

CIBSE

JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

August 2009

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Editorial

Editor: Bob Cervi
Tel: 01223 273520
Email: bcervi@cibsejournal.com
Reporter: Carina Bailey
Tel: 01223 273521
Email: cbailey@cibsejournal.com
Senior Designer: David Houghton

Advertisement Sales

Head of Business Development: Aaron Nicholls
Tel: 020 7880 8547
Email: aaron.nicholls@redactive.co.uk

Sales Manager: Steve Soffe
Tel: 020 7324 2785
Email: steve.soffe@redactive.co.uk

Display Sales Consultant: Jim Folley
Tel: 020 7324 2786
Email: jim.folley@redactive.co.uk

Senior Sales Executive and Classified Sales: Leon Dominion
Tel: 020 7880 6206
Email: leon.dominion@redactive.co.uk

Senior Recruitment Sales: Ali Scott
Tel: 020 7324 2787
Email: ali.scott@redactive.co.uk

Advertising Production: Jane Easterman
Tel: 020 7880 6248
Email: jane.easterman@redactive.co.uk

For CIBSE

Publishing Co-ordinator: Nicola Golledge
Tel: 020 8772 3697
Email: ngolledge@cibse.org

Editorial advisory panel

Laurence Aston, Director of Mechanical Engineering, Morgan Professional Services

David Clark, Partner, Max Fordham Consulting Engineers

Patrick Conaghan, Partner, Hoare Lea Consulting Engineers

David Hughes, Building Services Consultant, MTT Consulting

Philip King, Director, Hilson Moran

Chani Leahong, Senior Associate, Fulcrum Consulting

Stephen Lisk, President, The Society of Light and Lighting

Professor John Swaffield, CIBSE Past President

Ged Tyrrell, Managing Director, Tyrrell Systems

Ant Wilson, Director, AECOM

Morwenna Wilson, Graduate Engineer, Arup

Terry Wyatt, Consultant to Hoare Lea

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CIBSE, 222 Balham High Road, London SW12 9BS Tel: 020 8675 5211. www.cibse.org

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Nicola Golledge at ngolledge@cibse.org or telephone 020 8772 3697.

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From the editor



Soft landings need hard graft

The arrival of the summer holiday season in Britain has, depending on your point of view, been either good or bad for the industry. In the run-up to the parliamentary recess, ministers issued a flurry of policy documents, most of which can be described as much-needed and long-awaited (see pages 6 and 14). So, for those of you who must attend to the minutiae of such publications, the bad news is there are a lot of pages to be downloaded and pored over in the summer heat and rain (just add the pile to the Part L and F consultations recently produced).

Among these latest announcements, we didn't quite get a final definition of zero-carbon homes, but we are now closer to it, and are promised a final statement later this year. Also crucial are policies aimed at giving a major boost to renewables. The money and initiatives that are being pledged by ministers – albeit, in many cases, reconfirmed – will hopefully provide genuine encouragement to the public and to public authorities to adopt more renewable technology – which in turn will stimulate the sector.

One other, much slimmer document that was also given a parliamentary launch recently but which shouldn't be overshadowed by the government's mighty tomes, is also essential reading for everyone in the industry. The emphasis here is on "everyone", because the report, Soft Landings Framework, published by BSRIA, goes to the heart of the kind of project teamwork and commitment that is needed to ensure that new buildings are as energy efficient as they claim to be (page 6).

For some, the term soft landings has become synonymous with post-occupancy evaluations (POEs). But, as the report suggests, the process involves a lot more than this. In the launch issue of CIBSE Journal, in February this year, an article by Bill Bordass of the Useable Buildings Trust called for a "new professionalism" in building services aimed at moving POEs from "post-mortem to life support". Soft Landings Framework, co-written by Bordass, provides practical advice on how project teams can adopt this approach.

But, to make it happen, teams and their clients will need to embed this thinking at the early procurement stage, and then be committed to

the longer-term monitoring and review of the buildings' performance. So, while a significant step forward, the Framework is one stage on a long and difficult journey.

So what needs to happen next? Those professionals and bodies involved in the soft landings work will be looking to apply it in the real world, and

a good starting point is the public sector, which is continuing to receive a laudable amount of government investment in schools, colleges and social housing. Local and central government must now commit themselves to championing soft landings. Initially this could be in the form of trials; but, ultimately, authorities should make soft landings a precondition of awarding building contracts. Such a key commitment would give the leadership that's needed if the modern building stock is to fulfil its role of supporting rather than undermining the government's brave targets for cutting carbon emissions.

Bob Cervi, Editor
bcervi@cibsejournal.com

Authorities should make soft landings a precondition of awarding contracts.

Raft of policies set course for greener future, say ministers

The government has announced a multi-million-pound investment in renewables to shift Britain into a low-carbon economy and create thousands of jobs in the green sector.

At the same time it released more details of its long-awaited definition of zero carbon homes.

The new White Paper, *The UK Low Carbon Transition Plan: National Strategy for Climate and Energy*, commits the government to investing millions in offshore wind power, wave and tidal energy, geothermal energy and nuclear.

A number of other supporting documents were also published, including the *UK Renewable Energy Strategy*, which maps out how the government will achieve 15 per cent of all energy generated from renewables by 2020.

The White Paper was released shortly after a report by the Carbon Trust, a government-backed agency promoting low-carbon technologies, which found that the UK could generate up to £70bn and 220,000 jobs in offshore wind and wave power.

Housing Minister John Healey has also reaffirmed that all new UK housing will be zero carbon by 2016. For a home to be zero carbon, he said, its net emissions, including those produced by appliances should be equal to zero or negative across the year.

When the government uses the term "energy use" it refers to both that contained within the building



Shutterstock

Renewable technologies such as solar power are set to benefit from the government's new energy strategy

regulations, and other energy used in the home.

Following criticisms that the current minimum regulatory standard for energy efficiency was not suitable, Healey has set up a task group to examine energy efficiency metrics and standards that could be used. The results will aim to provide a clear new standard that will be announced by the end of this year.

Another new report by the NHBC

Foundation, a body which aims to improve new-build standards, shows that the 2016 target for England and Wales to reach zero carbon is one of the most ambitious internationally, and that the UK is unique in using carbon emissions instead of energy as its key measurement metric.

It is also one of the only countries to propose including both regulated energy and unregulated energy

in its zero-carbon definition. In addition, more help is being made available to UK householders to make their homes more energy efficient through CERT (Carbon Emissions Reduction Target), and CESP (Community Energy Saving Programme), a newly introduced finance initiative. The programmes, funded by energy firms, will provide around £3.5bn for householders to carry out energy efficiency projects.

Advice framework aims to give projects a soft landing

A document aimed at helping design and engineering teams conduct reviews of new buildings during their handover has been published by research body BSRIA and the Useable Buildings Trust (UBT). It contains procedures and checklists to enable teams to carry out systematic post-occupancy evaluation of buildings.

Roderic Bunn of BSRIA said: "We know that few new buildings are truly operationally ready at handover [to the client], and that energy consumption is often far higher

than anticipated. The *Soft Landings Framework* provides a simple mechanism by which project teams can remain involved after practical completion, in order to identify emerging problems, resolve causes of energy wastage, and help the occupants gain full control over the building's environmental systems."

BSRIA is also launching a soft landings user group for early adopters of the *Framework*, which is based on work conducted in recent years by a number of organisations, including CIBSE and consultancies.

The soft landings approach was initiated by architect Mark Way when he was at the RMJM practice. Way and a group of designers and contractors tested the scheme with buildings run by the University of Cambridge. The UBT is now working with a similar group of professionals to look at how the *Framework* can be applied on schools projects.

The *Framework's* lead author, Bill Bordass of UBT, said: "Soft Landings helps to manage client and design aspirations through the procurement process and on into

use. The result: buildings perform better with less effort."

The report says the proposed extended "aftercare" period for a building, running up to three years, will also provide valuable insights for the individuals involved to take back to their own workplace.

It adds: "This in turn will help to improve the goods and services they and the industry provide, and make sure that their future efforts are targeted more accurately on the things which will really make a difference."

www.softlandings.org.uk

After years of heated debate, four eco-towns finally get go-ahead

Only four of the final 11 proposed eco-towns have been granted government approval to be built in the UK following years of consultations and deliberations.

Housing Minister John Healey gave permission for the “pioneering” zero-carbon developments to go ahead in Whitehill in Bordon, Hampshire; St Austell in Cornwall; Rackheath, Norwich; and North West Bicester.

However, ministers still want a total of 10 eco-towns to be developed, and some of the remaining seven not given the go-ahead this time could gain permission at a later date.

Developers must now go through the normal planning processes and consultations, with approval resting with each local authority.

The decision follows a number of campaigns against the proposals and a High Court battle over the lawfulness of the government’s consultation process.

The judge in the case eventually ruled in favour of the government earlier this year. Eleven areas had been shortlisted for eco town development.

Healey said: “Eco towns will pioneer genuinely sustainable living, setting standards that will need to be followed more widely to deal with the challenge of climate change.”

The announcement is the first wave of new carbon-neutral towns proposed, with the government pursuing up to 10 eco-town developments by 2020.



Protestors oppose the plan for Middle Quinton, which is not among the four chosen

A funding pot worth £5m has been earmarked for helping other potential areas carry out further assessments and technical work.

Each development will contain between 5,000 and 20,000 homes. All of the towns’ buildings, including commercial, public and domestic, will have to be zero carbon, meaning eco-town developers have to achieve zero carbon a few years ahead of the government’s existing targets.

For example, each town should have a zero-carbon school in place by 2013 – three years ahead of the government’s existing zero-carbon target – and 10,000 homes are expected to be built by 2016. Of those, 30 per cent will be affordable.

The towns will test a wide range of innovative and emerging technologies, and homes are expected to be fitted with remote control heating and ventilation, and other features.

Each home should also be connected to high-quality broadband. About 40 per cent of each town will be green space, and all homes will be located within 10 minutes of frequent public transport. Technology will be used to enable all homes to be powered and heated by energy from the sun, wind and earth. According to Healey, all four ecotowns have the capacity to link well into existing developments, as well as operate as a new settlement.

Historic buildings could get green makeover

The National Trust is carrying out feasibility studies to decide whether more of its historic buildings and castles are suitable for renewable energy developments. The assessments of 10 buildings will analyse the viability of biomass and solar-thermal technologies. Buildings being considered for the sustainable measures include Chirk Castle in Wrexham, pictured.



National Trust

News in brief

Councils share £1.7bn

Ten UK local authorities are to share £1.7bn to build or refurbish more than 6,000 homes and create thousands of jobs in a new Private Finance Initiative deal. The move aims to help regenerate 10 of the most deprived areas of the country and create 20,000 construction jobs.

Heritage plan under fire

English Heritage has attacked the UK government’s proposal to no longer fully exempt historic buildings from Part L of the Building Regulations. The body says the move would lead to building control officers misunderstanding the concept and result in implementation problems.

Baxi to merge with rival

British heating products manufacturer Baxi has agreed a merger deal in principle with German rival De Dietrich Remeha Group. Remeha will hold a majority of the equity in the new combined group.

New roofing guidance

The revised third edition of BRE’s Roofs and Roofing has been published. The document contains new coverage of photovoltaic systems, thermal insulation, new materials technologies and how to accommodate climate change.

Training academy launched

A new academy to share best practice has been launched by engineering consultancy Hilson Moran. The Hilson Moran Academy brings together a number of existing training and development practices at the firm.

Arup links up with UCL

Consultancy Arup said it had signed an agreement with University College London (UCL) on collaboration on some projects. The memorandum of understanding will involve researchers working together, sharing thinking on innovation, and students spending time in both organisations under joint doctoral supervision.

International

Gifford wins three projects

Gifford has won three new engineering design projects in Abu Dhabi. The consultancy will design key elements for a new road scheme at Abu Dhabi airport, develop concepts and detailed designs for a new sea wall and shore protection on Al Sowah Island, and review design and construction plans to repair a damaged marina.

LEED Platinum for Hong Kong development

Gammon Construction has been awarded a contract worth £120m to redevelop the Hennessy Centre in Hong Kong. The 36-storey development is the first Hong Kong project to achieve a Platinum level pre-certification LEED green building rating. It should be complete in 2011.

Bidder in pole position for international games project

Engineering and environmental consultancy WSP is the preferred bidder to build the £245m athletes' village for the 2014 Commonwealth Games in Glasgow. WSP will be involved in the masterplanning and design of the 38.5 hectare site in Dalmarnock.

Mott wins hospital contract

Mott MacDonald Hong Kong has been appointed as the building services consulting engineer for the extension works at Haven of Hope Hospital in the province. The project involves demolishing three existing old infirmary wards and building a new hospital block.

Buro helps to revamp pre-war airport

An iconic European airport built before World War Two, Berlin's Tempelho, is to be regenerated, thanks to an international urban ideas competition run by the Berlin Senate. The competition generated more than 80 entries, but one of three chosen ideas was put together by a partnership between Chora Architecture and Urbanism, multidisciplinary engineering consultancy Buro Happold, and landscape architect Gross Max.

Brown accused over 'missed' target in plan to boost social housing

A new UK government target to boost social housing has been condemned as promising fewer affordable homes than was pledged two years ago.

The Construction Products Association, representing UK manufacturers and suppliers, accused the government of trying to hide its own missed housing targets by announcing new, lower and more expensive ones. Prime Minister Gordon Brown announced plans to build 110,000 affordable homes costing £2.1bn by 2011.

Michael Ankers, chief executive of the association, said: "We have been saying for some time that the government would miss its affordable housing targets, so this latest announcement should come as no surprise. However, it is difficult to understand why they need additional money to deliver fewer houses.

"The last Comprehensive Spending Review allocated the necessary funds to deliver the



istock/Matthew Dixon

government's programme to the end of 2010-11, so why do they now need to divert money from other capital programmes to deliver a lower target that should be costing less? It sounds very much like the government is promising less for more."

In 2007, then Housing Minister Yvette Cooper announced that the government would provide at least 70,000 affordable homes a year by 2010-11.

The latest announcement states

that around 56,450 affordable homes will be delivered each year up to 2011, missing the target by more than 13,500 a year.

The new target of 110,000 affordable homes to rent or buy would create an estimated 45,000 jobs in construction and related industries, Brown said.

The programme would be paid for by using the spending allocations made in the last Budget and by switching funds from other projects into housing, he said.

Colleges scale back building plans after funding shortfall

Thirteen colleges in Britain have been forced to reduce the cost of their building projects after their funding body got its figures wrong.

The projects have been allocated funding to go ahead this year but will now have to make cuts to their initial plans.

The move follows a scaling back of the government's overall college building programme earlier this year after the Learning and Skills Council (LSC), the body that allocates funding, discovered it did not have enough cash available.

The government admitted that it could not afford the £2.7bn needed for more than 70 college projects that had been given approval in principle by the LSC to proceed.

The LSC now has £300m to spend between all 13 projects this year.

Further education minister Kevin

Brennan said the 13 colleges would receive the funding only if the overall cost was reduced. He described the reductions required as "significant but manageable".

Meanwhile the LSC will help colleges whose projects are not proceeding in the short term to draw up a revised estates strategy and examine other possible sources of finance, such as collective approaches to private financing and borrowing.

Separately, two English local authorities are to proceed with planned development projects under the Building Schools for the Future programme (BSF).

The first phase of the £360m Barnsley BSF scheme has received funding from the European Investment Bank (EIB), making it the first council to do so. Separately a £91m BSF scheme has been signed in north Lincolnshire.



Firm wins YEN award

Steve Hodkinson, building engineering managing director at consultancy AECOM, right, receives the CIBSE Young Engineers' Network (YEN) Champions Award for larger companies from Paul Hardy, MD of Baxi Commercial Division. The same award for smaller companies was won by Australian consultancy Steensen Varming. The award runners-up were Gifford (large firm) and CBG Consultants (small). www.cibse.org/yen

Sector 'must promote itself as a leader in renewables'

The new head of the skills council for building services engineering has called on the sector to promote itself more strongly as a leader in renewable energy solutions.

Dr Ian Livsey, chairman of the body SummitSkills, told a meeting of MPs and industry leaders at the Commons that, as a relative newcomer to the sector, he was aware of the frustration it felt about its public profile.

"We should be bigger than we are and should punch harder than we do. We're a big sector in terms of impact," he said.

"Frankly there is no renewable agenda without the building services engineering sector."

He added: "I would like to see us feeling more confident and saying more about how good we actually are. I'm sure this sector has a healthy future. I believe that building services engineers make the world we live in tomorrow – we



Livsey: sector should "punch harder"

are building Britain's future."

Claire Curtis-Thomas MP, chairman of the parliamentary All Party Building Services Engineering Group, which hosted the meeting, agreed the sector "should punch above our weight".

She said: "The whole issue of protection of the environment and getting more for your investment really is our world – we can deliver

more than any other part of the construction industry on that."

A UK government minister who attended the meeting said he believed that the sector was an important industry at a key time when infrastructure in Britain needed to be brought up to standard. Kevin Brennan, the new skills and apprenticeships minister, said: "There's a strong future base of demand for your industry."

Responding to a call from CIBSE technical director Hywel Davies to look at the issue of inspection of air conditioning systems, Brennan said his department would discuss the matter with CIBSE and SummitSkills.

CIBSE and the Heating and Ventilating Contractors' Association have warned that some organisations are promoting training for those interested in becoming air conditioning inspectors before the bodies have been accredited.

Weather study issues warning of killer heatwaves

Keeping Britain cool could become building services engineers' biggest challenge as the UK faces a frightening future of killer heatwaves, droughts and floods.

Predictions for Britain's future climate are contained in a new report, Climate Projections, launched by Environment Secretary Hilary Benn. Based on Met Office science projections, the report is said to provide the most detailed picture to date of global warming triggered by carbon dioxide, and illustrates the extent of the changes the UK might face in the absence of global action to cut emissions.

A report by the Department of Environment, Food and Rural Affairs (Defra) noted that the change in climate will have a serious impact on buildings: "Offices are more likely to overheat as a result of warmer summer temperatures. Methods of passive cooling, such as the use of blinds and external shading, will be needed so as not to increase the reliance on air conditioning, which will increase energy consumption."

The projections also predict a rise in average summer temperatures of between 2 and 6 deg C in the south east of England. The projections show a range of climate changes across the UK up until the end of the century, based on three possible greenhouse gas emissions pathways – high, medium and low.

The world's emissions are currently equivalent to the medium pathway, although there is a risk we could still be heading for the high scenario, according to scientists.

www.defra.gov.uk

Engineering consultancy triumphs in World Cup

AECOM FC are winners of the CIBSE Trophy after triumphing in the 2009 Building Services World Cup held in Liverpool recently. The club, managed by John Dickinson, won the final against Crown House England FC on penalties, netting all five shots. Both teams won all their group-stage matches. Third place in the tournament was taken by Flakt Woods FC. The winner of the Everyman Shield was Liverpool One FC.

www.buildingservicesworldcup.com



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Haden Young in merger

Balfour Kilpatrick and Haden Young have been merged by parent company Balfour Beatty, the international engineering, construction and investment group.

The newly formed business will become Balfour's electrical and mechanical engineering arm.

The two had operated as separate specialist businesses within the Balfour Beatty group. Earlier this year the *Journal* reported on the redundancies being made at Haden Young. The new company, which will have revenues of £600m, will offer national and regional coverage across the UK.

Minimum design standards sought

Homes in the UK capital may soon have to be built to new minimum design standards.

From 2011 all publicly funded homes could be built to the design guidance laid out in the London Housing Design Guide, launched for consultation by Mayor of London Boris Johnson.

The minimum internal space standards recommended are broadly 10 per cent higher than the 1961 Parker Morris benchmark.

Eventually it could be applied to private sector homes once incorporated as policy in the revised London Plan.

The guide contains six key areas of design that new developments will have to meet, including ensuring homes are designed to meet climate change and are suitable for warmer summers and wetter winters.

www.london.gov.uk

Small firms get loans help

Small businesses in the UK are being encouraged to take up interest-free loans to make their premises more energy efficient.

The Carbon Trust, the body which dispenses the loans on behalf of the government, has reduced the lower limit for loans to £3,000 from £5,000, in order to make the loans more attractive to the smallest firms. The upper limit for a loan has been doubled to £400,000.

www.carbontrust.co.uk/loans

Award winners celebrate being among best in sector



The 12th annual Building Services Awards have been held to honour the contributions made to the sector. The awards, a joint venture by CIBSE and UBM Built Environment, were held at the London Hilton, Park Lane. The list of winners is:

Large Consultancy of the Year

Arup
(Buro Happold – Highly Commended)
Sponsor: Space Air, Daikin

Consultancy of the Year

Beatty Flanigan
Sponsor: Polypipe Terrain

Major M&E Contractor of the Year

Dodd Group
Sponsor: Andrews Water Heaters, Potterton Commercial

New Achiever of the Year

Laura Bayliss, BDP
Sponsor: EAL

M&E Contractor of the Year

J S Wright
Sponsor: FläktWoods

Health and Safety Initiative of the Year

Haden Young
Sponsor: HILTI

Training Initiative of the Year

Hoare Lea
Sponsor: SummitSkills

Innovation of the Year

Task Air System, Cundall and UCI
Sponsor: Polypipe Terrain

Best Use of IT Award

Hoare Lea
Sponsor: AMTECH Group

Major Project of the Year

New Street Square, Cundall and Sir Robert McAlpine
Sponsor: Lochinvar

Project of the Year

Lion House @ Alnwick, Haden Young and AECOM
Sponsor: Hays Building Services

Environmental Initiative of the Year

Lion House @ Alnwick, Haden Young and AECOM
(Arup and Carbon Trust – Highly Commended)
Sponsor: EAL

International Achievement of the Year

Cundall
(PHA Consult – Highly Commended)
Sponsor: Space Air, Daikin

TSB launches sustainability competitions

A board that encourages innovation in Britain is launching two competitions to help the building services industry develop low-impact and zero-carbon buildings.

The government-funded Technology Strategy Board's Design and Decision Tools competition focuses on the

development, enhancement and integration of building design and decision support tools, to help achieve the government's targets for zero carbon and low water usage.

A second competition, Monitoring of Demonstrator Buildings, aims to enable building

and renovation companies to retrofit social housing stock. The competition will look for at least 50 demonstrator whole-house solutions to improve the performance of the entire property, with the goal to make deep cuts in carbon emissions.
www.innovateuk.org



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

Institution welcomes two new quality assurance managers

CIBSE welcomes their two new quality assurance managers, Ying Chen and Henry Hubbard, to the team.

They will be working hard to ensure the quality of the certificates lodged by CIBSE energy assessors are up to standard. This will be done either by visiting assessors on-site, in their offices, or by desktop study and reviewing the procedures implemented and information used. Once audits are completed, they'll issue a report to the assessors with comments, recommendations or additional requirements to help raise quality further. They are also keen to increase awareness of the quality requirements set out by CIBSE and the Department for Communities and Local Government (DCLG). The DCLG requires 2 per cent of certificates be quality checked, but both Chen and Hubbard have



Chen and Hubbard aim to beat the DCLG's 2 per cent requirement

pledged to exceed this figure. They see this as being key to raising quality across the board and ultimately helping CIBSE's energy assessors further raise their reputation in the marketplace.

But this is not a one-way process; they will be working closely with the energy assessors to offer support and guidance where needed. Hubbard says: "This isn't

something we want anyone to worry over. This is a way assessors can gain confidence that what they're doing is correct."

Their role will also ensure that assessors are aware of the legal requirements (for instance, keeping records for 10 years), and are gathering enough evidence.

Chen, who has been an accredited CIBSE energy assessor for some time, understands the difficulties and challenges energy assessors face, and where problems may arise.

Chen and Hubbard will also be looking at client satisfaction – key to the system's success. Although it's still early days, they have been pleased overall with the standard of what they've seen so far. They do, however, both acknowledge that there is room for improvement and they look forward to the challenge ahead.

Young engineers showcase their projects during 'school celebration day'

Report by Eur Ing Dr David Rhodes, vice chairman of the East Midlands Engineering and Science Professionals (EMESP)

More than 300 people attended this year's 'celebration day for school projects' in honour of nearly 30 teams of young engineers and their innovative solutions.

Students, company engineers and representatives from science and engineering institutions were among the attendees of the scheme, called Engineering Education Scheme for England (ESEE). The ESEE, which is part of the Engineering Development Trust (EDT), organised 29 teams of Year-12 students and set them technical problems to solve. Resources and a designated project engineer were then provided to each team, and all participants attended

a three-day residential workshop at a local university. The teams then presented their solutions during the celebration day.

Attendees were treated to well-presented stalls with artefacts, demonstrations, posters and eager-to-explain young scientists and engineers.

Among the ideas was Countesthorpe Community College's successful effort to measure the tilt of a control rod in a nuclear reactor. Other projects ranged from the design of a cover for the coupling of a mainline train to the use of Bluetooth technology in a JCB cab. The event, as in previous years, was held in collaboration with the East Midlands Engineering and Science Professionals (EMESP), who awarded Master's Prizes to winners from East Midlands' universities. The EMESP overall



Professor Geoff Kirk, president of the Institution of Engineering Designers, congratulates Andrew Hilton, overall winner of the 2009 Master's Prize

Master's Prize winner 2009 was Andy Hilton, from the University of Nottingham. He was rewarded because of the realistic goals and highly pragmatic and patentable features of his project into the design and manufacture of a rotary pump to supplement heart function.

News in brief

CIBSE goes on Twitter

You can now follow CIBSE on Twitter. We will be posting news, updates, new initiatives, campaigns, policy and technical updates, and events information all on our Twitter site. Join us at: <http://twitter.com/CIBSE>

Recognising the IOR

CIBSE Certification has confirmed that it will now recognise membership of the Institute of Refrigeration (IOR) as equivalent to CIBSE membership for entry onto its accreditation scheme for Air Conditioning Assessors.

Since January 2009, all air conditioning systems with a cooling capacity of 250 kW or more must be inspected by a competent and accredited person who belongs to a Department of Communities and Local Government approved scheme, such as that operated by CIBSE Certification. CIBSE also accredits inspectors to undertake these inspections in Scotland and Northern Ireland. For more information visit www.cibsecertification.co.uk

100th birthday celebrations

Congratulations to John Holmes, past president of the Society of Light and Lighting (SLL) and Honorary Fellow of CIBSE, who recently celebrated his 100th birthday. Holmes' career was largely in optical design, starting out with the glassmakers, Chance Brothers, before becoming technical director at Holophane. He retired in 1970, but remained an active part of the industry. He joined the IES (Illuminating Engineering Society) in the early 1930s, serving on the technical committee and contributing to a vast array of publications. He became president in 1951, and in 1987 he was awarded the inaugural Lighting Award.

Training and Development

Submissions

The closing dates for annual submissions to be considered at the October 2009 and January 2010 Training and Development Panel meetings are 8 September, and 18 December, respectively. Training submissions and queries, plus employers' enquiries and applications for approved company training schemes should be addressed to Olwen Williams, training and development administrator, on 020 8772 3605 or email owilliams@cibse.org

CPD Directory update

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

We also accept applications for online courses and we will welcome more e-learning applications. Bronz-Glow UK Ltd has recently been added to the directory. A concessionary rate is available for entries into some categories. Further information on training and development is available on the IPD CPD section of the CIBSE website (www.cibse.org)

Consulting on Part L

Members are urged to comment on Parts L and F of the Building Regulations consultation. CIBSE has chapter overviews, the consultation text, and a number of short response forms at www.cibse.org/partl. Topics can be selected for comment and there is a lively discussion forum. The proposals are considered to be the single most significant legislation affecting those who design buildings, or manufacture, install and commission building services. The technical department is working with CIBSE's special interest groups/societies and other industry bodies to ensure the practical building services experience features in responses from the wider construction industry. Events are being held on the consultation too, with bulletins reported in CIBSE's e-brief. For more information contact Samantha McDonough on 020 8772 3626 or smcdonough@cibse.org

CIBSE's Annual General Meeting

The institution's AGM was held at the Royal Society in London, on 7 May 2009. John Swaffield, outgoing president, chaired the meeting. Chief executive Stephen Matthews read the notice convening the meeting

The minutes of the 31st Annual General Meeting of CIBSE held on 8 May 2008 and published in the July 2008 issue of *Building Services Journal* were accepted as a correct record and signed by the chairman.

Annual report and financial statements

John Swaffield introduced the annual report and financial statements. Membership now exceeds 20,000, a great milestone for the institution, and the development of the Young Engineers Network (YEN) was noted. It had been a very good year which left the institution well placed to develop in the future.

Sally-Jayne Bonner of Chantrey Vellacott, CIBSE's auditors, read the audit statement confirming the responsibilities of the auditors and the trustees, and stating that the accounts presented a true and fair view of CIBSE's finances, with no qualification to the audit statement.

Graham Manly, honorary treasurer, presented an overview of the financial position for 2008. Income had risen by almost £2.5 million, a 55 per cent increase. Subscriptions had gone up 10 per cent due more members joining, better retention, and upgrading. Fees for charitable services, including publications, were up 10 per cent. The main item, however, was a 150 per cent increase in trading subsidiary income. Costs of trading activities had increased considerably. Membership costs were also up, reflecting additional functions and staff increases to improve member retention. Technical advice and publications spend had also increased, and support costs had been allocated more accurately. Support costs included about £300,000 for the Carbon 60 project to reduce carbon emissions, and on internal and external refurbishment.

A trading surplus of £379,000 had been achieved, up from £189,000 in the previous year. Realised and unrealised losses on investments and the pension fund valuation amounted to £756,000 however, resulting in an overall decrease in funds of £377,000.

The balance sheet position was noted, including the full value of the pension scheme liability. The large creditor figure of £1.5 million included substantial deferred income, being advance payments of membership fees, training courses etc for 2009.

Graham Manly described the activities of CIBSE Services Ltd, which had increased income from £1.4 million to £3.6 million. Certification had produced income of £1.5 million, and professional learning activities £1 million. Mid Career College performed well with more than £500,000 turnover. The National Conference did well, but one-off events had been weaker financially. Certification delivered a considerable surplus, with many EPC (energy performance certificates) and DEC (display energy certificates) assessors registered, and CIBSE Services held the lion's share of the DEC market – a considerable achievement in the face of much competition. The work of finance manager David Ryan, auditor Sally-Jayne Bonner and the finance team was acknowledged, and much credit given to Jacqueline Balian and her team, and non-executive chairman Brian Moss and director David Willcox.

In response to questions, it was confirmed that the expanded YEN was helping to involve younger people, and a wider range of individuals, including the fringes of building services, were being targeted. The increased stock value of publications reflected their wider range and increased values, and reflected minimum economic print runs. Debtors reflected large intercompany debts at times, plus an increase in trade debtors, reflecting increased activity.

Cash-in-hand was managed to maximise income, it had not been felt appropriate to increase investments in equities.

The Final Salary Pension Scheme closed to new members in 1999, and the liability was to continuing and deferred members. It had also been affected by the drop in equity values. It was confirmed that

2009 was likely to be a challenging year. Subscriptions seemed to be holding up quite well and new members recruited, but lapsing levels for the year were not yet known. Certification activity would continue but results were hard to predict due to market conditions and increased competition. The new CIBSE Journal and the Flexible Learning initiative were being introduced this year. The executive had the task of matching expenditure to suit income.

Auditors

Graham Manly proposed that Chantrey Vellacott be appointed as auditors for 2009, and that the board be empowered to agree their remuneration. It was noted that Chantrey Vellacott had been selected as auditors following tenders in September 2007. This proposal was seconded by Bryan Franklin and approved nem con.

Special resolution

Graham Manly moved the special resolution for subscriptions for 2010 as set out in the calling notice. Representations were made to reduce the rate of student subscriptions, and a reduced fee of £20 for the full-time and four-year student rates was proposed. On other subscriptions, an increase of 1.5 per cent was proposed to cover this reduction. David Wood seconded the resolution which was agreed nem con.

Officers for 2009

President: Mike Simpson
President-Elect: Rob Manning
Vice Presidents: Terry Dix, Andy Ford, Ted King
Hon Treasurer: Graham Manly
Immediate Past President: John Swaffield

Members of the Board 2009

Elected Members: Peter Kinsella, Chani Leahong, Nick Mead, Stuart MacPherson, Tony Sung,
Co-opted Member: Terry Giles

Members of council 2009

Elected Members: Colin Ashford, Thomas Briault, Andy Geens, Lynne Jack, Susan Logan, Neil Pennell, Geoff Prudence, Mary Anne Wright

Cutting carbon

CIBSE is again aiming to help hundreds of firms cut their emissions with the launch of the 4th 100 Hours of Carbon Clean-Up campaign, writes **Carina Bailey**

CIBSE's fourth national 100 Hours of Carbon Clean-Up campaign starts next month to encourage companies across the country to improve their energy efficiency.

The 100 Hours campaign lays down the gauntlet to all types of companies in all sectors, both public and private, to reduce their energy demand and costs, and transform the behaviour of staff to be more energy efficient long term.

Organisations are now being invited to take part by pledging to dedicate 100 hours of staff time to specific energy reducing activities. These actions and hours are then recorded on the campaign website, allowing participants to log in and follow their progress. The website also includes free tips for companies taking part on how to save energy at low and no cost.

Many ideas during last year's event centred around helping participants prepare their buildings and their occupiers for receiving what was then their first Display Energy Certificate (DEC), or their next Energy Performance Certificate (EPC). All building types may be entered into the campaign, including commercial, industrial, retail, leisure, public

All of these activities will be included in the online log book to allow participants to pick and mix approaches to build up their 100 hours. The project will be officially launched in September and will run for six weeks.

www.100hours.co.uk



Champion of Carbon Saving Champions Award 2009 winner: **Quinten Babcock** from TfL, with sponsor **David Morgan** from E.ON (left) and **Ellen MacArthur**

sector, education, or healthcare.

The winner will be judged to have delivered the best ongoing carbon-saving performance as a result of the initiatives undertaken.

As part of CIBSE's Low Carbon Performance Awards 2010, three categories will once again be open exclusively to the 100 Hours campaign entrants. These are: Best Carbon Saving Programme; Best Carbon Saving Programme SME; and Champion of Carbon Saving Champions.

Jacqueline Balian, director of CIBSE Services, said: "The 100 Hours categories in the awards have always been amongst the most successful and are the ones which, in all likelihood, provide the more high profile names as winners.

"The 100 Hours has allowed The Low Carbon Performance Awards to celebrate the achievements not just of the usual suspects in the industry, but to draw in a significant list of high profile clients."

Each of CIBSE's 100 Hours campaigns has attracted between 500 and 700 clients. Its original aim was to provide businesses with the advice and information they needed to reduce their carbon emissions.

CARBON/OFF
100 HOURS OF CARBON CLEAN UP

Each year, the free information and advice available has been expanded and this year will be no exception.

Updates to the 2009 campaign will include:

- The introduction of water waste advice within the behavioural and managerial information packs; and
- A range of seminars and information tools to enable participating facilities managers, energy managers and others in such posts to start putting together the underlying data for their own DEC. These seminars will seek to emphasise the need for high quality DECs if there is to be a positive carbon saving outcome from the exercise. Low Carbon Energy Assessors (LCEAs) will be asked to participate in these training events and to instigate them in their local area.

Initiatives can be carried out at all levels so organisations of every type, size or budget can benefit. Everyone can get involved and take part in the campaign by simply turning off lights and monitors in the office, changing light bulbs, printing out fewer emails and switching off the air conditioning.

CIBSE Low Carbon Performance Awards 2010

Now in their third year, the CIBSE Low Carbon Performance Awards



showcase innovative and inspirational low-carbon solutions, and highlight carbon reduction in both the design and management of buildings. Entries are now invited for the 2010 awards. The award categories are:

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

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

There are three different levels from which participants can choose.

First steps – activities designed for organisations that are at the early stages of the carbon reduction path.

Further steps – more suited to organisations with behavioural change strategies already implemented and looking at ways to take their carbon reduction strategies further without capital investment.

Bigger steps – for companies which are prepared to make some level of investment in their property to reduce carbon emissions and make big savings in the future. ●

Greening Britain?

A new energy strategy to help transform Britain into a low-carbon and renewables-based economy has been released by the government. **Carina Bailey** looks at the plans

Feed-in tariffs enabling electricity consumers to sell power back to the Grid are set to become law in April 2010, according to the UK government's wide-ranging new energy White Paper.

The grandly titled *UK Low Carbon Transition Plan: National Strategy for Climate and Energy* sets out how ministers believe that Britain will be able to meet its Climate Change Act commitment in this year's Budget to cut emissions by 34 per cent on 1990 levels by 2020.

The White Paper aims to lay the foundations for the government to meet its ambitious target to create a low-carbon, sustainable Britain by 2050. These targets and the strategy have been prepared in advance of the global inter-government climate change talks in Copenhagen, Denmark, in December this year.

Alongside the White Paper, the Department for Energy and Climate Change (DECC) has also released its Renewable Energy Strategy, which maps out how the government intends to ensure that 15 per cent of energy used in all sectors, from homes to industry to transport, will derive from renewables by 2020.

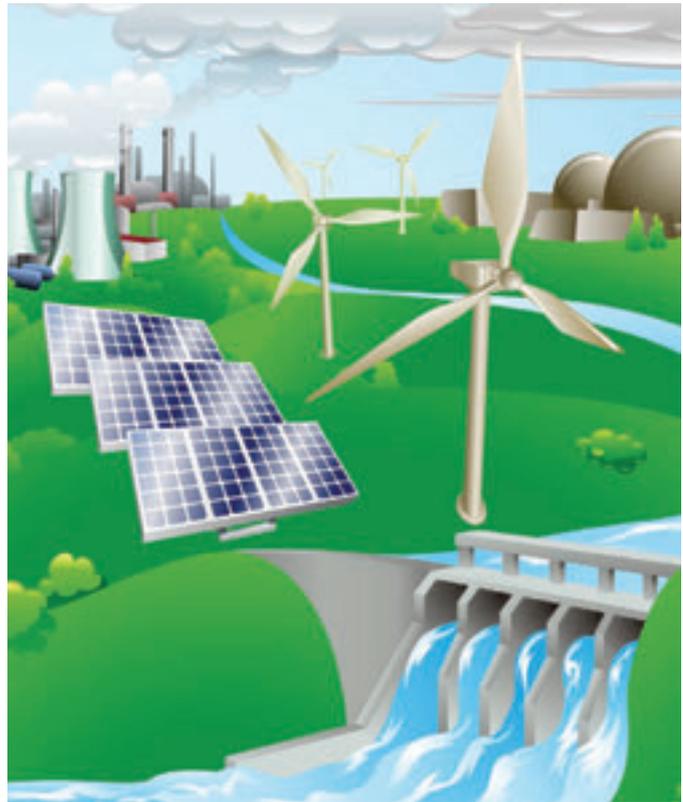
The energy strategy aims to help

tackle climate change and reduce the UK's carbon dioxide emissions by more than 750m tonnes between now and 2030. It also claims that it will help secure the UK's energy supply and create up to 500,000 jobs in the renewable energy sector.

Currently the government's key incentive for producing energy from renewables is the Renewables Obligation (RO), which requires energy companies to source a specified amount of energy through renewable sources. The RO will be expanded and extended from its current end date of 2027 to 2037 for large-scale, centralised renewable electricity generation. The government believes this should ensure that 30 per cent of the UK's electricity is generated renewably by 2020.

The strategy would also see the introduction of feed-in tariffs – or “clean energy for cash-back”, as ministers call it – for households, businesses and communities which generate clean energy using renewable sources, to be introduced in April 2010. Those who generate renewable energy will be encouraged to sell it back to the grid.

The government hopes this will



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provide an incentive for individuals, communities and businesses to install small-scale renewables and has pledged £45m of additional grants through the Low Carbon Buildings Programme (LCBP) to cover the interim period before the feed-in tariffs come into force.

The strategy states that the government is yet to explore how this can be structured to allow everyone to access these benefits, not just those with capital to invest.

A similar scheme, the new

Renewable Heat Incentive, is expected to be introduced in 2011 after a consultation is held later this year on how this would best be supported. This would encourage individuals, community groups and businesses to install renewable heat technologies at all scales.

A further funding pot of £4bn will be sourced from the European Investment Bank to help finance renewable and other energy projects. This will enable power companies to secure the loans



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needed to install renewable energy technologies and allow the supply chain to grow their operations.

By the time the government introduces the feed-in tariffs and Renewable Heat Incentive, it estimates that it will have provided more than £100m of public money into small-scale generation through the LCBP. This equates to about 30,000 projects, it says. In addition, it will have provided more than £30m through bio-energy grant schemes.

“Before we start generating electricity with renewables, we ought to be asking ourselves ‘do we need to generate that renewable energy at all?’” – Hywel Davies

The government believes these measures will help it to meet its target of generating more than 30 per cent of Britain’s electricity by renewables, up from about 5.5 per cent today. This is expected to derive from both on- and off-shore wind power as well as biomass, hydro-power and tidal sources.

Ministers also want 12 per cent of all the UK’s heat used in homes, businesses and communities to be generated from renewables – such as biomass, biogas, solar, and heat pumps. Hitting this target would mean supplying 4m households with their current heating needs.

In order for the government to meet this range of energy saving targets, it has created the Office for Renewable Energy Deployment

(ORED), which was launched at the same time as the new energy White Paper. ORED will work with organisations such as regional authorities, government offices and planning authorities, in order to identify and co-ordinate the use of new technologies.

Brian Mark, a director at Fulcrum Consulting and a member of the Renewables Advisory Board, helped advise government on the energy issues. The board suggested that renewable generation should always be done on a large scale because it is more economically viable, and it advised the government against introducing feed-in tariffs.

Mark says this is potentially a political issue, because it helps to promote a form of fuel poverty, with only those people who own the buildings they live in able to benefit from the feed-in tariff, making it viable only for the property owning middle classes. He also criticises the government’s ambition of making Britain a global leader in the manufacture of renewable technologies, such as photovoltaic (PV) solar panels, as countries such as Germany and China already have a well-developed manufacturing industry providing their products at the lowest cost possible. He says it would be impossible for Britain to compete at the same price level.

CIBSE’s technical director, Hywel Davies, says that solar thermal heating, as opposed to PV, is noticeable by its relative absence in the energy strategy.

However, Davies is concerned about the lack of focus on energy efficiency itself within the energy strategy: “What bothers me is that, before we start generating electricity with renewables, we ought to be asking ourselves ‘do we need to generate that renewable energy at

Key points Government cash smooths way to greening of Britain

Homes

- ‘Pay as you save’ pilots helping people make their whole house greener by using the savings made on energy bills to repay the upfront costs, backed by up to £4m from low-carbon investment funding. An eventual national roll out could create 34,000 jobs
- Consultation on the shape and rates of a new ‘clean energy cash-back’ scheme (feed-in tariffs) to be in place by April next year. People and businesses that generate their own electricity from low-carbon sources will be paid for doing so. A similar scheme for renewable heat will follow in April 2011
- Challenging 15 villages, towns or cities to be testbeds for piloting future green initiatives

Power sector

- Up to £6m to start development of a ‘smart grid’, including a policy road map next spring
- Launch of the new Office for Renewable Energy Deployment in DECC to speed up the growth of renewables in the UK

- £11.2m to help regions and local authorities prepare for and speed up planning decisions on renewable and low-carbon energy
- A consultation covering the changes to the existing Renewables Obligation (RO), such as extending the life-time of the RO to at least 2037 and the introduction of a 20-year limit on support, to make it capable of delivering some 30 per cent of our electricity from renewables
- Approval for the UK’s largest biomass power station on Teesside

Industry

- Up to £120m from low-carbon investment funding to significantly advance the offshore wind industry in the UK
 - Up to £60m from low-carbon investment funding announced in the Budget to cement the UK’s position as a global leader in wave and tidal energy
 - Campaign to be launched later this year to help small and medium businesses in the shift to low carbon
- Source: UK Department for Energy and Climate Change

all?’ If you’ve got a building and 30 per cent of its electricity demand is going to waste, then generating that 30 per cent by renewable means is an extremely expensive way of wasting electricity. It would be far better to cut out that wasted demand, which is usually much cheaper than generating it from renewable sources.”

The Royal Academy of Engineering welcomes the fact that the energy strategy will be underpinned by what it describes as “a full engineering roadmap” to

ensure that all parts of the strategy come together in the right order and at the right time.

Davies says, ultimately, he is concerned about how the government will deliver its plans, and how it will enforce them.

He says: “There are a number of sensible ideas in there but what isn’t yet clear is how they’re all going to be co-ordinated so that they work together and not against each other, and it’s not entirely clear how some of them are actually going to be delivered or enforced.” ●

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Letters

Protecting the regs is a priority

Professor Michael Kelly is absolutely right to point out that none of the recent energy initiatives have been justified by full economic analysis and, in particular, we should be extremely cautious about the value issues of “compulsion” in making homeowners improve the energy performance of their properties and possible “sanctions” for defaulters (*Journal*, July, page 7).

Older hands will recall that, in the mid-1990s, CIBSE and kindred institutions were engaged in a desperate battle to prevent the entire Building Regulations from being consigned to the bin by the Deregulation Task Force of the government of John Major. Hence, any talk at this point of compulsion or sanctions could easily provide hostages to fortune if the Building Regulations come under threat once again from a change of government next year.

In the same edition of the *Journal* there was much to admire in Amanda Reid's commentary on the challenges of being a young female engineer of four in an office of 70 males (Opinion, July, page 20). It was good to see that the situation was much more welcoming on her return to the industry after some gap years, and that she received offers from all of the firms that she applied to. How many males from her peer group could claim that? But her disparaging use of the term “senior gentlemen's industry” is both sexist and ageist at the same time and does nothing to advance the equality agenda that she seems keen to encourage, and which is also CIBSE policy. More importantly from her point of view, neither is it likely to inspire the confidence and trust that all young engineers need from their seniors in order to support and advance their careers up to and into the boardroom.

Ian Brown MSc CEng FIMechE FCIBSE

We need to express a view

“In my view, in the present economic downturn, the environmental case didn't offset the cost and complexity in the proposals thus far outlined.” So said UK Housing Minister John Healey to justify taking the proposals for consequential improvements out of the consultation on plans to amend Parts L and F of the Building Regulations (*Journal*, July, page 6). And so the current consultation package contains no tangible provision for improving the existing housing stock, which accounts for some 27 per

cent of the total UK carbon emissions. What is the environmental case for that decision? I thought the idea of a consultation was to obtain a wider view of the viability and economic case for policy proposals. So wouldn't it have been a good idea to include the idea in the package, perhaps with some very specific questions about whether the environmental case could offset the cost and complexity? After all, if it was to be made a legal requirement that when undertaking building

quoted in our article. We chose the prices at the time in the Luton area, where the Ecodan unit we were closely monitoring is installed. Our central thrust, though, is beyond dispute. Prices of oil and gas will continue to rise year on year. Electricity prices may fluctuate and a lot depends on how it is produced, but it is also almost certain to become ‘greener’ to produce in general.

I must also correct the wrong impression given by the letter about the seasonal COPs of air source heat pumps. We have just completed live winter trials in four sites around the UK and have achieved an average COP of between 3.0 and 3.4. This covers the period between October 2008 and March 2009, including the periods where temperatures dropped to minus 9 deg C. What this means is that heat pumps are at least three times more efficient than a modern gas condensing boiler – regardless of the price of the fuel. This is also being generous to gas, as very few boilers operate at 93 per cent efficiency levels all of the time.

Max Halliwell, product manager,
Mitsubishi Electric heating department

Not so passive house

In the July edition of the *Journal* you report on the UK's first Passivhaus school. Although the design of an airtight, super-insulated school is to be praised, the design does not meet Passivhaus standards; nor, I assume, has been certified by the Passivhaus institute. I therefore think the title of the article somewhat disingenuous. Furthermore, the article says in its fourth paragraph that, because the building has a small heat requirement, it cannot be certified as truly Passivhaus. This is incorrect: the standard allows for 15 kWh/sq m per annum. It would be bad indeed if readers got the impression that Passivhaus was synonymous with unheated.

David Coley, Senior Research Fellow, Centre for Energy and the Environment, Exeter, UK



work on existing homes, 10 per cent of the bill must be spent on improving the energy efficiency of the home, then people wouldn't stop doing home improvement. They would merely factor in the cost of the energy efficiency work, much as they factor in the cost of a burglar-resistant front door, or Part L-compliant windows.

Perhaps the minister was worried that last time his department consulted on consequential improvements, 80 per cent of respondents said it was a good idea. At least last time we got a chance to express a view. So, this time around, as well as commenting on the proposals that are included in the package, everyone who wants to see consequential improvements introduced for all homes should get in there and argue the case.

Hywel Davies, technical director, CIBSE

Truths about heat pumps

As the author of much of the research that was used as the basis for the CPD Module on heat pump technology published in the May *Journal* (page 59), I must reply to Michael Cade's letter in the June issue entitled ‘Misleading figures on heat pumps’. Cade questions the prices of energy

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

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

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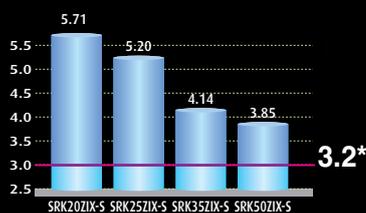


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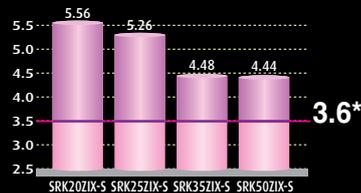
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Renewing the rule

The Merton Rule for using renewables has served us well but, **Glen Irwin** asks, isn't it time to increase flexibility and put engineers back in the driving seat?



When the Merton Rule was devised a few years ago with the aim of providing at least 10 per cent of a development's energy needs from on-site renewables, the ideas were new and fundamentally correct: reduce base loads by efficient design ('lean'), use low-carbon technologies to reduce emissions ('clean'), and then top it off with renewables ('green'). But it seems this creed has been misunderstood in many quarters, and it now threatens to strangle a designer's ability to innovate and be creative in pursuit of lower overall carbon emissions.

For example, it could be argued that a very low-demand, passive building complies with this process in theory, but in practice it can fall foul of the renewables goal – and thereby the planning process. With very low loads there is either little point or no money left to spend on combined heat and power or renewables: the scheme has achieved a very good result overall by working hard on the lean stage alone, but some planners will reject it while fundamentally more energy-intensive buildings that do have CHP, and maybe even 20 per cent renewables, sail through the planning process because all the boxes are ticked – even though the overall emissions in Kg CO₂/sq m may be double that of the low-carbon passive building. As a result, the message to the industry is: 'It's not what you actually achieve, as long as it ticks all the boxes.'

Renewables may well have a place, if considered appropriately, but an unhealthy obsession with them implies that all carbon savings are equal but renewable carbon savings are more equal than others. I have heard of some design teams employing larger biomass boilers than required so that they can achieve a 20 per cent renewables target, while the façade performance is allowed to be poor to save money overall. The net result is that we see little real progress towards achieving our 2020 or 2050 emission-reduction targets.

Renewables are subject to targets, but they are not necessarily the answer. How can solar energy absorbed by an electrically powered heat pump be a higher priority than direct passive solar heat gains

that offset a heating load? I sympathise with the local authority planning departments – it is not easy for them to deal with the complexities of the technologies and the calculation methods. What we now need is a new approach: throw all the emissions into one pot and let the engineers do their thing to save the most carbon by whatever means are cost-effective and practical.

We also need a system that is easily measured by calculation, that aligns with Building Regulations, is easily understood by planners and makes no constraints on innovation. One solution is to extend Energy Performance Certificates (and rename these CPCs – carbon performance certificates) to include all energy demands in buildings, in just the same way that we currently prepare renewables studies – that is, regulated loads (Part L) plus non-regulated loads (usually from benchmark documents) less the savings from low and zero-carbon technologies. This would also make comparisons easier with future, potentially more widespread, Display Energy Certificates.

It's not perfect because it is theoretical – but it would be a flexible measure of total operational carbon, which doesn't constrain designers into certain technologies. The planners can then set targets for all new buildings in their region to, say, meet a B energy rating. But how that is achieved is entirely up to a project's architect and engineers.

If we are to look back in 2050 and congratulate ourselves on a job well done, then we need real net carbon savings, and only full flexibility in design will get us there. ●

We should throw all emissions into one pot and let engineers do their thing to save the most carbon by whatever means are cost-effective and practical.

Glen Irwin is sustainability director with engineering consultancy Gifford. He is also involved with the MBE Knowledge Transfer Network and the BCO Environmental Sustainability Group.



The law has changed!

4:00:00

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Letter of the law?

The government's recent consultation on changes to Parts L and F of the Building Regulations include many 'Approved Documents'. Hywel Davies maps out their legal status



The Building Regulations (BRs) are a Statutory Instrument (SI), and as such are secondary legislation made under powers conferred by the 1984 Building Act. The latest BRs were made in 2000, although they have since been partially amended by later SIs.

Regulation 3 defines "building work". Regulation 4 requires that "Building work shall be carried out so that – (a) it complies with the applicable requirements... and (b) in complying with any such requirement there is no failure to comply with any other such requirement".

Other regulations cover workmanship, material changes of use of the building, energy calculation, completion certificates, testing, sampling and supervision.

The detailed requirements for the building work itself are in "Schedule 1: Requirements" in the form of a table, split into several parts, each with an alphabetical name. Requirement L1, relating to the "conservation of fuel and power" in buildings, is found in Part L (see sidebar). Part F sets out ventilation requirements, and Part P covers electrical safety in dwellings.

Requirement L1 is what you must do to comply with Part L. However, if you want to know what reasonable provision might look like, you need a bit more detail. And so government gives us guidance on how to comply with the requirements in each part of Schedule 1 in the form of the very familiar Approved Documents (ADs).

The Part L consultation proposes expanding the commissioning requirement, as shown in the sidebar. If adopted, this will make commissioning a more explicit requirement. It is already covered by Regulation 20C, which requires "the person carrying out the work" to "give to the local authority a notice confirming that the fixed building services have been commissioned in accordance with a procedure approved by the Secretary of State." The

AD then identifies CIBSE Commissioning Code M as the approved procedure, along with the various CIBSE, BSRIA and Commissioning Specialists Association documents scheduled in Code M.

The Code advocates preparing a commissioning plan to identify the work to be done, systems that need to be tested and the tests that will be carried out. This allows the building control body to check what is actually done against the plan as work progresses. The text of the AD is clear that it is a requirement to follow the Code if Regulation 20 is to be met. The introduction to

each AD emphasises that it provides guidance about compliance with specific aspects of the regulations in more common building situations, and what is likely to be accepted as reasonable provision for compliance. Although following the AD gives a presumption of compliance, it can be

overturned if a case is unusual in some way. And compliance may be achieved in other ways. But it may be advisable to confirm that the building control body will accept the solution offered in advance. Where the AD cites the BRs then the text must be complied with as stated, and there is therefore no flexibility to ignore the requirement, or to adopt an alternative compliance route. So where Regulation 20C is quoted, it must be followed. Paragraph 78 of ADL2A 2006 makes clear that the approved procedure is CIBSE Code M, and so there is no alternative.

So, the Act empowers ministers to make Regulations, which spell out the letter of the law; and the Approved Documents advise us how to comply – except where they tell us what to do. ●

Hywel Davies is technical director of CIBSE
www.cibse.org/part

Part L

Requirement L1: conservation of fuel and power

Current text as introduced in 2006

L1. Reasonable provision shall be made for the conservation of fuel and power in buildings by:

(a) limiting heat gains and losses:

(i) through thermal elements and other parts of the building fabric; and

(ii) from pipes, ducts and vessels used for space heating, space cooling and hot water services;

(b) providing and commissioning energy efficient fixed building services with effective controls; and

(c) providing to the owner sufficient information about the building, the fixed building services and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and power than is reasonable in the circumstances.

The current consultation on Parts L and F propose amplifying (b) as follows:

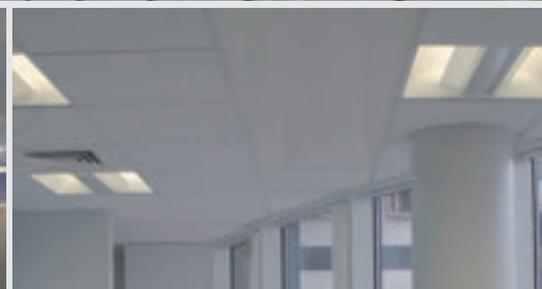
(b) providing fixed building services which—

(i) are energy efficient;

(ii) have effective controls; and

(iii) are commissioned by testing and adjusting as necessary to ensure they use no more fuel and power than is reasonable in the circumstances; and [(c)]

Approved Documents advise us how to comply – except when they tell us what to do.



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Flexible know-how



Illustration: Ian Whadcock

CIBSE is launching a new way to learn remotely with a series of online training modules. **Carina Bailey** reports

The new CIBSE online learning system is a series of training modules aimed at bringing practical skills to engineers. The training covers a range of essential skills and practical topics presented in an interactive, flexible format that makes it easy to learn and refresh skills.

There are two elements to the online learning programme: flexible learning and CPD (continuing professional development) updates.

The flexible learning programme is designed to meet the needs of engineers at graduate level and more experienced engineers looking to refocus their careers on unfamiliar areas, according to one of the programme's early adopters Paul Tymkow, director of learning and knowledge at consulting engineers Hoare Lea.

"Flexible learning is very much the foundation level of understanding," says Tymkow. "These guides are an introduction to the practical design issues in building services engineering. CPD is for engineers who are much further into their careers and are topping up and updating [their knowledge]."

The flexible learning programme is a series of modules, each providing thorough understanding of

a subject with seven hours of structured learning, plus a bank of material available for further reading. The supporting interactive elements – audio and videos of actual footage of building services being installed, and interactive multi-media graphics – will help guide users through the subject matter and ensure they finish the module with an excellent grasp of the topic. End-of-module quizzes are used to help participants evaluate their learning.

Hoare Lea has been heavily involved in the refereeing process, testing the modules at both a novice and expert level. The company's more inexperienced staff have been able to describe how the material worked for them, while its experts were able to provide input on what should be covered.

Tymkow adds: "Generally, they have been very pleased and their comments have brought about fairly minor [changes] about certain aspects that needed a little bit more explanation – or maybe things that may have been confusing and that perhaps needed a bit more time and attention in the module."

For those interested in a formal qualification, completion of relevant topics and formal assessment

"Flexible learning is very much the foundation level of understanding. These designs are a guide to the practical issues in the sector."

– Paul Tymkow

by London South Bank University could count towards obtaining the Edexcel Advanced Professional Diploma in Building Services Design.

In all, the development of these units has been supported by six consultancies, AECOM (formerly Faber Maunsell), Arup, Hoare Lea, Crown House, Laing O'Rourke and NG Bailey, which all nominated representatives to sit on the steering group with CIBSE, developing the courses, proof reading and beta testing the learning materials.

Mike Campbell – AECOM's associate director – is an early adopter of the scheme, helping to influence the scope, learning outcomes, and technical content of the modules. Campbell believes this has ensured that the content adequately covers the correct level of academic and practical knowledge that new graduates (particularly those with a science or engineering degree, rather than one in building services engineering) will require, based on the experience of practising building services engineers. He also agrees that the content is suitable for more experienced engineers who may want to update their existing knowledge for their individual continuing professional development.

And, unlike other distance learning programmes run by universities, the programme doesn't have time constraints. This means that students can take as long as they need to complete each module and are not

restricted by the number of topics they can complete per year. The cost of each module is similar to the cost of attending a one-day training course, but is viewed as much better value for money by Campbell because students can refer back to parts they may not have understood the first time.

Campbell adds: "As we all know, the afternoon session on a one-day training course is often not retained by delegates due to poor concentration."

Another of the steering group representatives, Steve Campbell, divisional technical director at Bailey Building Services, describes some of the "great advantages" of flexible learning as filling a technical training gap that currently exists within the building services industry, while also providing a means to gain a professional qualification, subject to meeting the required criteria.

"Thus far, NG Bailey has been satisfied with the learning material content that is both academically and practically suitable for engineers from graduates with minimal building services knowledge, through to experienced senior engineers, who may need or require a refresher in a particular system discipline technically," enthuses Steve Campbell.

"The learning modules have additional reference material/reading for those that want to gain further knowledge from leading manufacturers, industry standards codes of practice, guidance notes and onsite video clips and photographs and other forms of multimedia. All of the materials have been written by leading industry technical experts with input from CIBSE, main sponsors/steering group [members], making the material industry best practice.

"NG Bailey will be utilising the CIBSE flexible learning from September 2009."

It is anticipated that the CIBSE flexible learning programme will be developed to meet the academic level to satisfy the requirements to gain a professional diploma in building services, subject to the individual undertaking 10 modules and completing competence assessment design projects that will ensure they have reached the necessary requirements to meet the needs of today's market.

Completion of the modules will assist engineers in achieving the requirements of CIBSE corporate membership and CEng or IEng status.

NG Bailey is currently reviewing and trialling the first module on cable sizing.

Online CPD updates, designed for CIBSE members, are an easy and convenient way for engineers to keep up to date with new developments in building services and satisfy their CIBSE and ECUK CPD commitments. There will be four topics available from September 2009: heating design, cooling and ventilation systems, facilities management and lighting. Each seven-hour module will cover: legislation updates, any new standards, technology updates and an international overview.

CIBSE's flexible learning courses are being launched in August. Its CPD courses will be available from September 2009. ●

Courses

Future plans

Flexible learning courses available from August 2009

Introduction to mechanical and electrical services

Heating systems

Cable sizing – available NOW. Visit www.cibsetraining.co.uk/onlinelearning

Design of heating and chilled water pipe-work systems

Low voltage distribution

Courses in development to be available later in 2009

Lighting design

Drainage

Commissioning and testing

Ventilation

Air distribution systems

Comfort and design criteria

High voltage distribution

CPD courses available from September 2009

Heating systems update

Cooling and ventilation systems update

Facilities management update

Lighting update

www.cibse.org/onlinelearning



Paul Tymkow: "generally pleased"



Steve Campbell: "great advantages"

Marcin Balcerzak



Weather map

A new online building-design tool can help professionals incorporate weather and climate change information in a fast and flexible way. Anastasia Mylona explains

It is 5.45pm and the design team has to prepare for an early presentation the next day with their client. Their project is the conversion of a 1960s air-conditioned office block to natural ventilation. The aim is also to get some sleep before the presentation!

The younger members are tasked with assembling data that will enable the whole team to understand the challenges of the project and come up with a variety of options that could be discussed with the client. In addition, the issue of how the building will cope with climate change is also on the agenda.

The team needs to have a range of information that includes building form and fabric; future occupancy trends; site-related information including current and future weather; predicted internal gains; and overheating and comfort criteria. The sources of information available are building plans, client brief and CIBSE guidance.

One online tool the team now has available to help deliver this information is the CIBSE Design Compass. This tool does not yet provide comprehensive guidance for all aspects of the design of building services, but rather for those areas most affected by the external environment covering the design of heating, cooling, ventilation, lighting, public health and electrical systems of a building.

Once the team has identified its design challenge, in this case a ventilation-related one, the Design Compass guides the user to a series of design tasks and in turn to the information to assist in the completion of each task within the process framework. There are three levels to the framework for each design area:

- The building services design process, comprising six design stages, based on the design framework presented in the BSRIA publication *A Design Framework for Building Services: Design Activities and Drawing Definitions* (David Churcher, BG 6/2006); which is the same for all design areas under consideration;

- The tasks associated with each design stage; and
- Links to CIBSE guidance, to weather information and to other resources.

To apply the Design Compass, the team will need to refer to the first stage of the design process, 'Pre-design', and follow the tasks associated with it in order to assemble the information needed to inform decisions at this early design stage. Tasks include: identifying client and building users' needs and requirements; gathering information about site; occupancy patterns; form and fabric; and establishing regulations and standards applied.

Once the task is chosen, the user is directed to the location of the information needed within CIBSE guidance or within other resources. For example, the task 'gather information about site' will direct the user to a range of resources, such as chapter four of *CIBSE Guide F Energy Efficiency in Buildings*, which provides some general site considerations and explains the principles of the various ventilation strategies, and chapter three of *CIBSE Guide L Sustainability*.

Once the team has moved into the next stage of 'preliminary design', a new set of tasks direct them to the list of calculation tools, guidance and data available to assist them in the calculation of ventilation rates and assembly of the ventilation strategy of the building. Similarly, during the 'design development' stage, the user is directed to guidance that would assist in the completion of the design proposal. Tasks at this advanced stage direct the user to guidance on the use of advanced calculation tools, such as CFDs, as well as on controls, system selection, operation, system integration and other design considerations.

Although the Design Compass identifies specific steps in a prescriptive design process, experienced professionals have the choice to either follow it or access the information provided according to their own methodology. At the same time, it offers assistance to new designers to achieve best practice by following a recognisable and structured methodology.

A key aim of the tool is to make weather and climate-change information accessible for building design, including extensive guidance and resources of current and future data, assisting the team in achieving efficient design and passive solutions, and in the future-proofing of buildings to the impacts of climate change.

So, did our young designers make their evening deadline without burning the midnight oil? Applying the Design Compass at least meant they had a quick and flexible toolbox at their disposal – and they might even have time for an after-work drink! ●

■ A key aim of the tool is to make weather and climate change information accessible for building design. ■

Anastasia Mylona is CIBSE's environmental data coordinator.

The Design Compass is the result of a Knowledge Transfer Partnership. The project was a collaboration between CIBSE and the UK Climate Impacts Programme and was co-funded by Technology Strategy Board CIBSE and EPSRC.
www.cibsedesigncompass.org.uk
www.ktonline.org.uk
www.ukcip.org.uk
www.innovateuk.org
www.epsrc.ac.uk

Standard bearer

New energy saving standards for buildings are being developed in the US and could have a wider impact. **Tim Dwyer** reports from the summer meeting of the American Society of Heating, Refrigerating and Air-conditioning Engineers



Bill Harrison



Gordon Holness



Professor Sue Roaf

A new prototype ASHRAE energy label for buildings developed in the US was unveiled at the society's summer 2009 meeting in Louisville, Kentucky. The Building Energy Quotient will include both asset and operational ratings for all types of building excluding residential. Existing buildings will also be eligible to receive both an asset and operational rating.

Looking to fully launch the programme in 2010, ASHRAE has applied the label to its newly refurbished headquarters in Atlanta, which received an A- (Very Good) on a scale of A+ (Net Zero Energy) to F (Unsatisfactory). The label was created with the help of CIBSE, building on European experience in implementing the European Energy Performance of Buildings Directive.

In an increasingly competitive building labelling market the ASHRAE label focuses solely on energy use providing both an asset rating – similar to the UK's Energy Performance Certificate – and, following a year of building occupation, an operational rating. Existing buildings will also be eligible to receive both an asset and operational rating.

ASHRAE's outgoing president, Bill Harrison, said he believed that the label could provide a model for mandatory programmes in the US and possibly beyond.

Harrison also confirmed that ASHRAE's key energy standard, 90.1, which aims to create market-viable, net zero-energy buildings, would be 30 per cent more stringent when it is revised next year compared with the 2004 edition. It is likely to be released at the next summer ASHRAE meeting in Albuquerque.

ASHRAE is also to release a standard next year that it believes will be as important 90.1. The Standard for the Design of High-Performance Green Buildings, 189.1, is being developed in partnership with the Illuminating Engineers Society of North America and the US Green Building Council. The standard aims to provide minimum criteria for green building practices and take in siting, design, construction, and plans for operation of non-residential buildings.

As well as having thermal performance metrics, the draft standard incorporates extensive requirements in terms of lighting and internal environmental quality.

In his inaugural presentation, incoming ASHRAE

president Gordon Holness developed his theme for his year of office, 'Sustaining our future by rebuilding our past'. He said: "The vast majority of buildings that will exist in the year 2030 exist today."

The way to influence future energy demand was to ensure that we improve existing stock, he said. Holness, who is due to visit the UK in the second week of October, added: "If the building industry is looking to build a sustainable future, we can see the foundations of that right now."

ASHRAE is also rolling out an ambitious set of eLearning courses, as well as a worldwide certification programme that is already available in 20 countries. The certification scheme covers the design of healthcare facilities and high-performance buildings,

"If the building industry is looking to build a sustainable future, we can see the foundations of that right now." – Gordon Holness

the management of operations and performance, and the commissioning process.

Harrison said he accepted that the US government is now becoming more involved with addressing energy in buildings, and stressed that ASHRAE's government lobbying had led the development of a High-Performance Building Congressional Caucus Coalition, a private sector group of leading US building organisations that is raising the US Representatives and Senate's awareness of the role that buildings must play in energy and environmental policy. A key example of this was the recently introduced Green Energy Education Act.

In her presentation at the opening plenary session, Professor Sue Roaf, of Heriot Watt University, UK, argued that environmental performance certification schemes such as LEED had not necessarily promoted significant architectural change. She said that many buildings that were modelled to have a high performance at design stage were proving to be way off-target when in operation.

Roaf pointed to the Burj in Dubai and the glass towers currently rising out of the ground in Las Vegas as examples of the lack of joined-up sustainable development. ●

Professor Tim Dwyer works at London South Bank University and is chairman of the CIBSE ASHRAE Group. Details of Gordon Holness's visit to the UK in October will be posted on ASHRAE's website.

www.cibseashrae.org

<http://buildingEQ.com>



Four developers have striven to build new homes that meet some of the tough targets of the Code for Sustainable Homes. Carina Bailey looks at valuable lessons learned

Feeling at home

Since May 2008 it became mandatory for all new homes to have a rating against the Code for Sustainable Homes (CSH). It changed the emphasis of building sustainably in the domestic sector from an ambition to a more defined commercial and environmental target.

The code, which ranges from level one at the lowest end to level six at the highest, requires domestic properties to meet energy efficiency targets across a number of design categories. But the code, introduced in 2007, is so new it is relatively untested in the new-build housing market.

However, an early assessment of four new-build projects, three of which were built to level 5 of the code, offers some useful lessons for future developers. The findings, prepared by the Good Homes Alliance (GHA) for the Department for Communities and Local Government, show that different types of housing can

be built to high code levels – including detached and terraced homes, flats and live-work units.

The building projects started about 18 months ago, and represent some of the first code-compliant homes to be built. The GHA was approached because its members were the most likely source of projects completed to code level 3 and above.

In order for a developer to be a member of the GHA, it has to commit to building at least 50 per cent of its new homes to the GHA Standard of Code 3++ (which is level 3 of the CSH), and to achieve tighter CO₂ emission standards of at least 70 per cent less carbon dioxide compared with the UK average for that building type in 2003.

The developer must also monitor and assess the buildings after occupation.

The GHA is currently looking to obtain funding to help its members carry out monitoring and post-

The Old Apple Store in Stawell, Somerset, UK, achieved code level 5 (see page 29)



with the code

occupancy evaluations for a series of projects. The GHA liaised with the developers and relevant members of the design team for each case study, gathered relevant data about the projects and reported on their findings. Two of the case studies were privately funded and two were housing association-funded developments.

“These case studies show that the code can be applied to both new and traditional construction types. But there were also some more experimental construction methods that people were trialling,” says GHA associate Henrietta Lynch.

One such example of these ‘experimental’ techniques can be seen in the Bristol case study, where the fabric of the building was made using prefabricated solid cross-timber laminated panels with external insulation and render – a system that is not widely used in the UK.

Lynch says the trialling of the new construction systems and green technologies on these projects

“It’s totally possible to build to a high level of the code, but planners need to understand where the developers are coming from.”

makes it difficult to know exactly how much more expensive properties built to the code are, compared with traditional construction methods.

But she estimates that construction costs per square metre shown for the four case studies ranged from £950 to £1,850 (excluding land prices and fees), depending on the code level being built to. The costs are high, but they were always expected to be so because of the fact that developers were using the code for the first time and new technologies and construction techniques were involved.

The projects

Four projects were included in the study:

- The Old Apple Store, Stawell, Somerset, a rural private housing project built to code level 5 by ECOS Homes;
- CO₂ Zero, Bristol, a scheme providing urban private live-work units built to level 5 by Logic CDS Ltd;

Zero CO₂, Bristol, attained level 5 of the code (see page opposite)



- > • Mid Street, South Nutfield, Surrey, a semi-rural social housing venture built to level 5 by Raven Housing Trust;
- Norbury Court, Staffordshire, an urban social housing development built to code level 3 by Staffordshire Housing Association.

All the projects were relatively small, each comprising between two and six properties, including private housing for sale and social housing for rent and sale.

Most of the schemes have a high-quality, highly insulated building shell with low air-permeability that take advantage of passive solutions before adding active or renewable features. These include low levels of air-permeability, passive solar design strategies, low-energy lighting, the use of environmentally benign materials, low-water-use sanitaryware, and rainwater harvesting.

The three projects that achieved level 5 of the code also included renewable energy technologies, such as photovoltaics and biomass boilers.

The overall technical performance for the developments varied according to the code level achieved, with low-e double or triple glazing and wall U-values ranging from 0.10W/sq m K at code level 5, to 0.29W/sq m K at code level 3.

Air permeability test results were also roughly in line with expectations, ranging from 1.7 cu m/h@50pa at code level 5 up to 5.63 cu m/h@50pa for code level 3.

Code categories

There are nine categories of standards in the code that homes are judged against: energy/CO₂; water; materials; surface water run-off; waste; pollution; health and well-being; management; and ecology.

Only the first five of these categories set minimum requirements for meeting different levels of the code (see table, left). The requirements for three of these groups – materials, surface water and waste – are at entry level and apply only to code level 1.

The overall ‘scoring’ of a property against the code to establish which level it is at, is derived from the ‘credits’ the property achieves across all nine categories – for levels 1 to 6 the respective minimum scores required are 36, 48, 57, 68, 84 and 90.

Lessons learned

But most importantly, a number of key ‘lessons learned’ were revealed about how to design and construct a home from scratch to meet CSH standards, says GHA.

Fundamental to creating a home to high levels of the code is the need for a holistic approach to be taken towards the design at the earliest possible stage, with a detailed knowledge of, and careful consideration given to, the CSH criteria. This will help give the whole team a greater understanding of the implications to achieve the low U-values and low levels of air permeability required.

For example, if developers have previously used brick and block cavity wall construction, they may be >

Mandatory minimum standards in the code*

Code Level	Category	Minimum standard
1(★) 2(★★) 3(★★★) 4(★★★★) 5(★★★★★) 6(★★★★★★)	Energy/CO₂ Percentage improvement over Target Emission Rate (TER) as determined by the 2006 Building Regulation Standards	10% 18% 25% 44% 100% A ‘zero carbon home’ (heating, lighting, hot water and all other energy uses in the home)
1(★) 2(★★) 3(★★★) 4(★★★★) 5(★★★★★) 6(★★★★★★)	Water Internal potable water consumption measured in litres per person per day (l/p/d)	120 litres per person per day 105 l/p/d 105 l/p/d 80 l/p/d 80 l/p/d
1(★)	Materials Environmental impact of materials	At least three of the following five key elements of construction are specified to achieve a relevant <i>Green Guide 2007</i> rating of A+ to D • Roof • External walls • Internal walls (including separating walls) • Upper and ground floors (incl separating walls) • Windows
1(★)	Surface water Run-off surface water management	Ensure that peak rate of run-off is no greater for the developed site than for the pre-developed site. This should comply with the Interim Code of Practice for Sustainable Drainage Systems
1(★)	Waste Construction site waste management Household waste storage	Ensure there is a site waste management plan in operation which requires the monitoring of waste on-site in accordance with the best practice and the defined waste groups. It must also include procedures to sort and divert waste landfill according to the defined waste groups. This must be performed either on-site or through a licensed external contractor, in accordance with best practice The legal requirement is set out in the Household Waste Recycling Act 2003. The size, type and number of containers may be set out by the Waste Collection Authority using their statutory powers

*Four other standards are not mandatory but do contribute to a property’s overall score against the code to establish its code level: pollution; health and well-being; management; and ecology
Source: UK Department for Communities and Local Government, *Code for Sustainable Homes*, February 2008
www.communities.gov.uk/thecode

CASE STUDY 1: The Old Apple Store, Stawell, Somerset



Project brief: Originally designed to meet the criteria for Ecohomes Excellent, its final target was code level 5

Development type: Five new private family homes – two detached four-bedroom houses, and three three-bedroom terraces

Construction type: Glulam Frame with Orientated Strand Board (OSB)

Key sustainability features: Photovoltaic cells, solar thermal

water heating, passive solar design, wood pellet boilers, rainwater harvesting

External fabric: Thermally efficient timber cassette shell that was considered replicable for future projects. U-value of 0.14W/sq m K

Roof: Engineered 'I' beams, filled with recycled newspaper insulation with 100mm woodfibre with OSB top and bottom and an internal vapour control layer to the underside of the OSB. U-value of 0.12W/sq m K

Ground floor: Constructed from concrete planks with 150mm foam insulation under a 50mm screed with 50mm edge upstands. U-value of 0.15W/ sq m K

Windows/doors: Triple-glazed FSC certified with U-values of 1.2W/ sq m K. External doors U-value of 1.1 W/ sq m K

Air permeability: Target was 3 cu m/h@50pa; tests have shown

improvements upon this, with two of the houses achieving 2.57 and 2.17 cu m/h@50pa respectively

Insulation: Recycled newspaper between the timber studs, and woodfibre boards which wrapped the complete building envelope. Sheep's wool insulation was used for inter-floor insulation

Key problems: Complex architecture hindered the build process and also the low air-permeability.

Build cost:
 • Excluding land costs and fees: £1,375 per square metre – higher than standard expectations
 • Water management and renewable energy systems costs: an additional £170 per square metre

Sales value: Between £275,000 and £399,000, or £2,238 to £2,615 per square metre, Local comparable sales prices are £2,045 per square metre

Lessons learnt:

- Designing for compliance with code level 5 or 6 requires a holistic approach to design and a very detailed knowledge and careful consideration of CSH criteria at the earliest design stage
- Design detailing for the code can be time consuming and labour intensive if the overall design concept is complex
- The administration of the code process should be considered from the outset of a project and suitable systems implemented with contractual obligations for suppliers/contractors to provide information relevant to the agreed design and construction programmes
- Assembling and educating a dedicated construction team is essential to meeting the challenges of higher level code developments, particularly when new materials and construction methods are being used

Occupant feedback: None yet available

CASE STUDY 2: CO2 Zero, Bristol

Project brief: The first private residential development in the UK and the first live-work development to reach code level 5

Development type: Nine two-bedroom, three storey live-work units

Construction type: Solid cross laminated timber panels with external insulation and render. Aluminium sheet roof with upstand seam and curved profile

Key sustainability features: Passive solar design, low flow rate sanitaryware, rainwater recycling, low energy LED lighting, PV array, biomass pellet boiler, low energy rated white goods, FSC timber, green roof and MVHR

External fabric: Solid cross laminated timber panels with 290mm mineral fibre bat external insulation. U-value of 0.10W/ sq m K

Roof: Aluminium sheet, upstand seam, curved profile with 200mm

mineral wool plus 100mm foam sheet insulation. U-value of 0.10 W/ sq m K

Floor: 50 per cent 99BS concrete slab with 165mm foamed sheet insulation and FSC raised timber floor. U-value 0.10 W/ sq m K

Windows/doors: Roof-lights (U-value 1.1W/ sq m K) and duplex windows (U-value 0.70W/sq m K) are triple-glazed, low-e windows with thermally broken frames. Shop front windows are double-glazed with thermally broken frames (U-value of 1.2W/ sq m K). Doors are fully insulated, in thermally broken timber frames with U-value of 1.0W/sq m K when unglazed and 1.4W/sq m K with vision panels.

Air-permeability: Test results were 1.2 cu m/h@50pa for the first complete dwelling

Insulation: Units constructed using prefabricated solid cross timber laminated panels with external insulation and render

Key problems:

- Space constraints on-site created particular difficulties in installing renewable technologies
- The implications of the thickness of the external insulation used in the new build system were not fully appreciated by the subcontract teams

Build cost: Excluding land and fees – £1,428 per square metre, about a 15 per cent increase over traditional build methods

Sales value: Estimated at about £250,000 or c.£2,974 per square metre (net internal). Sales prices for similar properties in the area were not available

Lessons learned:

- There needs to be a greater understanding of the implications of detailing to achieve low U-values and low levels of air-permeability
- The use of specialist subcontractors for design and installation can be beneficial in terms of ensuring successful delivery



- Preparing well co-ordinated construction and delivery management programmes at an early stage is essential to understand and avoid likely difficulties
- Some specialist MVHR suppliers in the UK do not yet seem to appreciate the considerable potential that their systems have for use in smaller scale, highly insulated developments
- There needs to be a greater awareness of zero carbon and the implications of building to high levels of the CSH throughout the construction industry

Occupant feedback: None yet available

CASE STUDY 3: Norbury Court, Staffordshire

Project brief: To be affordable and sustainable with the hope that they would make a real difference to people's lives and the local community

Development type: Nine terraced units – seven three bedroom houses, one two-bedroom house and one three-bedroom dormer bungalow

Build system: Factory fabricated timber frame construction with particle board sheathing and brick cladding

Key sustainability features: Solar thermal water heating, passive solar design, low flow rate sanitary ware, rainwater recycling for garden, low energy lighting

External fabric: Timber frame with cement particle board sheathing and phenolic foam insulation. U-value of 0.29W/ sq m K

Roof: Timber frame with timber strand board and cut block foam

insulation. U-value of 0.20W/ sq m K

Floor: Proprietary concrete beam construction with polystyrene infill and concrete screed. U-value 0.21W/ sq m K

Windows/doors: Double glazed, low-e windows U-value of 1.20W/ sq m K. Doors average U-value was 2.0W/ sq m K.

Air-permeability: The final air-permeability tested was 5.63 cu m /@50pa for the first complete dwelling

Insulation: Phenolic foam was injected into the external wall panel void, supplemented with cut block foam insulation in remaining voids that could not be filled in this manner. The floors were constructed from a concrete beam system using polystyrene infill with concrete screed

Key problems:

- Site construction complications



associated with the installation of the renewable energy systems and energy reduction measures

- Meeting the low water use sanitaryware criteria because the supply chains for the equipment were not adequately established at the time of construction

Build costs: £950 per square metre, excluding land costs and fees. The developer estimated that the development cost about £7,500 per

unit extra in terms of build costs to meet the requirements of code level 3

Sales value: About £135,000 or c.£1,688 per square metre compared to sales prices in the local area for existing stock of about £125,000 or £1,563 per square metre

Lessons learnt:

- Use a good Code for Sustainable Homes assessor and work with them from the start of the project
- Achieving code level 3 or above means extra costs for renewable energy technologies such as solar thermal water heating
- Not all renewable energy technologies will be appropriate for all sites
- Supply chains for some items required to achieve code level 3 and above are sometimes still in development

Buyer/occupant feedback: All positive, with lower energy and water bills reported

CASE STUDY 4: Mid-Street, South Nutfield, Surrey



Project brief: Initially planned to be code level 3, the scheme went on to become the first publicly funded social housing development in the UK to achieve code level 5

Development type: Two two-bedroom flats

Build system: Structural Insulated Panel System (SIPS) and beam-and-block flooring with mineral wool and expanded polystyrene insulation

Key sustainability features: Passive solar design, low flow rate sanitary ware, rainwater recycling, low energy lighting, PV array, biomass pellet boiler, low energy rated white goods,

FSC timber, and MVHR

External fabric: Structural Insulated Panel System (SIPS) with 50mm of external insulation. U-value of 0.14W/ sq m K

Roof: Timber frame with concrete tiles and 400mm mineral wool insulation. U-value of 0.13W/sq m K

Floor: Beam-and-block with additional 75mm insulation. U-value 0.14W/sq m K

Windows/doors: Windows were triple-glazed, low-e windows uPVC. U-value of 0.80W/ sq m K. Doors were fully insulated. U-value of 1.2W/ sq m K

Air-permeability: Design air-permeability test targets were 3 cu m/h@50pa. Final tests provided results of 4.9 cu m/h@50pa

Insulation: The SIPS system has a sandwich of mineral wool and expanded polystyrene insulation

Key problems: The biomass boiler needs maintenance or attention roughly every one to two weeks, plus six-monthly servicing. This has created a series of additional call outs to service the boiler, causing significantly greater maintenance costs

Build costs: About £1,850 per square metre, excluding land costs and fees – an uplift of about 20 per cent over standard build costs

Sales value: Between £175,000 to £200,000, or c. £2,857 per square metre, roughly equal to or above sale values for equivalent properties in the local area

Lessons learnt:

- It is important to involve a code assessor with experience in energy

efficiency before drafting initial designs

- Construction details need to be produced early in the design process – remedial work is not as effective as achieving low levels of air-permeability on the first attempt
- Mechanical Ventilation with Heat Recovery can offer key advantages in reducing energy requirements if correctly specified and installed
- Local planning constraints may limit the available design options
- For small dwellings in rural locations wood pellet boilers can be an attractive option
- Shared heating systems can be a practical and cost-effective solution
- A good relationship and understanding with the site manager is necessary for a design to be realised
- Heating, ventilation and renewable energy systems specified in a project need to be demonstrated to the occupants. Clear written guidance on their use also needs to be provided

Buyer/occupant feedback: Generally satisfied but the erratic working of the boiler caused irritation



> able to meet the lower levels of the code with the same approach. However, if they are aiming for higher levels, they may need to use new materials and building systems.

It is also essential to ensure enough time and resources are made available to meet the detailed requirements of the code, as this can be time consuming and labour intensive. Suitable systems should be put in place to deal with the administration of the code from the beginning of a project, with contractual obligations made for suppliers and contractors to provide the relevant information. It is advisable, therefore, that a good code assessor is used from the start of the project.

It can also be beneficial to use specialist sub-contractors for the design and installation of a project, as well as preparing well coordinated construction and delivery management programmes early in a project, in order to understand and avoid likely difficulties.

One problem which is yet to be overcome, says GHA, is the fact that some specialist mechanical ventilation heat-recovery suppliers have failed to realise the potential of their systems in smaller scale, highly insulated developments.

Another problem is a lack of awareness throughout the construction industry about how to achieve low-carbon solutions and the implications of this when building to the code.

It is also advisable to note that the supply chains for some of the items required to achieve code level 3 and above are sometimes still in development, says GHA. Enough money should therefore be made available for the extra costs associated with choosing, sourcing, buying and installing appropriate renewable energy technologies.

In rural locations for small dwellings, using wood pellet boilers can be an attractive option to consider. Also, shared heating systems can be a practical and cost-effective solution, but the performance of such schemes is dependent upon a good relationship and an understanding between the design and construction teams.

But whatever design options are selected, pivotal to the success of a project is demonstrating how heating, ventilation and renewable energy systems work to the occupants, with clear written guidance supplied. "Renewable energy technologies are for many people

still quite an unknown area in terms of installation and understanding how they work," Lynch says. "Sometimes planners expected buildings to look a certain way, more similar to local vernacular styles. I think it's totally possible to build to the code – and to a high level code – to that type of design, but [planners] need to understand where [developers] are coming from."

Energy savings

The reaction of the different planning authorities varied, with some restricting the architecture to suit the area – which sometimes conflicted with the simplest sustainability solutions – while in other cases planning officers allowed a more modern look because of the sustainable approach being taken. Yet despite no official energy-saving data being available, residents in some of the units are already reporting reductions in their utility bills.

Lynch says: "All of the developments seem to show savings in energy use. None have been occupied very long, so we didn't put that data into the reports – to be meaningful and realistic, we need a whole year's data for it to make sense."

And even though it is not part of the GHA's remit to carry out post-occupancy evaluations (POE) on these case studies, the developers that are members of the GHA have agreed to carry out monitoring of their developments. The GHA is currently in the middle of accessing funding to start a monitoring and POE programme for some of its developers' specific projects, although nothing has yet been confirmed.

Says Lynch: "I think the success of the case studies has been in showing where we have learned to build to a high code level, born out of strong teamwork and collaboration; design and construction teams learning to work well together to build good low-energy housing – we need that."

She says the properties appear to be selling well, but stresses that it is still a very difficult market, making it hard to gauge. Despite this, the developers involved believe the sale value of these code properties should be worth 10 per cent more than conventional homes overall. ●

Specialist sub-contractors were used for installations on the scheme sites

"Our success has been where we have learned to build to a high code level, born out of strong team work and collaboration between different sides."

www.goodhomes.org.uk

www.communities.gov.uk



Supermarket chillers will be affected by the F-Gas rules

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Healthier chill

Moves in Europe aimed at banning the use of certain greenhouse gases in refrigeration and aircon units are nonsensical, claims the UK industry, which argues that the truly green option is to ensure these refrigerants are properly sealed. **Ewen Rose reports**

The European Commission is under heavy pressure from environmental groups to ban the use of hydrofluorcarbon (HFC) gases as refrigerants in cooling equipment. Late next year the commission is due to review the current regulations around the use of such gases, and may decide to phase them out.

This is despite the fact that the new 'F-Gas' rules on the use of such refrigerants were introduced only this year, with the aim of ensuring they do not leak from systems – a requirement that has been welcomed by the industry despite the multi-million pound costs involved in implementing it.

In fact, when it comes to which type of refrigerant gases are 'best' for the environment, according to the

UK sector, systems using HFCs are actually more energy efficient, and therefore have a lower carbon footprint, than those using alternative non-fluorinated gases.

HFCs are in the legislators' firing line, however, because the industry historically has had a lamentable record when it comes to leakage rates. Suppliers estimate that up to 30 per cent of all refrigerants sold are used to top up leaking systems.

But, properly applied, the F-Gas regulation has the potential to limit HFC leakage and, therefore, its impact on the environment. For example, the Dutch STEK scheme, which partly inspired the F-Gas rule, reduced refrigerant leakage rates from around nine per cent to less than two per cent in 16 years.

"F-Gas must be given a chance to work," says Karen Leader of the Heating and Ventilating Contractors Association. "The professional industry welcomes a piece of legislation that has the potential to raise standards and remove unregulated firms from the sector.

"The controversy surrounding the long-term role of HFC refrigerants has created a false impression that we are locked in combat with the environmental lobby. We are not. We share the same aims.

"RAC [refrigeration and air conditioning] engineers have access to a wide range of potential solutions and

each has its place. Our principle aim is to deliver the best possible performance for clients at the lowest energy penalty, whether that is by using HFCs, ammonia, carbon dioxide or hydrocarbons.”

Warming impact

European Commission officials, however, have called on the RAC sector to step up research into alternative non-HFC gases that have low ‘global warming potential’ (GWP). But most design and installation engineers regard the ‘total equivalent warming impact’ (TEWI) of a cooling system to be the most meaningful measure of environmental friendliness.

TEWI takes into account the GWP, the energy efficiency, and the life-cycle costs of running the equipment.

Hywel Davies, CIBSE technical director, says: “In practice, an efficient refrigerant used in a properly contained, maintained and inspected system does not cause global warming, and will result in much lower energy consumption, with associated much lower emissions, than an inefficient system containing less appropriate refrigerants, that doesn’t leak but has to work much harder and use more energy.”

The Air Conditioning and Refrigeration Industry Board (ACRIB) says that removing HFCs would drive up energy consumption to such an extent that the ‘indirect’ emissions from power generation would far outweigh the benefits of removing the ‘direct’ global warming impact caused by HFCs.

The Air Conditioning and Refrigeration European Association (AREA), which represents contractor trade bodies, believes there will have to be a range of solutions far into the future, including HFCs.

“Our industry cannot simply produce a one-size-fits-all solution,” says Graeme Fox of AREA’s technical and environment committee.

“There is simply no such thing as one refrigerant being the answer in all applications. For large, deep-freeze applications, I have seen some wonderful ammonia systems, for large central plant systems I have seen fantastic evidence of CO₂ working very well and with excellent efficiencies.”

HFC review

And how practical would a ban on HFCs be? We are in the middle of a phase-out of HCFCs – the interim replacement for CFCs – but a survey carried out by the British Refrigeration Association (BRA) showed that progress is painfully slow. In many cases, HCFCs should be replaced by HFCs.

“It’s the last year that virgin R22 [a popular HCFC refrigerant] can be used and the latest BRA survey shows rate of reclamation of R22 has not increased to meet future demand,” the association says. “The quantity of virgin R22 sold in 2008 was close to that in the previous year and at odds with the 25 per cent reduction predicted in the last survey based on users switching to alternatives.

“R22 reclaimed in 2008 was just over 200 tonnes and similar to the volume in 2007. There is no evidence



The European Union could consider extending its rules on refrigerant gases

that the rate of reclamation is increasing. Current reclamation levels of around 10 per cent of demand will leave most R22 users short of product come 2010,” the BRA adds.

Ken Logan, managing director of refrigerant supplier A-Gas (UK), warns that time is running out. “Although recycled material is readily available at the moment, there may be issues with supply towards the end of the year,” he says.

“Now is the time to start looking into alternative refrigerants, as by 2015, if not sooner, alternative refrigerants or new plant may be the only accessible options but a strategy needs to be put in place to facilitate budgeting and ensure a smooth transition.”

Persuading end-users to make radical and expensive changes to systems that are working perfectly well is a difficult, if not impossible, task. The snail-like pace of conversion from R22 shows that any attempt to remove HFCs could take decades and would, inevitably, also undermine the phase out of R22.

HFCs are an alternative to R22 in many systems and, if they were not available, long-term wholesale plant replacement programmes would be needed. There is an enormous installed base of cooling equipment that simply cannot work without HFCs. Medium- to high-temperature systems in shops, offices, and some domestic applications along with the growing numbers of small heat pumps being installed across Europe rely on HFCs – there are alternatives, but few that could match the energy efficiency delivered by HFCs.

All sections of the industry, from system designers to product manufacturers, recognise the importance of making F-Gas stick. It has only been law in the UK since March, meaning that there will have been little time to gauge its impact before the EC’s review next year. The industry, justifiably, believes it needs to be given more time to prove it can get on top of the refrigerant leakage issue and drive up installation standards.

Moreover, despite the problems of implementation and arguments about the future, the UK was among 20 of the 27 EU member states said to be in compliance with F-Gas when the deadline passed on July 4 this year. This is according to a survey conducted by the >

“There is simply no such thing as one refrigerant being the answer to all applications.”
– Graeme Fox



> European Partnership for Energy and the Environment (EPEE), whose members manufacture and install heating and cooling products.

EPEE says it hopes all member states will eventually comply “so that the delivery of fluorinated gases will not be disrupted”. The rule restricting sales of refrigerant gases to firms that have properly registered employees is a “critical component... to ensure both reduced emissions and responsible management of F-gases”.

Mike Nankivell, chairman of ACRIB’s F-Gas Implementation Group, believes the European Commission’s review of F-Gas next year is an opportunity for it to “fine tune” the regulation and take on board some of this feedback from the industry to improve refrigerant containment.

He adds: “We recognise the legal obligations of the EC to hold a review, but would urge them to take a ‘light touch’ approach. Rather than making hasty policy changes based on limited data, why not take the opportunity to review progress to date and tighten up the provisions?” ●



The UK industry argues that a range of gases can be used in refrigeration

Installers: half of firms fail to register by deadline

UK companies that install, maintain or service RAC equipment and heat pumps must now apply for certification from REFCOM, which was appointed as the UK’s mandatory company registration scheme, as required by F-Gas, in June. Without registration they cannot, in theory, buy refrigerant gases – effectively putting them out of business.

The F-Gas Regulation and REFCOM operate alongside the requirements of the Energy Performance of Buildings Regulations requirements for air conditioning systems to be inspected. Any system over 250kW should have been inspected in January 2009, and this inspection should have identified whether R22 refrigerant is used, and drawn this to the attention of the owner or inspector.

As the July 4 deadline for the mandatory F-Gas registration passed, only about 2,500 companies had registered with REFCOM. Originally, the intention was that unregistered firms would not be able to trade after July 4 and Defra, the government department responsible for managing F-Gas, had estimated that 5,000 firms would be signed up in time. However, with such a shortfall it was compelled to issue a statement insisting that failure to hold a certificate would be a criminal offence, and it is “vital” that firms act as soon as possible. Missing the July 4 deadline “should not deter companies from registering now”, Defra added. This may suggest that simply applying for registration could buy some companies more time.

To receive certification, firms must employ suitably trained engineers. A new set of refrigerant handling qualifications has been created to meet the demands of the Regulation – City & Guilds 2079 and CITB J11-J14. They are designed for any engineer carrying out leak checking of systems with more than

3kg charge (6kg if hermetically sealed), recovery, installation, as well as service and maintenance work.

When qualified, an engineer will be able to work anywhere in the EU, but they will have to master in-depth theoretical work covering subjects like thermodynamics, vapour compression cycles, and pressure enthalpy. The training also covers all components of an air conditioning system as well as testing the engineer’s knowledge of the regulations. Practical tasks include pressure and leak testing, recovery of refrigerant, oil draining, refrigerant charging, brazing etc.

Interim certificates are valid until July 2011, but by that time every engineer in the industry will have to hold the new qualification. It is going to be tough for a lot of working engineers to get back into the classroom, but there is no alternative.

ACRIB has also called for a statutory register of individual operatives to accompany the company scheme to prevent untrained engineers moving from job to job and staying below the F-Gas radar.

The sector has another Achilles’ heel that undermines attempts to reduce leakage: a large number of unregulated and untrained operatives can have an impact on cooling system installations. For example, pipework is often carried out by non-refrigeration experts, who may not employ high enough standards of brazing and pipe jointing techniques or use leak-tight components.

Flare nuts are also thought to be responsible for as much as 50 per cent of refrigerant leakage. “Properly trained engineers do not need flare nuts,” says Scott Gleed, of Essex-based installer Ceilite. “Our engineers remove them at installation or when they come across them during servicing – ideally manufacturers should just get rid of them.”



“The controversy around HFC has created a false impression that we’re locked in combat with environmentalists. But we share the same aims.”
– Karen Leader

Introducing Parasense

Duncan Carter, Sales Engineer, Industrial & Commercial at refrigerant monitoring experts Parasense, considers the importance of leak detection.

For many organisations, it's legislation that's the driver behind the installation of leak detection equipment in refrigeration systems. And there is a forest of legislative acronyms that make leak detection so critical – EC842-2006 (or the F-Gas regulations) legislates the use of fluorinated greenhouse gases, BS EN 378-2008 outlines the safety and environmental requirements of refrigeration systems and heat pumps, EC2037-2000 controls substances that deplete the ozone layer and BREEAM P02 Building Research Establishment Environmental Assessment Method includes their installation in its assessment criteria.

All this legislation tends to make investment in leak detection equipment to control refrigerant leakage a rather grudging one. But that shouldn't be the case – leak detection offers many more tangible benefits aside from simple compliance with legislative requirements. Fundamentally, these benefits boil down to reduced costs – something that's top of everyone's agenda at the moment.

Refrigeration can take up a huge proportion of an organisation's financial and environmental budgets. In some cases refrigeration accounts for 25% of the carbon footprint – and 70% of the total energy usage. Put simply, it means that any cuts you can make to the refrigeration budget will offer substantial benefits – and leak detection equipment offers the ability to make these cuts.

There are numerous documents that give consultants the tools to develop their own leak detection specification. My advice is – don't do it! Parasense is just one example of a company that's got years of experience (20 years in our case) of developing and refining leak detection equipment. So don't reinvent the wheel – go to an organisation that can tailor a solution that uses tried and tested equipment.



Take our GRM refrigerant monitor. It's certified to CE, UL and CSA standards and can be used to ensure the refrigeration installation is compliant with F-Gas, BSEN278-2008 and BREEAM. A well written specification will monitor all the areas of a refrigeration system that are at risk – be they part of the evaporator, the compressors and the condensers. Individual parameters can be set for each, making it very flexible. It's scalable too – it can be provided with 4, 8, 12 or 16 sampling channels. The system takes measurements at typically 30 minute intervals, 24 hours a day, seven days a week and data is fed through to Headline News. This is our secure, internet-based application that allows users to access the level of information they need to do their job efficiently (overview data for financial managers; detailed analysis for engineers, for example).

The system allows you to improve system efficiency, a factor that shouldn't be underestimated in its ability to cut costs. Refrigeration systems are designed to operate with a certain charge of refrigerant. Once the charge drops below its minimum level the compressor will need to work harder to maintain the discharge pressure and cooling capacity. Refrigerant charge only decreases when there is a leak and a leak has a massive effect on energy usage. A refrigeration system operating

with a charge 15% below the designed minimum will typically lose 40-50% of its capacity and require up to 100% more energy to maintain the required cooling load.

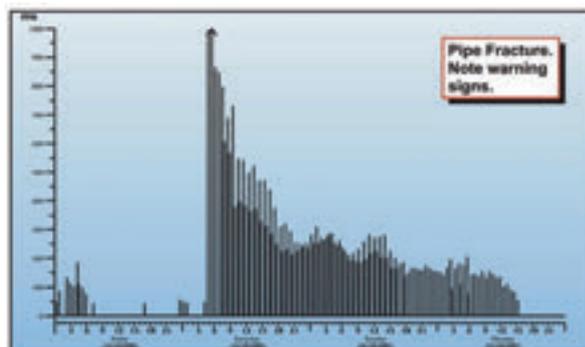
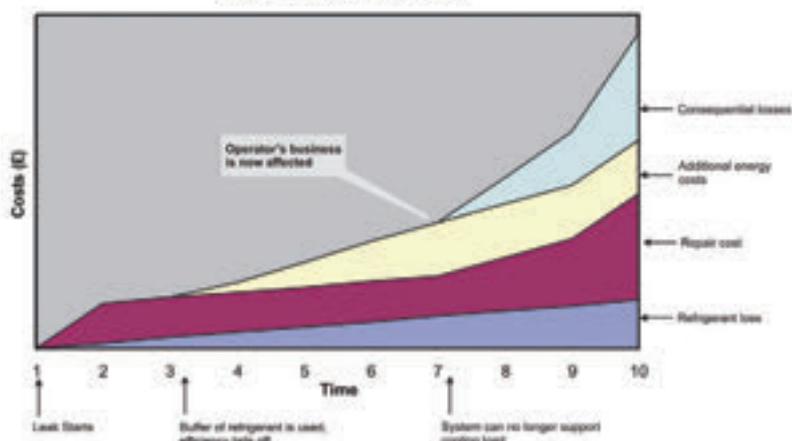
Figures like that clearly demonstrate the need to find and fix leaks as quickly as possible and that's exactly what the refrigerant monitor is for. The system will alert engineers and managers as soon as a leak occurs. This means that the problem can be fixed immediately, rather than when it's chanced on during random sampling in a routine maintenance check. As a result, your organisation has not only saved the ongoing cost of running inefficient, leaking equipment, it's also saved the cost of replacing more refrigerant than is absolutely necessary. It also means you're saved the consequential losses involved when a worn part finally breaks and causes the entire system to fail.

Not only does the system save you money and aid compliance with legislation, because the entire maintenance process is administered through the Headline News interface, it also gives you an asset management tool: the data it stores equips you with the information needed to monitor response time, first fix rate, fixture availability and so on.

The capabilities of 21st Century refrigerant monitors such as the GRM mean that leak detection systems can offer more than just a way to comply with environmental legislation. In fact, leak detection systems such as ours at Parasense, which are backed with years of expertise and understanding, offer a tried and tested means to make substantial cost savings and that's a fact!



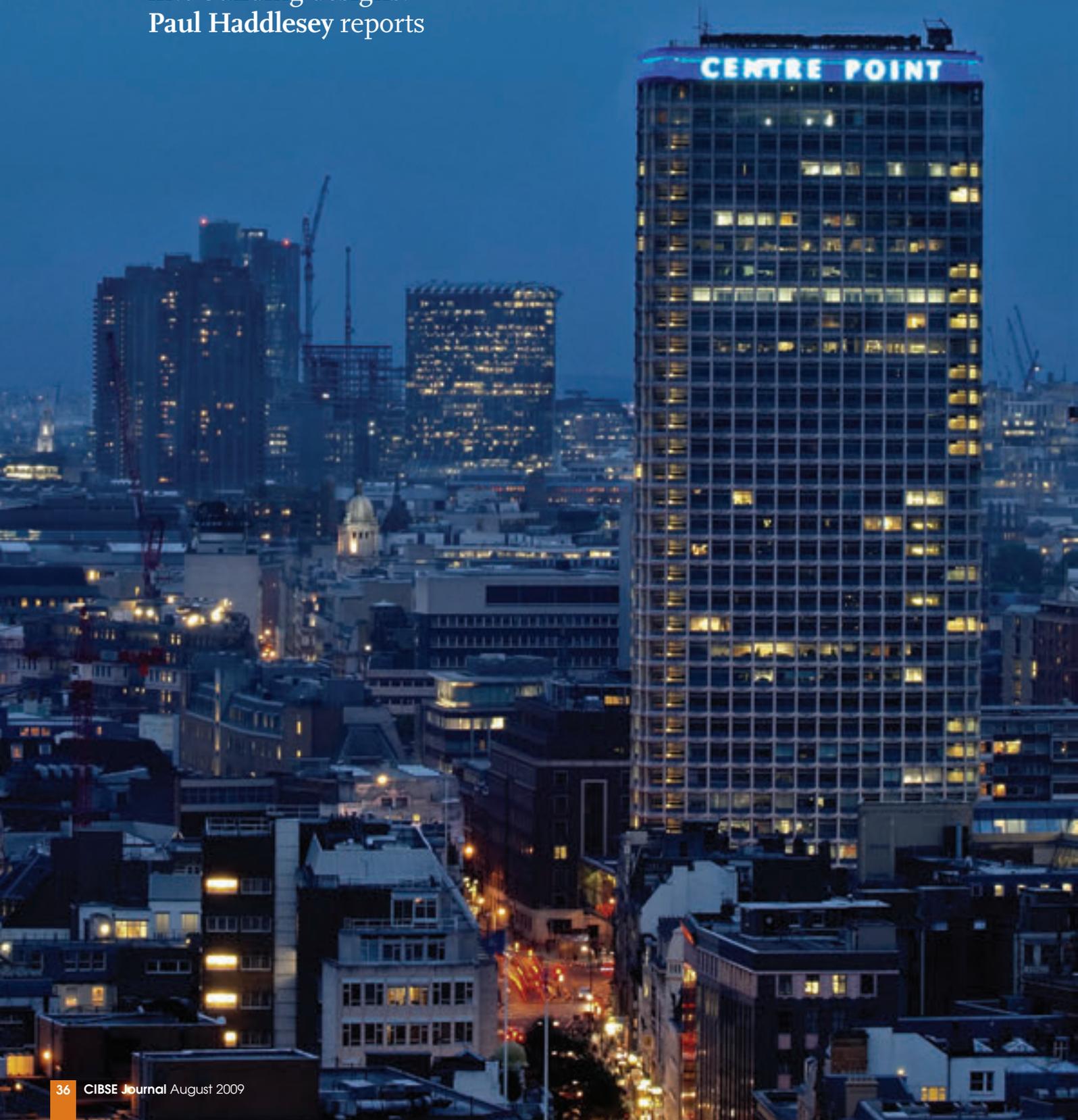
Cost of a Refrigerant leak



Illuminating design

Recent technologies are enabling designers to more readily integrate lighting into building designs.

Paul Haddlesey reports





Light fantastic: Palace Xchange shopping centre, Enfield, London, above, and Cabot Circus, Bristol, below

In an ideal world we would only see the effects of lighting and be totally unaware of the luminaires and light sources that create them. That's certainly what many lighting designers feel, and is one of the reasons we are seeing more emphasis on integrating lighting more closely with a building's façade or interior fabric. It is also widely believed that LED (light emitting diode) and OLED (organic LED) light sources will facilitate this trend.

So far, the majority of integration has been in exterior lighting of façades, moving away from simply 'throwing light' at the building to concealing more compact light sources within the façade itself, picking out architectural features. And while older buildings offer plenty of 'hiding places', the same isn't necessarily true of newer structures. "Modern minimalist architecture with high levels of glazing certainly makes it harder to conceal the fittings," observes Tim Downey of Pinniger & Partners.

In this respect, the emergence of compact LED fittings is proving a boon in terms of concealment. However, the cost is still relatively high because of the need for precise engineering and requirement for fittings with IP67 ingress protection.

Another potential barrier is the need for co-ordination between all interested parties early on in the design phase, taking account of the main role of the façade as well as its potential to create 'night art'.

"The design of the façade is generally dictated by thermal-based decisions long before the lighting is considered – so the lighting becomes an add-on," says Dominic Meyrick, of Hoare Lea Lighting.

"It's also important to be clear where the responsibilities lie. Architects often focus on the appearance of the building during the day, but they should also be responsible for its appearance at night," he suggests.

Another 'player' in this respect is the façade engineer, a role that has taken on greater influence with the introduction of energy performance targets: "The façade will modify the internal climate but it can also destroy the lighting," notes AECOM's Ant Wilson, speaking on

“One of the roles of the façade engineer is to ensure that the façade works both thermally and visually.”

– Ant Wilson

behalf of the Society of Façade Engineering. "One of the roles of the façade engineer is to ensure that the façade works both thermally and visually and, most importantly, provides people with a view so they can engage with the outside."

Maintaining 'a room with a view', however, is at odds with some designs that make use of opal glazing combined with integral lighting to create a glowing effect across the façade. Furthermore, this approach restricts the use of natural daylight within the building. "Any design that reduces the potential for daylighting is a definite no-no," Meyrick warns.

AECOM's Martin Valentine adds: "Daylight is the overriding factor because of the quality of the light and its importance to health and wellbeing, as well as the energy considerations. Consequently, we need to use the façade and the interior fabric to maximise daylight penetration, with mechanisms such as light boxes, reflective strips at high level, light pipes, super-reflective surfaces and light shelves."

With regard to artificial lighting there are also key concerns that, currently at least, constrain the potential for increasing the integration between lighting and the building fabric.

"With façade lighting it's all about the visual effect, but with interior lighting the emphasis is on how the lighting helps the space function efficiently for the people in it," Downey explains.

"So, once we've got the functionality right, and the right light levels on the surfaces, then we can start to look at whether we *need* to add more. So any integration of lighting into the fabric may be the icing on the cake," he suggests.

Again the relatively compact nature of LED light sources offers the lighting designer more potential for concealment within the fabric, and we are even beginning to see strips of LEDs built into desks and partitions to provide extra localised or task lighting.

In fact, there is growing opinion that the way forward is away from the prescriptive guidelines that dictate many lighting designs, to a situation where ambient light levels are reduced and better use is made of local task lighting. This move is fuelled to some extent by increasingly mobile work patterns within the workspace, as well as a reduction in paper-based tasks and more use of 'self-lit' screens of various sorts.

If ambient lighting levels were reduced in this way it would open the door further for the newer technologies, such as LEDs, that are currently constrained by their relatively low light outputs. However, visual comfort will continue to be a major concern for designers. >





> “LEDs need to be treated in the same way as MR16 spotlights; they are directional sources so you have to deal with the surface brightness for them to be useful,” Downey notes.

Another constraint is that many designers prefer to work with LEDs that have proved their performance and reliability over two to three years, rather than taking the risk of installing newer designs that claim higher light outputs.

Looking further ahead, many lighting designers consider OLEDs to be the light source of the future. They are light, thin (around 0.5mm) and flexible, and have the potential to be attached to surfaces to provide a large, diffuse light source. However, it will take a few years for them to come onto the market.

Bob Venning of Arup Lighting points out that there is another relatively low-output, distributed light source that is already being used to supplement general lighting – the increasingly common display screen.

“There are now many more illuminated advertising and information screens in buildings, using either LED or fluorescent light sources, and these should be taken into account when doing the lighting calculations and controls strategy,” he says.

“In a 3m wide corridor lined with illuminated billboards, for example, there would be very little requirement for any other lighting and as the building operator is getting income from them, this can be an attractive proposition. Information screens in offices can perform a similar role, though you have to watch the contrast,” he adds.

So, while there is considerable potential for artificial lighting to evolve into quite a different beast from the one we are currently familiar with, there is still a need to stick with some tried and tested principles.

Says Valentine: “We have evolved with light coming from above, that’s what our bodies are used to, and we can’t break away from that completely. Consequently, we need to view new technologies as extra tools that we can use while being clear that we still need good design.” ●

Integrated lighting can have startling effects, as shown, above and below, at Cabot Circus shopping centre in Bristol, UK

Lighting up the future

OLED lighting works by passing electricity through one or more extremely thin layers of organic semiconductor material. These layers are sandwiched between two electrodes – one charged positively and one negatively. The ‘sandwich’ is placed on a sheet of glass or other transparent material and protected by a cover glass.

When current is applied to the electrodes, they emit positive and negative particles that combine in the organic layer of the ‘sandwich’ to create a brief, high-energy state. As this layer returns to its original ‘non-excited’ state, the energy flows evenly through the organic film, causing it to emit light. Using different materials in the organic films makes it possible for the OLEDs to emit different coloured light.

Mike Simpson, technical and design director with Philips Lighting, says: “Small panels are already in production but a cube law applies to the cost, so if you double the surface area the price increases eight times.

“There are also production issues: basically, if you go from a 50mm x 50mm panel to a 600mm x 600mm panel you need a much bigger oven. And would you want to restrict the design to the conventional 600mm x 600mm approach anyway.”

In fact, it’s predicted that OLED panels may eventually get up to 1m sq, creating the opportunity for illuminated walls and even desk surfaces – but, if that happens, glare and contrast are going to be major challenges.

“OLEDs certainly have the potential to make traditional fittings disappear so that the surface becomes the light source,” says Tim Downey of Pinniger & Partners.

“However, as the light output of OLEDs increases to a point where they are useful light sources, the surface brightness will also start to create problems with contrast.

“So it’s likely that we’ll move to higher numbers of lower-brightness sources. For example, in a space that would currently use two or three conventional fittings you might have 36 OLED panels scattered around the space.”

■ **Façade design is often dictated by thermal-based decisions long before the lighting is considered.** ■
– Dominic Meyrick



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Legionella bacteria accumulate in water tanks

Keeping the legions at bay

Renewable systems such as solar thermal heating need careful handling to prevent infection from potentially deadly water-borne bacteria, writes **Ian Vallely**

The dangers posed by water contamination in building services have been underlined in recent decades by suspected cases of infection from Legionnaires' disease. Legionella pneumophila, the bacterium that causes the disease, tend to thrive in lukewarm water where there is stagnation, debris, scale and corrosion.

There are accepted practices for mitigating the effects of the bacteria in most cases by the use of thermal sterilisation. But there are concerns about how effective this process is for certain types of renewable energy source, such as solar thermal and

heat pump systems – particularly as these are growing in popularity. Yan Evans, technical director of Baxi Commercial Division, says: "Legionella, particularly in relation to solar thermal water heating, comes up on every project that we work on – it is a subject that provokes great debate.

"The main concern is that, during certain times of the year, the hot water cylinder may not get to a sufficient temperature to pasteurise and mitigate the risk of legionella bacteria development."

Temperature

The approved code of practice and guidance document, *Legionnaires' Disease – The Control Of Legionella Bacteria In Water Systems (L8)*, from the Health and Safety Executive, offers advice on the risk from exposure to legionella bacteria. L8 warns that conditions suitable for multiplication of the organisms include a water temperature of 20 to 45 deg C and a source of nutrients

such as sludge, scale, rust, algae and other organic matter. Dr Mervyn Smyth of Ulster University, UK, sees L8 as a comprehensive document in its detailing of the control of the legionella bacteria in hot water systems. “However,” he says, “we may need to be careful about any disinfection processes adopted for solar water heating systems in the UK as they may compromise the collector performance, thus rendering these systems less economically attractive.

“I guess there is a fine line between optimising solar water heating systems whilst still ensuring safe operation – perhaps there is a case for flexibility on legionella control in solar systems based on the perceived risk.”

L8 warns that conditions suitable for multiplication of the organisms include a water temperature of 20 to 45 deg C. To pasteurise – and therefore disinfect – the cylinder, the water temperature needs to be taken above 45 deg C regularly.

However, says Evans, this heating process can be problematic: “The issue with solar thermal and any other renewable source that you want to run at a low temperature to maximise its performance is the risk of legionella because of the cylinder’s water temperature.

“With an air-source heat pump, for example, to get the maximum coefficient of performance, the outlet temperature needs to be around 35 deg C. However, this means the water temperature within parts of the cylinder it is operating in conjunction with is liable to fall below 45 deg C and within the band at which legionella can breed.”

One part of the cylinder is particularly prone to this, warns Evans: “When you heat water in an indirect cylinder that has a coil inside it, the heated water rises up through the cylinder. But there is always a portion that is below the coil at the bottom of the cylinder which is at a lower temperature. This is also an area in which sediment resides. This combination creates a potential breeding ground for legionella.”

Length of time

Legionella bacteria are killed in a matter of seconds at 70 deg C, and more than 90 per cent of the bacteria are killed after two minutes at 60 deg C. That is why it is generally recommended that an anti-legionella cycle should raise the water temperature to at least 60 deg C for at least an hour to be certain of destroying the legionella bacteria.

However, according to Bob Towse, head of health and safety at the Heating and Ventilating Contractors Association, this can be problematic in solar water heating systems since, at certain times of the year, the solar collector array that feeds the indirect cylinder coil might not heat the water up to 60 deg C.

Towse says: “In the UK during the winter, for example, there is only sufficient irradiation for solar thermal systems to satisfy around 20 per cent of the hot-water demand. The remainder is usually provided by gas-fired boilers or water heaters.”



Solar thermal and other renewables have raised concern about bacteria collecting in the systems

It is, he says, these “primary” gas-fired boilers or water heaters that tend to be used in the anti-legionella cycle in winter months.

Frequency

Document L8 is not entirely clear about how frequently the anti-legionella cycle should be operated, although Evans suggests at least once a week for at least an hour to ensure disinfection.

The frequency of the cycle and the time of day at which pasteurisation occurs have a significant impact on the performance and operation of the solar thermal system.

Says Evans: “Optimum sizing of a solar system can maximise the solar fraction [the percentage contribution of the solar system to hot water production over the course of a year] to something between 35 and 40 per cent. To achieve this level of solar fraction, the solar thermal system should be designed for the daily hot water demand.

“However, if you were to pasteurise the water by taking the cylinder water temperature up to 60 deg C every day, then, effectively, you are not offering any load to the solar system and you are therefore completely negating its economic and environmental benefits.”

So the frequency of the anti-legionella cycle is a critical performance issue. To manage the risk of legionella while also maximising the performance of the solar system, Evans recommends raising the water temperature once a week to remove the threat from the bacteria.

Cycle timing

The timing of the anti-legionella cycle is also critical to the performance of the system. Evans says: “On the face of it, it may seem a good time to run the cycle at midnight in an office block, for example, when there is nobody in the building. However, there is no draw-off during the night, so the next day, when the sun >

“ Legionella, particularly in relation to solar thermal water heating, comes up on every project that we work on. ”

– Yan Evans

> comes up, you have no load to offer the solar system. "Taking the system's water temperature up to 60 deg C is inevitably going to negate some of the solar benefit, but timing is important."

Martyn Griffiths, technical consultant to the Hot Water Association, says one solution is the use of smart control systems that look at the temperature regime at one or two levels in the tank and use fuzzy logic electronics to ensure that the water is taken up to a sufficient temperature to mitigate the effects of legionella.

"This will ensure the right balance between economy and safety," he says.

However, he argues that it is unclear how big an issue legionella in hot water systems is: "The theoretical risk is there, particularly in existing systems, but nobody can give figures because legionella is often not diagnosed properly."

David Matthews, chief executive of the Solar Trade Association, insists there is no evidence that solar water heating increases the risk of legionella contamination compared with a conventional boiler, although he concedes that solar can run at a lower temperature.

"We are conducting due diligence research into this. With others, we hope to prove that solar does not increase the risk of legionella. I imagine we are a year away from the results of these tests," he says.

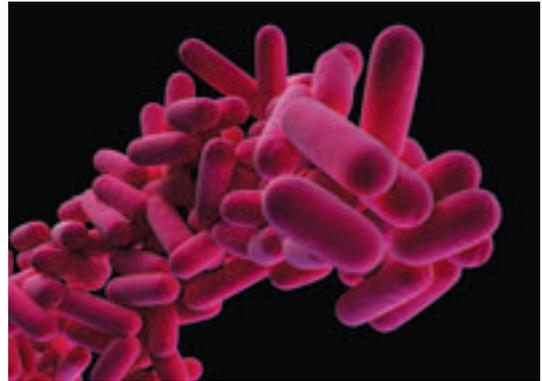
According to the report *Preparatory Study on the Eco-Design of Water Heaters*, published in September 2007 for the European Commission:

"Despite millions of installed solar thermal systems in use worldwide, no cases of legionella have been reported that could be traced back to the solar water heater." Nonetheless, Matthews stresses that it is sensible to take precautions to mitigate any risk. ●

Solar Heating Design and Installation Guide (Domestic Building Services Panel: 2007), order code HVSH, is available from the CIBSE bookshop at www.cibse.org

"We may need to be careful about any disinfection processes adopted for solar water heating systems."

– Mervyn Smyth



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Coils: designs to keep bacteria at bay

A typical solar water heating cylinder has two coils. The lower coil is fed by the solar collector array and the top coil by the primary heating appliance – usually a boiler. If the solar heating is unable to raise the temperature of the water in the cylinder to the temperature needed to feed the heating load, the boiler will kick in and take it to the required temperature.

However, the top coil can also be a source of energy for pasteurisation. Yan Evans, of Baxi, says: "You can fit a temperature sensor that says: 'I'm not up to temperature, I'm going to call the primary heating appliance [boiler] on to raise the water to 60 deg C in the top segment of the cylinder'."

"Different temperatures mean that the water has different densities, so you can have a stratification effect within the cylinder. This means the legionella bacteria could live in different parts of the cylinder. Therefore, this sort of system should be fitted with a destratification pump to circulate the hot water from the top of the cylinder to the bottom. So there is pasteurisation throughout the cylinder."

An alternative system design might involve solar hot water to preheat a system that incorporates direct-fired water heaters or a calorifier. In this case, the system may not have an immersion heater or second coil because the primary heating appliance is the direct-fired water heater. So there is no source of energy within the cylinder to use for pasteurisation purposes.

"However," explains Evans, "calorifiers and direct-fired hot water storage heaters typically store water at around 60 deg C. In this case, we would place a shunt pump between that primary heat source – the calorifier or water heater – and the pre-heat cylinder; and a building energy management system or solar control unit would cause water between the internal storage of the primary heating appliance and the pre-heat cylinder to be drawn off, ensuring pasteurisation. One of the big design issues here is that the shunt pump needs sufficient flow rates to take a certain quality of water up to 60 deg C within an hour and hold it there so you have to make sure the pump is sized correctly."



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Different kinds of solar thermal systems are available

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Energy reduction system launched

Holophane Lighting's new ecapsule is a simple to retrofit energy reduction system, designed for use with the company's Prispack and Prismalume hi-bay luminaires, which enables 0-10V dimming of 320W to 400W metal halide lamps down to 25 per cent of initial lumens. As such, the ecapsule has the potential to reduce the energy consumption of existing installations by up to 50 per cent, with typical paybacks within 12 months.

Installation is straightforward, simply requiring replacement of the existing magnetic capsule with the new electronic capsule – and retaining the existing glass reflector. This switch to electronic control gear reduces the lamp's lumen depreciation so it will often be possible to replace 400W lamps with 350W, resulting in a lower installed electrical load and even further energy savings.

● Visit www.holophane.com

Anti-bacteria technology

With the spread of bacteria at the top of the public health agenda, the UK supplier of lift components and control systems, LiftStore, is launching a range of call and control buttons, engineered with built-in antibacterial Microban technology, to help reduce the



spread of infection in public places.

The Microban antibacterial technology is built into the lift button interface at the point of manufacture, providing continuous protection against bacteria such as staphylococcus aureus, E. coli, and MRSA.

● Email ereidf@liftstore.com

Comfort control system

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

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

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



hotel bedrooms.

● Visit www.titanproducts.com

Delta hands out award

Building management system installer Building Environment Control (BEC) has won a Top Ten Sales Award from Delta Controls, the developer and manufacturer of high-quality native BACnet building automation systems.

BEC was one of two UK companies that won a place, beating off competition from Delta's 90 pan-European partners.

"It's great to be honoured with this award," says Nick Payne, BEC's managing director. "We offer customers a specifically tailored building



management solution to suit their needs."

● Email jbrough@deltacontrols.com or call 01923 432651



Snakes alive!

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

in-room humidifiers are installed in the snake rooms to maintain the required humidity for the health and comfort of the animals.

The Nepronic SKR steam humidifier can supply between 3.5 and 5.5kg of steam per hour. It is easy to install and use, and requires only a single-phase power supply.

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Solution to reduce energy

Dalkia CarbonCare provides organisations with a solution for reducing their energy use in preparation for the



forthcoming Carbon Reduction Commitment (CRC). The CRC will apply to all organisations where the total half-hourly metered electricity use for 2008 was 6,000 MWh or over.

It commences its first phase in April 2010 and all organisations must register for the CRC during 2010. Failure to do so, and failure to comply with the payment and reporting requirements of the scheme thereafter, will result in heavy penalties.

● Visit www.carboncare.co.uk

Memera range redesigned



The feature-packed MEM Memera Consumer Unit range has been redesigned and expanded. It now includes units developed specifically to

overcome problems faced by installers endeavouring to meet the requirements of the 17th Edition of the IEE Wiring Regulations (BS 7671), in particular the need for more wiring space when units are fitted with RCBO protection of individual outgoing circuits.

The range supersedes the Memera 2000 and 2000AD ranges. Devices will continue to be available to fit these units.

● Visit www.eaton.com/uk



“Unparalleled opportunity for sales”

According to Philip Sloper, managing director of Thermofrost Cryo, the outlawing of R22 refrigerant at the end of the year offers an unparalleled opportunity for sales of new LG air conditioning systems.

As the bells toll on the first day of 2010 virgin R22 refrigerant will be outlawed, leaving only reclaimed R22 available to maintain existing systems. Prices for the gas is already going up and can only increase as we head toward the final deadline as production is cut back and a supply shortage kicks in.

● Visit www.uk.lge.com

Radiant heating benefits heart institute

HCP, a division of SAS International, supplied 970 linear metres of radiant heating panels to the new £60m Bristol Heart Institute, which opened this month. Radiant heating is a new concept for the University Hospitals Bristol NHS Foundation Trust, but one that has been seen as offering real benefits in terms of infection control.

Radiant heating solutions heat objects rather than air, therefore energy is not wasted bringing



large volumes of air to a comfortable temperature before occupants feel the heating benefits. Internal air temperatures can

therefore be reduced whilst maintaining comfort levels. As a result less energy is used by the heating system, particularly compared with all-air-systems.

The systems also reduce air flow, and therefore dust movement in an occupied space, another critical consideration for a healthcare environment.

● Visit www.hcp-sasint.co.uk, email info@hcp-sasint.co.uk or call 01424 712195

Sustainable system for school

When Forest Way Special Educational Needs School was opened recently, 35 Elta fans were installed as part of the system to provide a comfortable, effective and well ventilated learning environment for the pupils.

Designed with sustainability in mind, the school incorporates several integrated, eco-friendly systems, added to which is the low energy ventilation system that utilises the Elta

fans. The system is powered by renewable energy and automatically controls the ambient environment in each classroom.

● Email jchambers@eltagroup.co.uk or call 01384 275766



Hitting the right note

Bristol's famous music venue the Colston Hall has a new foyer with improved facilities. It incorporates a wide selection of Oventrop valves for heating control and hydronic balancing of the various heating and hot water systems.

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● Visit uk.lge.com



500 products in new catalogue

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Annual exhibition and conferences focusing on energy procurement, management and efficiency. www.theenergyevent.co.uk
- **16-18 Sep 2009** Institution of Lighting Engineers Annual Conference 2009 De Vere Royal Bath Hotel, Bournemouth
Current and future challenges in lighting. www.ile.org.uk
- **23-24 Sep 2009** London HEVAR 2009 Victoria
A series of heat pump seminars. www.hevar.co.uk
- **30 Sep 2009** Kent Construction Expo 2009 with EcoVillage Chatham Maritime
The latest in sustainable construction. www.theecovillage.co.uk
- **15 Oct 2009** Engineers for the future: CIBSE's vision for developing building services engineers IMechE, London
The CIBSE/ASHRAE Graduate Award followed by Patrons 30th anniversary dinner. cbrown@cibse.org
- **26-27 Oct 2009** Sustainable Innovation 09 Surrey
Future opportunities and challenges of low carbon innovation, technologies, products and services. www.cfsd.org.uk
- **28 Oct 2009** Green Building Summit Auckland, New Zealand
How green building represents quality building. www.ukgbc.org
- **5 Nov 2009** SoPHE Annual Dinner London
The Society of Public Health Engineers' annual dinner.
Tel: 020 8772 3613
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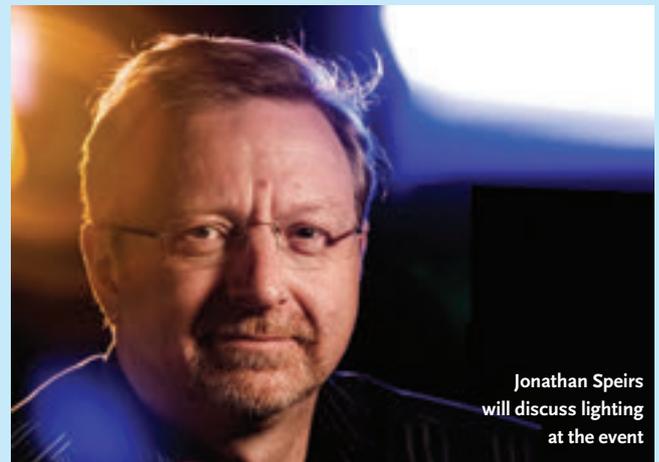
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- **3-5 Aug 2009** BREEAM International Assessor training course BRE Global, Watford
Three-day BREEAM Assessor training course. www.bre.co.uk/events
- **4 Aug 2009** The Future of Sustainable Housing – Part L1A 2010, Part F and SAP2009 Birmingham
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 - **2 Oct 2009** Design of Ductwork Systems (A404) London
 - **7 Oct 2009** How to Specify a Ground Energy System (A407) London
 - **14-16 Oct 2009** Mechanical

CIBSE Annual Lecture



Jonathan Speirs will discuss lighting at the event

The work of the Royal Institution of Great Britain, from the times of Faraday to the scientific fervour leading up to the formation of the IES (Illuminating Engineering Society) in 1909, will be discussed during CIBSE's Annual Lecture in September. Dr Bryson Gore and Dr Frank James will lecture during the event, being held at the venue in London's Albemarle Street, and it will include artefacts and demonstrations from the Royal Institution's collection and anecdotes about past pioneers. Jonathan Speirs, director of Speirs and Major Associates, will look at the creative aspects of lighting during a lecture on how lighting is a

combination of art and science.

To ensure the event is available to all 20,000 CIBSE members, it will be broadcast live as a webcast and afterwards as a podcast.

The free lecture is on 22 September at 6pm, for a 6.30pm start. The lecture will be followed by a drinks reception. Registration is essential and available via www.cibse.org and by clicking on 'events', or by emailing Veron Williams at sll@cibse.org. Live streaming will be broadcast on www.cibsewebcast.com

It will be presented by the Society of Light and Lighting, celebrating 100 years since the formation of the IES.

Services Explained (B126) Leeds

- **20 Oct 2009** Air Conditioning Basics 1: Comfort, Climate & Heat Gains (A409) London
- **21 Oct 2009** Air Conditioning Basics 2: The Air Conditioning Process (A411) London
- **FIRE SAFETY**
- **23 Sep 2009** Overview of Current Fire Legislation and Guidance (A402) London
- **23 Sep 2009** Examination of the new BS9999 on Fire Safety in Buildings (B125) Birmingham
- **6 Oct 2009** Managing Human Behaviour in Fires and Emergencies (A406) London
- **27-29 Oct 2009** Fire Safety Engineering Design – Principles & Practice three-day course (A416) London
- **27 Oct 2009** Control of Door Release Arrangements: New BS7273-4 half-day course (A414) London

PROJECT MANAGEMENT

- **22 Oct 2009** Successful Design Management (A413) London
- **PUBLIC HEALTH AND WATER**
- **29 Oct 2009** Current HSE Guidance on Control of Legionellosis (A418) London
- **ELECTRICAL SERVICES**
- **6-8 Oct 2009** Electrical Services Explained (A405) London
- **BUILDING REGULATIONS AND ENERGY EFFICIENCY**
- **15 Oct 2009** Renewables: Solar Thermal Energy (A408) London
- **20 Oct 2009** Introduction to Sustainability (A410) London
- **22 Oct 2009** Building Regulations Part L2: How to Demonstrate Compliance (A412) London
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Members of the Chartered Institution of Building Services Engineers (CIBSE) and other professional bodies are required to maintain their professional competence throughout their careers. Continuing professional development (CPD) means the systematic maintenance, improvement and broadening of your knowledge and skills, and is therefore a long-term commitment to enhancing your competence. CPD is a requirement of both CIBSE and the Register of the Engineering Council (UK).

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

programme is free and can be used by any reader. 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.

Simply study the module and complete the questionnaire on the final page, following the instructions for its submission. Modules will remain available online at www.cibsejournal.com/cpd while the information they contain remains current. You can also undertake the questionnaire online, and receive your results back by return email.



Applying the psychrometric relationships

The CPD article in the April edition of *CIBSE Journal* considered the majority of the properties of moist air that may be determined from a pair of coincident properties using the psychrometric chart. This article will continue to develop the formulae that may be used to calculate the properties and consider the comparative accuracy of using a chart compared with simple calculations

In the April article some subscripts were inconsistent in the explanation of the equation for moisture content, g ($\text{kg} \cdot \text{kg}^{-1}_{\text{da}}$)
The final relationship should be $g = 0.622 p_v / (p_{\text{at}} - p_v)$

Arguably the one process that determines whether a system is air conditioning, as opposed to simply ventilation, is the control of air moisture content. So a key requirement of psychrometric analysis is the ability to establish the vapour pressure that in turn can be used to calculate the air moisture content.

To establish the vapour pressure in air, p_v (kPa) the relationship based on Sprung's original experiments with in the late 19th century^[1] known as the **psychrometric equation** may be used

$p_v = p_s' \cdot p_{\text{at}} A (\theta - \theta')$
where, for a sling wet-bulb temperature,

$A = 6.66 \times 10^{-4} \text{K}^{-1}$ where $\theta' \geq 0 \text{ deg C}$

$A = 5.94 \times 10^{-4} \text{K}^{-1}$ where $\theta' < 0 \text{ deg C}$

Where p_s' is the saturation vapour pressure at the wet-bulb temperature that can be determined from tables or from the rather lengthy but suitably accurate empirical equation that is used to determine saturation vapour pressure, p_s (kPa)^[2]

$$\log p_s = 30.5905 - 8.2 \log (\theta + 273.16) + 2.4804 \times 10^{-3} (\theta + 273.16) - [3142.31 / (\theta + 273.16)]$$

and this is ideally suited to use in a spreadsheet or web tool (and is valid for temperatures above 0 deg C). Note that the saturation vapour pressure is not dependent upon the atmospheric pressure.

The final volume of the psychrometric story?

An element of the standard psychrometric chart that causes widespread uncertainty is the **specific volume** and more particularly its relationship with **density**. Many texts simply relate one as the inverse of the other - however there is a convention in the HVAC&R world that, for humid air, this is not the case.

The specific volume of moist air, v ($\text{m}^3 \cdot \text{kg}^{-1}_{\text{da}}$), is the volume of 1 kg **dry** air and its associated water vapour, so using the gas law $pV = mRT$,

$$v = V/m_a = R_a T/p_a = R_a T/(p_{\text{at}} - p_v)$$

$$= 287 \cdot T/(p_{\text{at}} - p_v)$$

where V is the volume occupied by the >

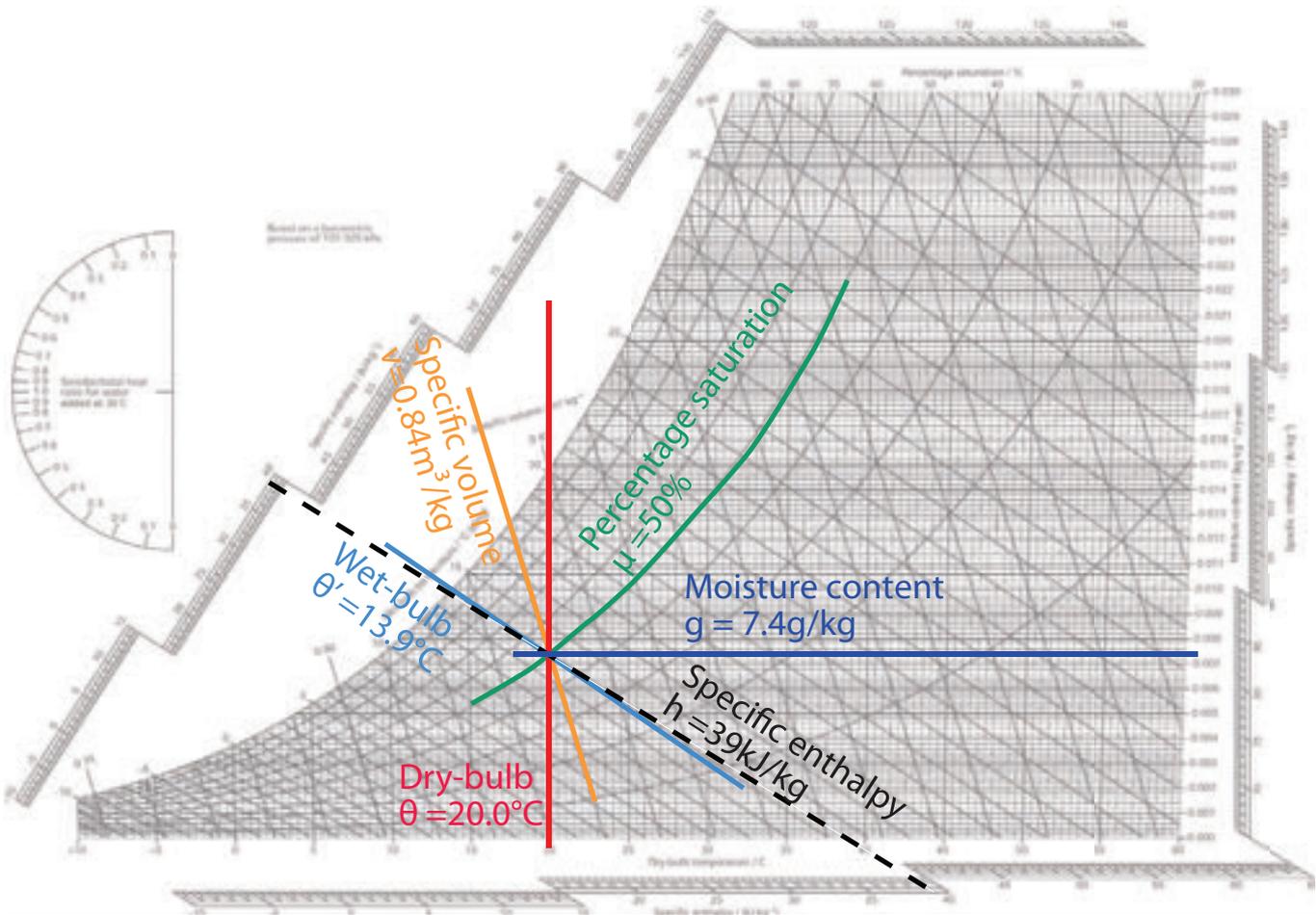


Figure 1 - Plotting psychrometric properties

> moist air, m_a is the mass of the dry air (that is combined with the mass of water vapour, m_v to give $[m_a + m_v]$ kg moist air), p_a is dry air partial pressure, p_v is water vapour partial pressure and p_{at} is atmospheric pressure.

Density, ρ ($\text{kg} \cdot \text{m}^{-3}$), is the mass of **moist** air that occupies a volume of 1 m^3 . To evaluate the mass of 1 m^3 of moist air the masses of the dry air and the water vapour are added together.

So as $m_a/V = p_a/R_a T$ and $m_v/V = p_v/R_v T$ the overall density of the single unit volume of moist air will be $(p_a/R_a T + p_v/R_v T)$.

Rearranging this and putting in values for R_a and R_v gives

$$\rho = (p_{at}/287 \cdot T)[1 - (0.378 \cdot p_v/p_{at})] \text{ kg} \cdot \text{m}^{-3}$$

(with all pressures in Pa)

As an example consider air at 20.0 deg C dry bulb and 13.9 deg C wet bulb at an atmospheric pressure of $101.325 \text{ kPa} = 101325 \text{ Pa}$ (ie standard atmospheric pressure).

To find the vapour pressure

$$p_v = p_s' - p_{at} A (\theta - \theta')$$

a value of p_s' is required and so using
 $\log p_s' = 30.5905 - 8.2 \log (13.9 + 273.16) + 2.4804 \times 10^{-3} (13.9 + 273.16) - [3142.31 / (13.9 + 273.16)]$ and so $p_s' = 1.591 \text{ kPa}$.

Hence $p_v = 1.591 - [101.325 \times 6.66 \times 10^{-4} \times (20 - 13.9)] = 1.179 \text{ kPa}$

And so to determine v and ρ

$$v = 287 \cdot T / (p_{at} - p_v) = 287 (273+20)/(101325 - 1179) = 0.839 \text{ m}^3 \cdot \text{kg}^{-1}$$

$$\rho = (p_{at}/287 \cdot T)[1 - (0.378 \cdot p_v/p_{at})] = [101325/(287 \times (273+20))][1 - (0.378 \times 1179/101325)] = 1.200 \text{ kg} \cdot \text{m}^{-3}$$

And to see what the practical difference is between the inverse of specific volume and density (at this particular condition) consider that the reciprocal of the specific volume calculated above is 1.192 and this compares with a density of 1.200 - a difference of less than 1 per cent. The difference will rise as moisture content increases and in conditions that are likely to prevail in heating, ventilation and air conditioning applications there is likely to be maximum of about 4 per cent difference at high temperatures and high moisture contents between the simple reciprocal value of specific volume and the true density.

Specific volume is particularly useful when undertaking calculations where there is a change in moisture content during a process (humidification and dehumidification), as the amount of dry air will remain constant while the amount of water vapour changes. However density is useful when measuring the flowrate of air through pressure drop

devices (such as orifice plates)^[3]

Considering the formula for air density above, moist air is less dense than dry air. This may seem counter intuitive however the ideal gas law states that a fixed volume of air at a certain pressure has a fixed number of molecules and each of those molecules has a particular mass. Looking back at the previous article^[4] dry air is made up principally of nitrogen (N_2) and oxygen (O_2) molecules with molar masses of 28 and 32 respectively. Water vapour has a molar mass of 18. Hence, when a given volume of air has water molecules displacing other heavier molecules its overall mass and hence density will be less.

Plotting the air point

Using the relationships described in this, and the previous, article and using nothing more than a sling psychrometer and a psychrometric chart or a hand held calculator (mobile phone, palmtop etc) the properties of air may readily be obtained.

As an example the air point of 20 deg C dry-bulb and 13.9 deg C wet-bulb (sling) is shown in Figure 1. The dry-bulb and wet-bulb temperatures may well have been obtained using a sling psychrometer in a room - the standard chart is drawn up for an

atmospheric pressure, p_{at} , of 101.325kPa. The other properties may then be read directly off the chart with the specific enthalpy obtained by aligning a straight edge through the plotted air point so that the same value is read on both the 'laddered' specific enthalpy scales (shown with the black dashed line in Figure 1).

These values may also be calculated. So using the values obtained from the earlier example for air at $\theta = 20.0^{\circ}\text{C}$ and $\theta' = 13.9^{\circ}\text{C}$.

v was calculated as $0.839 \text{ m}^3 \cdot \text{kg}^{-1}$ (compares with $0.84 \text{ m}^3 \cdot \text{kg}^{-1}$ from the chart)

p_v is 1.179kPa (previously calculated) and so

$$g = 0.622 p_v / (p_{at} - p_v) = 0.622 \times 1.179 / (101.325 - 1.179) = 0.0073 \text{ kg} \cdot \text{kg}^{-1} \text{ (0.0074 kg/kg from chart)}$$

To determine the percentage saturation the value of the saturated moisture content at the dry bulb temperature of 20 deg C is required. This can be obtained using the formula for g but using saturated vapour pressure (at the dry bulb temperature), p_s , in place of p_v to determine g_s . And p_s (at 20 deg C) can be obtained from

$$\log p_s = 30.5905 - 8.2 \log (20 + 273.16) + 2.4804 \times 10^{-3} (20 + 273.16) - [3142.31 / (20 + 273.16)]$$

and so $p_s = 2.342 \text{ kPa}$.

$$g_s = 0.622 p_s / (p_{at} - p_s) = 0.622 \times 2.342 / (101.325 - 2.342) = 0.0147 \text{ kg} \cdot \text{kg}^{-1}$$

$$\mu = g/g_s \times 100 = (0.0073/0.0147) \times 100 = 50 \text{ per cent (compares with 50 per cent on chart)}$$

Finally the Specific Enthalpy, h may be determined from

$$h = (1.005 \theta) + g (1.89 \theta + 2501) = (1.005 \times 20) + 0.0073 (1.89 \times 20 + 2501) = 39 \text{ kJ} \cdot \text{kg}^{-1} \text{ (the same value as on chart)}$$

Psychrometric accuracy

There is evidently reasonable correlation between reading information off the chart and the calculated values and this should provide some confidence (and will be similarly accurate across the whole chart). However it is important to keep in mind that the accuracy of the output data can be no better than the measurements that have been taken on-site or, perhaps, read from a screen of a building management system (BMS). The perception may be that since, for example, a BMS output screen shows several significant figures that the measurement is precise. This is unlikely to be the case. Legg^[5] reports that the practical uncertainties in the measurement of wet-bulb temperatures can lead to significant uncertainties.

The wet-bulb sensor (whether a true

Figure 2 - Assmann Psychrometer (source: www.mesdan.com)



wet-bulb or electronic sensor) is susceptible to contamination by both air borne contamination as well as finger grease. The wetted wick on a wet-bulb needs to stabilise at the wet bulb temperature before the temperature may be recorded. Tap water or other impure water can cause measurement errors when used to wet the wick, and if the wick (covering the bulb of a wet-bulb thermometer) is too long it will be affected by heat conducted from the thermometer.

Small variations in recorded temperature can translate into significant variations in percentage saturation. For example the gradations on the stem of a thermometer are likely to be 0.5 deg C – this alone will lead to an uncertainty of +/-2.5 per cent in the derived percentage saturation. To reduce possibilities of operator error devices such as the Assmann Psychrometer may be used to measure room air conditions (see Figure 2) – they have finer gradations on the temperature scales and provide a more consistent method of measurement with air being drawn over the thermometers by a small motor driven fan. This ensures that the air velocity is drawn across the wet bulb at the minimum required^[6] $1 \text{ m} \cdot \text{s}^{-1}$.

In terms of practical application of the psychrometric chart it has been observed that many seasoned users prefer to use a thicker pen rather than a sharp pencil when plotting

lines and identifying air points, as it builds in a clearly visible tolerance, or uncertainty, that reflects the real world challenge in obtaining an 'accurate' measurement.

A future article will apply the Psychrometric Chart to processes and systems.

© Tim Dwyer

Further Reading

Air Conditioning Engineering, Jones WP, Butterworth 2001, Chapter 2
ASHRAE Fundamentals 2009, Chapter 1
CIBSE Guide C1, CIBSE 2007

References

- [1] A Sprung, *Über die Bestimmung der Luftfeuchtigkeit mit Hilfe des Assmannschen Aspirations psychrometers*. 1888. A.Sprung
- [2] *CIBSE Guide C - Reference Data*. CIBSE. 2007.
- [3] R C Legg, *Air Conditioning Systems - Design, Commissioning and Maintenance*. Batsford, 1991.RC, Legg
- [4] T C Dwyer, *The properties of air*. CIBSE, 2009.T C Dwyer
- [5] R C Legg, *Private communication on Psychrometric Analysis*. 2009.R C,Legg
- [6] Thomas H Kuehn, J W R James L.Threlkeld. *Thermal Environmental Engineering* (3rd Edition).



Temperature - Celsius °C - normal symbol θ

Absolute Temperature - Kelvin K (normal symbol T) = $\theta^{\circ}\text{C} + 273.15$

Energy - joule J

Power - watt W (normal symbol P)

$$1 \text{ W} = 1 \text{ J} \cdot \text{s}^{-1} = 1 \text{ kg} \cdot \text{m}^2 \cdot \text{s}^{-3}$$

Pressure - pascals Pa (or bar) normal symbol p

$$1 \text{ Bar} = 1000 \text{ mbar} = 100000 \text{ Pa} = 100 \text{ kPa}$$

Other symbols (not units)

V = volume, m^3

m = mass, kg

R = gas constant, $\text{J} \cdot \text{kg}^{-1} \cdot \text{K}^{-1}$

g = moisture content $\text{kg} \cdot \text{kg}^{-1}_{da}$

ρ = density $\text{kg} \cdot \text{m}^{-3}$

v = specific volume $\text{m}^3 \cdot \text{kg}^{-1}$

h = enthalpy $\text{kJ} \cdot \text{kg}^{-1}$

μ = percentage saturation %

θ' = wet-bulb temperature $^{\circ}\text{C}$ (normally sling)

Subscripts

v = water vapour

s = saturated

a = dry air

da = dry air

at = atmospheric

Module 7

August 2009

1. The appropriate calculation to determine the specific volume of air is:

- A $273 \cdot T / (p_{at} - p_v)$
 B $287 \cdot T / (p_a - p_v)$
 C $287 \cdot T / (p_s - p_v)$
 D $273 \cdot T / (p_{at} - p_s)$
 E $287 \cdot T / (p_{at} - p_v)$

2. What is the value of standard atmospheric pressure?

- A 1 bar
 B 1.01325 mbar
 C 101.325 Pa
 D 100 kPa
 E 101.325 kPa

3. The practical difference (for HVAC applications) between moist air density and the inverse of specific volume is likely to be:

- A Less than 1%
 B More than 5%
 C No more than about 4%
 D Always less than 3%
 E No more than about 10%

4. Which of the following is **least** likely to be correct?

- A Water vapour molecules have a lower molecular mass than the principal constituents of dry air.
 B Saturation vapour pressure is not dependant on the atmospheric pressure.
 C Air with higher moisture content will have a higher density.
 D Nitrogen and Oxygen have molecular masses of approximately 28 and 32 respectively.
 E Moisture content may be calculated knowing the dry air partial pressure and the atmospheric pressure.

5. The accuracy a percentage saturation derived from readings taken from a typical sling psychrometer with 0.5°C gradations are likely to have a minimum uncertainty of at least:

- A +/- 0.4 percent saturation
 B +/- 1 percent saturation
 C +/- 1.5 percent saturation
 D +/- 2.5 percent saturation
 E +/- 10 percent saturation

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INVITATION FOR PRE-QUALIFICATION OF CONSULTANTS FOR HOTEL EXPANSION PLAN

Introduction

Transcorp Hilton Abuja is the leading 5-star hotel in the West African sub-region. It is situated in Abuja, the new and fast growing Capital City of the Federal Republic of Nigeria. Set in beautifully landscaped 20 hectare expanse of land, the 670 bedroom international hotel was opened in 1987 and has since been managed by Hilton Hotels Corporation under a management agreement. The hotel has 10 floors for guest accommodation including 2 floors dedicated to executive accommodation. There are 2 mezzanine floors and the ground floor for offices, shops, meeting rooms and restaurants. The hotel boasts 4 restaurants, 4 bars, 23 meeting rooms and a 1200-capacity congress hall. The recreational facilities include large hexagonal swimming pool, tennis courts, basketball and volleyball courts, squash courts and a fitness centre.

Pursuant to a growth and development strategy, the owners of the hotel, Transnational Corporation of Nigeria PLC, are desirous of utilizing the undeveloped part of the 20 hectare land to extend its facilities. Accordingly, the Transnational Corporation of Nigeria PLC now requests reputable engineering consulting firms to apply for pre-qualification that will lead to short-listing of eligible consulting firms for the hotel expansion project.

Scope of Work

The hotel expansion project is proposed to be a mixed development concept that includes shopping mall, offices, short lease apartments, entertainment and gaming arcade and a conference centre. The consultancy service is required for the design and construction of the mixed development-concept project.

The consulting firm must have proven and demonstrable expertise in multidisciplinary engineering projects consulting.

Pre-qualification Requirements

Prospective Consulting Firms should specify the following information as a basis for pre-qualification:

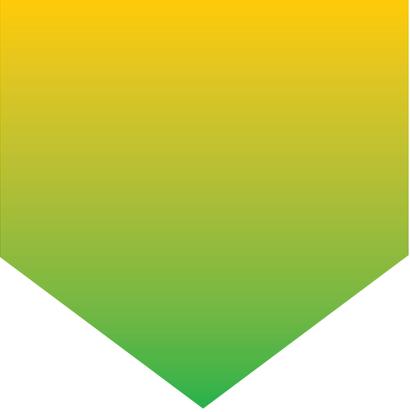
- Profile of the firm including ownership structure;
- Curriculum Vitae of individual consultants/staff who will be assigned to the required service(s), including qualifications and individual experience in handling assignments;
- Financial capability profile of the consulting firm;
- Summary of similar project/assignment executed or under execution in the hospitality/estate industry by the firm.

Interested firms must make their submissions in four printed (4) copies and 1 CD-ROM copy in a sealed envelope clearly marked "Pre-qualification of Consultants for Hotel Expansion Plan" on the left-hand corner.

Submissions should be addressed and delivered not later than 6.00pm Nigerian time on Monday 31st August 2009 at the address shown below:

The Group Managing Director
Transnational Corporation of Nigeria PLC
11, Alfred Rewane Road
PMB 40015, Falomo
Lagos, Nigeria
Email: nokoro@transcorpigeria.com

The logo for Transcorp, featuring the word "transcorp" in a lowercase, sans-serif font. The letter "o" is stylized with a red and orange gradient, resembling a sun or a flame.



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- Low Carbon Energy Assessor of the year – EPC (only open to CIBSE LCEAs)
- Low Carbon Energy Assessor of the year – DEC (only open to CIBSE LCEAs)
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For information relating to the online application process, please contact Jean Lindsay on 0123 686 1117.

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To apply online, please visit www.cityoflondon.gov.uk/jobs Alternatively, please contact the Corporate Recruitment Unit on 020 7332 3978 (24hr answerphone) quoting reference SUR090. A minicom service for the hearing impaired available on 020 7332 3732.

Closing date: 14 August 2009. Interviews are expected to take place w/c 7 September 2009.



The City of London Corporation is committed to Equal Opportunities and welcomes applications from all sections of the community.





Specialists in Building Services Recruitment

IS THE BUILDING SERVICES JOB MARKET PICKING UP?

If you are looking for a new role or have been struggling to find a new position call us for a free appraisal of your CV and update information about the M&E Market today. A well written and well presented CV can make all the difference. With an increasingly competitive candidate market you need to give yourself the best opportunity!

Mechanical Associate Director | London | £HIGH!

Our client, a blue-chip multi-disciplinary consultancy, is looking for a forward thinking Mechanical AD. You will have previous experience with high profile projects, the ability to lead teams and to win new business. An excellent career opportunity!

Principal Electrical Engineer | Surrey | to £65K+

A large multi-national company, our client is looking for an experienced Electrical Engineer for their renewable energy team. Ideally chartered you will have substantial experience in the design of electrical power distribution (33-132kV). Wind farm experience is preferable!

Marketing Manager – Building Services | Surrey | to £55K+

Our client is looking for a Marketing manager with experience of working within the M&E sector. You will be a results driven professional with a forward thinking and creative outlook. This is an opportunity to build a team and promote an International brand.

Electrical Design Engineer – RAIL | London | to £50K+

Our client is looking for an experienced engineer from a rail background, either with Network Rail, LUL or with a consultant. Based in London you will be working on a variety of projects.

For more information or a confidential discussion please contact Mark Butter

T: 02392 603030

E: mark.butter@blueprintrecruit.com www.blueprintrecruit.com

E3 & E5 Heritage Business Park, Heritage Way, Gosport, Hampshire PO12 4BG



Head of Mechanical Design Team/Senior Associate

Henderson Green is a positive and very progressive privately owned Building Services Engineering Consultancy which has seen continuous growth for 10 years, based in Southampton with a sister office in Jersey.

We have a wonderful team ethic, recognised for our commitment to staff by Building Magazine and listed in The Good Employer Guide, and offer a flexible working and benefits package.

The ideal candidate will:

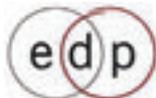
- be a 'hands on' mechanical design engineer
- be ambitious and self motivated
- have aspirations to become involved with business management
- be able to lead by example
- demonstrate a strong design record (preferably in the Healthcare sector)
- have a proven track record in winning work
- open new business opportunities for Henderson Green

We can offer:

- good salary and benefits package commensurate with the seniority of this role
- genuine opportunities for long term participation in the business ownership
- the chance to take an active role in the development of the best Engineering Services Consultancy in the South

If you think you would like to be part of our team here in Southampton, please send a current C.V. to Jane Primmer at janeprimmer@hgce.co.uk or call on 023 8022 5900.

For more information on what we do and examples of our work, please visit our website at www.hendersongreen.co.uk.



energy & sustainability project engineering compliance

ELECTRICAL ENGINEER/ SENIOR ELECTRICAL ENGINEER

This is an excellent opportunity to join EDP Consulting Engineers, a vibrant and forward thinking regional practice of Building Services Consulting Engineers specialising in sustainable design and energy efficient solutions.

Location:

Romsey, on the edge of the New Forest and within easy reach of Southampton, Winchester and the South Coast.

The successful candidate will offer:

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

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

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

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

Pentangle

Consulting Engineers Limited

Mechanical & Electrical Consulting Engineers

We are looking for Mechanical & Electrical engineering staff to expand existing teams of building services engineers in both our St Albans (Herts) & Brighton (East Sussex) offices.

Applicants are expected to have a high level of technical knowledge and a flair for sustainability, be conversant in AutoCAD and Microsoft applications and possess a solid appreciation of a wide range of the generally available engineering calculation and modelling packages.

Candidates will be selected on the basis of their experience in system design, specification, surveying, reporting and running projects, as well as their interpersonal and communications skills.

Please email your CV to consult@pcel.co.uk together with a covering letter detailing your experience and current level of knowledge and expertise.

Status: Full Time, Permanent

Salary: Dependant upon position and experience

Education Level: HND (as a minimum)

Professional Membership: ACIBSE (as a minimum)

www.pcel.co.uk

Low Carbon Consultants | Building Services Engineers | Architectural Technologists

SERVICES ENGINEER (ENERGY MANAGEMENT)

Manchester

Likely Reward Package between £40-50,000 pa



Norman Disney & Young is an international, leading edge building services engineering consultancy. At the forefront of sustainable management of existing buildings, we have an exciting opportunity for a highly motivated, innovative and experienced building services engineer who will join our team to both increase market share and provide tailored, cost-effective and best practice solutions for building maintenance, modernization and management.

Our ideal candidate will be accredited as an AC Inspector and/or Low Carbon Consultant and be able to demonstrate:

- Development of a client base and associated strong customer relationships that has delivered real value to the business
- Experience in dilapidation surveys, innovative energy efficient mechanical systems design and contractor installations
- Understanding of maintenance regimes and life cycle analysis of plant and equipment
- Knowledge of commissioning management
- Knowledge and application of current legislation and regulations in relation to Carbon Reduction Commitment

For a chance to be part of our team please send a current CV, salary details and covering letter detailing how your experience matches our requirements to Jackie Croft at j.croft@ndy.com or call on 020 7553 9494.

For more information about our company visit www.ndy.com

Closing date: August 10th 2009



Merseytravel...

...is the operating name of the Merseyside Integrated Transport Authority.

Temporary Building Services Officer

£26,188 - £31,558 pa Plus Car User Allowance

You will assist in the provision of a quality service to both internal and external stakeholders and have membership of a professional institution related to the Building Services field. Experience in dealing with major and complex capital and revenue projects in a multi disciplinary environment and understanding customer requirements is essential.

You will also have a comprehensive working knowledge of forms of contract, their procurement, administration and best practice procedures, together with sound financial awareness. Proven interpersonal and communication skills and the ability to work co-operatively in a team environment are prerequisites.

You must be computer literate and a knowledge of MS Office, MS Project and AutoCad skills would be a distinct advantage.

This post will be reviewed after 6 months with the possibility of an extension to 12 months.

Closing Date: Friday 21 August 2009.

Application forms and further details are available from The Personnel Section, Merseytravel, 24 Hatton Garden, Liverpool L3 2AN.

Or by visiting our website at www.merseytravel.gov.uk

This information can be provided in alternative formats on request.

Merseytravel is committed to equal opportunities and welcomes applications from all sections of the community. Only factors directly related to the job are taken into account.



BUILDING SERVICES CONSULTING ENGINEERS



**Building Services M & E Design Engineers
Permanent**

**Based in our offices in Bracknell (Berkshire)
& Camborne (Cornwall)**

- Proven design experience on complex mechanical, electrical and public health services
- Appropriate qualifications and ability to manage projects from inception.
- To be able to work without supervision and to be self motivated
- CAD experience (beneficial but not essential)
- A clean driving licence for site visits.

Application Form:

Alison Jones

(01209) 612030

alison@gpjconsulting.co.uk

Estates Office

Compliance Manager

Grade 8: £38,757 - £43,622 pa Ref: CSE00035

Responsible for the provision of professional advice and guidance on the compliance of all electrical and mechanical maintenance projects across the University Estate. To identify areas where the University needs to be fully compliant with legislation on electrical and mechanical maintenance contracts and make recommendations to ensure that compliance with legislation is achieved.

For further information and to apply on-line, please visit our website:

<http://www2.le.ac.uk/offices/personnel>

Closing date: **27 August 2009.**

**THE UNIVERSITY
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**University of
Leicester**

Promoting equality of opportunity throughout the University

CIBSE's CV database service attracts big-name employers

Companies surfing the site can find a candidate and approach them directly



Engineers are being urged to take advantage of a CIBSE CV database service that has already attracted the attention of some high-calibre employers.

A number of big-name firms and organisations have already used the service at the *CIBSE Journal* jobs' website including MI5, HM Revenue & Customs and Harvey Nash.

Candidates looking for a job can upload their CV for companies

"Our new jobsite is just one of the ways we are helping members and firms."

and organisations to view. Any employers surfing the site looking for new recruits can then approach the candidate directly if they are interested in scheduling an interview.

The service is free to all CIBSE members, but particularly those who find themselves out of work during the current turbulent economic conditions.

Other companies that have used the CV database service already

include BSKyB, Moat, Jacobs, and National Portrait Gallery.

Stephen Matthews, CIBSE's chief executive, says: "CIBSE is acutely aware that in the current economic climate, we have a large number of members who are actively seeking new employment.

"Our *CIBSE Journal* jobsite is just one of the ways that we are helping our members and businesses to develop by putting them in touch with one another. The new jobsite is proving to be very popular with jobseekers and employers alike and we hope more of each will continue to take advantage of the service."

Other services available by registering as a jobseeker on the *CIBSE Journal* jobsite include: straightforward job searching; the option to apply for jobs online; the option to receive relevant jobs direct to their email inbox when they are first posted; and a record of all the jobs they have applied for will be kept in their account.

To find out more visit: jobs.cibsejournal.com – no www required – and click 'My Jobs' in the left-hand menu.

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

Movers & Shakers



Professor Malcolm Horner has been appointed as new centre director for the Scottish

Construction Centre (SCC). Horner is still employed by the University of Dundee (UoD) as an emeritus professor, but the UoD has agreed to make his service available to the SCC, which promotes innovation, best practice, research, and communication across the Scottish construction sector.



Mitsubishi Heavy Industries Europe (MHIE) has appointed **Des Franklin** and **Louis Sullivan** to

co-ordinate the firm's campaign to increase its air conditioning presence in Europe. The pair will strategically develop product sales and international key account business.



ERCO Lighting has recruited **Jonathan Morrish** as sector manager of its retail lighting

division. Morrish has more than 20 years' experience in the lighting industry in both manufacturing and consultancy, and has worked as a lighting designer and in sales and marketing roles.



Scott Nursten has been announced as the new systems integration director for Bailey

Teswaine, the cabling, ICT and managed network services division of NG Bailey. Nursten accepted the position after working closely with Bailey Teswaine from December 2007 when his own business, secure systems integrator s2s, was acquired by the organisation.



International engineering consultancy hurleypalmerflatt has placed **James O'Byrne** in post

as its new regional director for the firm's West End of London office. O'Byrne joined the firm from Hilson Moran Partnership where he worked since 1988, becoming a director in 2003 with particular responsibility for client development. He will help to drive the organisation forward.

Construction firm Laing O'Rourke has confirmed that **Douglas Oakervee, OBE**, is to join the group's senior team. Oakervee is a former chairman of Crossrail, and in his new role he will lead Laing O'Rourke's business development activities in Hong Kong and the surrounding regions.

Independent engineering and environmental consultant **Gifford** has expanded its partnership with the appointment of eight new working partners from within the business. This brings the number of partners to 51. The latest group appointed includes specialists from around the country in transport masterplanning, building structures and sciences, and mechanical and electrical engineering.



BDP has announced **David Ritter** as its new sustainability director for its

Manchester studio. Ritter joined the interdisciplinary consultancy six years ago and has played a leading role in its development.



Consulting engineer Hoare Lea has announced that **Justin Spencer** and **Peter Wells** have accepted invitations to join the partnership. Spencer joined Hoare Lea's Bristol office in 1993 as a graduate engineer. He now has more than 15 years' experience in environmental engineering building design. Wells joined Hoare Lea's Cardiff office in 1988 as a senior engineer. He has 20 years' experience in electrical building services design.

SWITCH|OFF
TURN|OFF
MONEY|OFF
LIFT|OFF



Another 100 hours

100 Hours of Carbon Clean Up campaign is back

Sign up to:

- significantly reduce your company's energy use and lower your bills
- cut the cost of EPCs and DEC's – the commercial building energy certificates required by law
- lower carbon emissions from your building

Last year, around 600 companies signed up to save carbon in their building. They received our action pack, free events and special themed days to help them to involve their staff and save more carbon.

Sign up is free and there are gains for every organisation, no matter the size or budget.

The campaign includes measures that you and your staff can implement and low cost managerial measures that your company can adopt to give your carbon savings more impact.

Sign up now at www.100hours.co.uk
and help us to reduce carbon
emissions from UK buildings

CARBON/OFF
100 HOURS OF CARBON CLEAN UP

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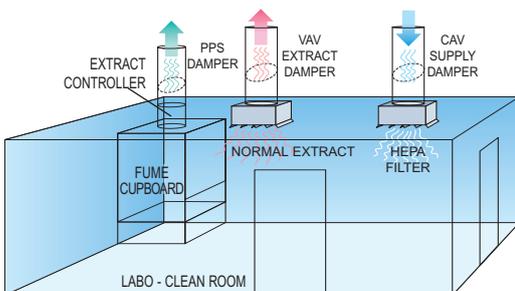


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Panel Mount Pressure or Velocity Transducers with remote alarms, analogue and digital interfaces. Traceable calibration certificates supplied as standard.

AIR MANAGEMENT SYSTEM

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



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PPS Damper

