical to optimising energy, and overall building operations. This conference aims to help you create a metering strategy for your building.

Electrical Services Explained

Training Course | 25 – 27 Nov | Loughborough

This three day course will give grounding and a better appreciation of design, installation and maintenance of electrical systems.

Fans in the 21st Century, Parts L, F and all that

Training Course | 14 Dec | London

This course discusses the effects of the new Parts L & F, the need for higher efficiencies and accurate system resistance, the importance of life cycle costs and noise, fan types, fan laws and variable flow.

Also on our website you will find dates for those wishing to train as Energy Assessors and Air Conditioning Inspectors.

For a full listing of events, more information and to book online visit

www.cibsetraining.co.uk



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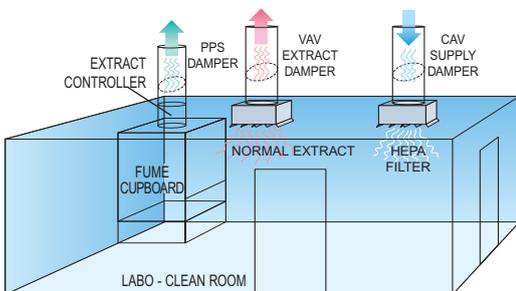


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PPS Damper

