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JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

March 2011

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Contents

March 2011

NEWS

- 8 News**
Feed-in tariffs review 'creating uncertainty'; Green Deal plans to be extended to new homes; court tells Gove to review scrapped BSF projects; high-rise ambitions.
- 14 CIBSE News**
Brainstorming on carbon reduction; recognition for Hong Kong members.
- 16 News analysis**
An update on the 'final piece of the jigsaw' that is still missing from the zero carbon homes definition.
- 18 Rewarding building excellence**
Honouring the best performers in the built environment in CIBSE's first Building Performance Awards.
- 20 CIBSE conference**
Why persuading clients of the benefits of refurbishing their buildings is not enough.



OPINION

- 23 Simpler solutions**
Housebuilding boss Mark Clare explains why industry cannot just rely on technology to hit ambitious low carbon targets.
- 24 Letters**
Be open about the pros and cons of green technologies; back-check design statistics.
- 25 Old is the new new**
Why sustainability and liveability have to go together when building new homes.
- 26 Regulations**
New requirements for flues.

42



SCHOOLS SPECIAL

- 42 Class act**
Why one Building Schools for the Future project chose natural ventilation over a mechanical option.
- 48 Lessons in design**
Examining the prospects for school regeneration in England following the cancellation of the Building Schools for the Future programme.
- 52 Background noise**
The importance of getting the acoustics right in the classroom.

Features

- 28 Green shoots**
The lessons learned by one Cambridgeshire family who built their own eco-home from scratch. 
- 32 Quality conditions**
A look at the issues surrounding heat recovery in air conditioned spaces.
- 39 Energy counters**
How effective are current inspection procedures in Europe?

'Many of the live BSF projects we are working on are subject to cuts of 20% to 40%'
Page 48

LEARNING

- 59 CPD**
Issues surrounding the design, selection and system integration of low carbon heating and hot water systems in homes.

CLASSIFIED

- 63 Products**
The latest products and services.
- 66 Directory**
Your guide to building services suppliers.

PEOPLE AND JOBS

- 67 Appointments**
Find your next job here and online at jobs.cibsejournal.com
- 71 Looking ahead**
CIBSE's Republic of Ireland region conference and the latest training and events in the sector.

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

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

The opinions expressed in editorial material do not necessarily
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©CIBSE Services Ltd. ISSN 1759-846X

Subscription Enquiries

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CIBSE Journal, subscribe now! Costs are £80 (UK) and £100
(international). For subscription enquiries, and any change of
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020 8772 3697. Individual copies are also available at a cost of
£7 per copy plus postage.

Cover photo courtesy of Atkins



ABC audited circulation: 19,139
January to December 2010



Policymaking on the hoof is prone to slip

Welcome to the new-look *CIBSE Journal*, which has a fresh design throughout. We hope you find it more accessible and inviting. It's possible some readers will love it and some will not – the inconclusiveness of which fits well with a key theme in this month's news pages. When it comes to major policy developments, we're finding that the industry is now faced with a raft of shiny new green initiatives that are at critical stages of their development but are mired in uncertainty. It's still very unclear how the coalition government's Green Deal will develop in relation to existing properties, but this hasn't deterred ministers from suggesting that the Deal could also apply to new properties.

How would this work, what are its pros and cons, what are the resourcing implications? We simply don't know – and may never do so. The Housing Minister, Grant Shapps, simply announced this new policy aspiration at a recent conference ...

“Ministers' twisting over major green policy initiatives has left many in the industry spitting with fury over the uncertainty

and then asked the audience to come up with the details to make it work. This sounds like major policymaking on the hoof – which can be worse than no policymaking at all.

This casualness – and accompanying arrogance – on the part of coalition ministers is what has led to the fresh turmoil surrounding feed-in tariffs, which are now up for review because of concerns that the funds will be sucked up by large-scale solar farms rather than going to home owners (but wasn't this danger apparent some time ago from Germany's experience of this type of initiative?). In addition, the government now has to review a number of cancelled Building Schools for the Future projects after losing a case in the High Court; and it continues to twist and turn over the implementation of the Carbon Reduction Commitment scheme – leaving many in the industry spitting with fury over the uncertainty created. We need good ideas and innovative practices, but coalition ministers must learn to think things through before embarking on a wave of knee-jerk initiatives that may cause more harm than good.

Bob Cervi, Editor
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In Brief

DESIGN MERGER CONFIRMED

CABE and the Design Council have confirmed they will merge from 1 April, with CABE's design review service, which provides advice to councils and developers through reviews of major proposed projects, continuing. The new body will advise the government on design and the built environment. www.cabe.org.uk

CALLS FOR NEW MINISTER

Responsibility for sustainability policy should be taken away from the Department for Environment, Food and Rural Affairs and given to a new dedicated minister who will oversee the work of government departments, according to the Environmental Audit Committee (EAC). Such a minister would be able to hold departments to account over the delivery of green targets, says the EAC.

NEW MUMBAI OFFICE

Multi-disciplinary consultancy Buro Happold has opened an office in Mumbai – its second in India. The move follows a major contract win for the firm to provide structural and MEP design services for a new high-end residential development in Bangalore. The development will be 1.2 million sq ft in size and include five high-rise towers.

TELL US ABOUT YOUR JOB

This year's *CIBSE Journal*/Hays Jobs Survey is live, and we need your views. If you're an employee, please fill in the questionnaire at www.surveymk.com/s/YCDVIX9. The questionnaire for employers is at: www.surveymk.com/s/QKP69BM

Feed-in tariffs review 'creating uncertainty'

● Large-scale PV applications for FITs prompts review ahead of schedule

The Renewable Energy Association (REA) has expressed fears that a new review of the feed-in tariffs (FITs) scheme could create uncertainty for a range of projects.

The Department for Energy and Climate Change (DECC) originally announced that a review of FITs would take place in 2012.

But that has now been brought forward following concerns within DECC that large-scale solar farms – those over 50kW – could soak up cash intended to help homes, communities and small businesses generate their own electricity.

The REA says that a wide range of schemes, including those planned for schools, hospitals and community buildings, will be caught up in this 'fast-track' review.

Gaynor Hartnell, REA chief executive, said: 'Developers of PV [photovoltaic] installations [larger than] 50kW will be left hanging in the air.'

She added: 'Bands up to 4kW can be more confident tariff levels will remain unchanged until April next year – but developers of schemes from 10kW to 50kW in particular will be wondering how the announcement applies to them.'

'DECC is fast-tracking far more than the standalone field arrays. In our view, this has escalated the uncertainty.'



The government is concerned that large-scale PV could be a drain on the FITs funding pot

'DECC is fast-tracking far more than the standalone field arrays. This has escalated the uncertainty'

The FITs review will look at a number of areas within the scheme, including the tariff levels, eligible technologies, arrangements for exports, and accreditation and certification issues.

DECC, which intends to save £40m, or 10%, of the FITs budget in 2014-15, says the review should be completed by the end of 2011.

Tariff levels are expected to remain unchanged until April 2012 – unless the review reveals a need for greater urgency, particularly with regard to large-scale PV technology.

CIBSE will be responding to the FITs review – comments for inclusion in the response should be sent to cbreslin@cibse.org

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

Anger over further delay for CRC scheme

Plans for a 'green tax' on business are likely to be changed before they come into force, it has emerged.

The Carbon Reduction Commitment Energy Efficiency Scheme (CRC) was due to come into effect on 1 April, with the intention of rewarding companies that reduce their carbon emissions while penalising those that do not.

But the Chancellor, George Osborne, revealed last October

that the money generated from the scheme would instead 'be used to support the public finances'.

Now the government has confirmed it is looking at changing elements of the initiative, with one option being to scrap it altogether. However, that would cost an estimated £1bn a year to the Treasury by 2014/15.

Stuart Bowman, of engineering consultancy hurleypalmerflatt,

said: 'These reports [of a CRC review] will be a blow for those companies that have already invested significant resource in preparing for the scheme.'

He added that businesses now need clarity urgently.

CIBSE is preparing a response to the consultation, which closes on 11 March. Contributions to the response should be sent to cbreslin@cibse.org

OLYMPICS SITE ON SCHEDULE

A report from spending watchdog the National Audit Office says all the building projects on the Olympics site in east London will open on time. However, the report points out that time left for handover of the Aquatics Centre – shown in this aerial shot taken last month as temporary seating is added – is ‘becoming tight’. Almost four fifths of the construction work has been completed, it adds.



Green Deal plans to be extended to new homes, says Shapps

● Minister calls on industry to help devise incentives scheme for new homes

People looking to buy a new home will be given incentives to move into ‘zero carbon’ properties under new government proposals.

Ministers are planning to expand the Green Deal scheme contained in the Energy Bill currently going through parliament to cover new homes as well as existing ones.

Under the existing plans, Green Deal ‘providers’ will pay for home improvements, such as insulation, up-front – and recoup the funds from savings made on energy bills. Housing Minister Grant Shapps announced last month that the same principle could be applied to new homes.

Addressing the Zero Carbon Hub annual conference, he said: ‘Such a scheme [for new homes] would allow developers to cover some of the costs of building better homes, to meet modern energy efficiency standards.

‘At the same time we can protect the home buyer by ensuring that their repayments are no more than the savings made on their energy bills. It seems to me that this would be a win-win.’

However, Shapps was unable to give any more details of how the Green Deal for new homes would

MINISTER SEEKS STREAMLINED CODE

Housing Minister Grant Shapps confirmed that he wanted to see the Code for Sustainable Homes (CSH) – which grades new dwellings according to their low or zero carbon attributes – combined with the Building Regulations.

He said: ‘I’d like to simplify what happens when we build a home. I’ve invited the industry to give their views on what can be done.

‘And it’s in that context that I think it would be very helpful to take the sustainability code [CSH] and merge it effectively with building standards.’

He added: ‘This would have all sorts of ramifications, and for the time being the two [code and regs] will run in parallel, but in time I want to see them merged.’



work. Instead, he invited the construction industry to offer feedback and make proposals on the details.

‘I want to know what you think as an industry,’ he told the conference. ‘I want to work with you to look at how we can make this idea a practical reality. It is the next big challenge that I would like to set out. I invite you to come up with a system that is fair and works for both the developers and the home buyer or occupier.’

Shapps also announced that a final definition of ‘zero carbon’ homes should be available later this year. The Hub, which advises the government, has been working on a definition and has issued proposals for levels of ‘on-site’ emissions. But more time is needed to define allowable solutions, which include those that are off site, Shapps indicated. In its *Final Report*, issued last month, the Hub proposed that on-site compliance levels could range from 60% to 44% – implying a higher proportion from off-site renewables.

See News Analysis, page 16

‘I want to work with you to look at how we can make this idea a practical reality’

For more information visit: www.zerocarbonhub.org

Dual attack on Localism Bill

House building companies have joined politicians in slamming the government's Localism Bill, predicting that it will stall any recovery in the construction industry.

The all-party Commons Energy and Climate Change Select Committee argues that the bill, which would give local communities more power to permit – or block – building plans in their areas, could conflict with other changes in planning law already in the pipeline. It says the government should adopt a more co-ordinated approach to planning.

The report from the committee says: 'The government has set out important, but potentially disruptive or even conflicting, reforms of the planning system in relative isolation from one another. The Localism Bill should not be enacted until the national planning framework and the national infrastructure plan are active.'

Giving evidence to the committee, representatives of house-building companies were scathing about the potential effects of the bill.

Peter Redfern, chief executive of Taylor Wimpey, said: 'My personal estimate is that, under the previous system, it would have taken six years to return to what was the status quo in 2007. With this bill it will take longer, more like seven to eight years, principally because of the transition period while the new system beds down.'



A computer image of Shotton Hall Academy in Peterlee, Durham, which was completed under the BSF scheme. See our Schools Special starting on page 42

Court tells Gove to review scrapped BSF projects

● Six local authorities take minister to the High Court over the scrapping of BSF

Education Secretary Michael Gove has been told by the High Court to reconsider some decisions taken when the main schools' rebuilding programme was cancelled.

Gove's scrapping of the £55bn Building Schools for the Future (BSF) programme last summer was challenged in the courts by six local authorities, whose rebuilding programmes were among a total of 735 axed projects.

In the High Court, Mr Justice Holman ruled that the Secretary of State's decision to stop the funding in all six areas was unlawful because of a lack of consultation and a failure to consider equality issues properly.

The challenges related to the development of 58 schools which would have cost the government £1bn if they had been allowed to go ahead. The councils – Waltham Forest, Luton Borough Council, Nottingham City Council, Sandwell, Kent County Council and

Newham – were seeking a judicial review on the grounds that the projects had been stopped in an arbitrary and legally flawed way.

The judge said: 'However pressing the economic problems, there was no overriding public interest which precluded consultation or justifies the lack of any consultation.'

In a written response to the High Court ruling, Gove emphasised that the judge had 'not ordered a reinstatement of funding for any BSF project. Nor has he ordered me to pay compensation to any of the claimants'.

He said the judge had made it clear that it was 'too late' for any other local authority to also seek a judicial review on the scrapping of BSF.

He added: 'My department will shortly make contact with the claimant local authorities to set out a process through which they can make their representations to me.'

See our Schools Special, starting on page 42

'There was no overriding public interest which justifies the lack of consultation'

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

Movers & Shakers | The latest appointments in the sector



Multi-disciplinary consultancy Arup has appointed **Ngaire Woods** as a non-executive director. Woods has served as an advisor to the IMF board, and the Commonwealth Heads of Government.



Mark Walley has been appointed as UK executive director of the Royal Institution of Chartered Surveyors (RICS). This will enhance RICS' ability to advance and enforce standards in the built environment.



Jason Malik is NG Bailey's new business development manager for its off-site manufacturing division in West Yorkshire. He will be responsible for developing the building services firm's external customer base.



Professor **Roger Plank** (BSc PhD CEng MICE FStructE) is the new president of the Institution of Structural Engineers. He has held several positions as a visiting professor and chaired a number of committees.



The Institution of Lighting Professionals (ILP) has appointed **Mark Ridler** as vice president, with special responsibility for architectural lighting. ILP aims to develop a wide range of services for its members.



Andy Green, a director of consultant Faithful + Gould, is the new vice chairman of the SFG20 Technical Standards Committee, responsible for developing HVCA's *Standard Maintenance Specification for Building Services*.



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commercial

High-rise ambitions

US policymakers are pushing a policy for 'better buildings'.

Ewen Rose reports from the ASHRAE winter meeting

Upheaval overseas coincided with storms across the US as delegates gathered in balmy Las Vegas for the winter meeting of the American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE). As news of the turmoil in Egypt reached the conference's 3,000 delegates, which threatened to push oil prices ever-higher, several US states struggled to keep the lights on as major snowstorms battered three quarters of the country.

The meeting also coincided with President Obama's launch of the Better Buildings Initiative, which aims to make commercial buildings 20% more energy efficient over the next decade. The White House estimates that the plan could reduce energy bills by about \$40bn, with private sector investors encouraged to finance the necessary upgrades in return for a series of incentives.

ASHRAE has provided detailed recommendations to the US Congress ahead of the new programme, and society president Lynn Bellenger told the Las Vegas meeting: 'Through innovative design and retrofits, buildings are one of the most cost-effective means of solving the nation's fiscal and energy challenges.'

Among the society's suggestions to Congress are: measures to report and display annual building energy performance – similar to Display Energy Certificates in Europe; the use of demand-side management; improved funding and direction for data collection and analysis of energy use; implementation of smart grid and micro-grid systems; improved commissioning and re-commissioning regimes; and the adoption of technologies that capture and use waste heat.

All US states will be urged to adopt commercial building energy codes, with ASHRAE's energy conservation Standard 90.1 as a minimum. Much of the work undertaken through



Obama's new initiative will be guided by 90.1, which provides engineers with a methodology for reducing existing building energy consumption by up to 30%. Major revisions to the standard, which was first produced 35 years ago as a response to the oil crisis of that era, were announced at the meeting. The scope of that original standard has been expanded to cover more energy loads including, crucially, plug loads or unregulated electrical consumption, such as cooking appliances, fans, and IT equipment, which account for as much as one third of all energy in US buildings.

'If you are aiming to reduce building energy use by 50%, which we must, that means you have to tackle plug loads, which is a huge technical challenge,' said former ASHRAE president Kent Peterson.

The new 90.1 standard offers energy efficiency comparisons with and without plug loads. It also incorporates more building types, but this means that projected savings cover an extremely wide band. Mick Schwedler, immediate past chair of the 90.1 committee, pointed out that exact estimates of savings using the standard were subject to major caveats.

'When we are asked "what are the savings?," it is almost impossible to give

a simple answer,' he told the meeting. 'Savings estimates are based on many assumptions [including building type, usage patterns and climate zones] – and will never match a specific building.'

On a nationally aggregated level, energy savings possible using Standard 90.1 ranged from 8.8% to 38.3%, compared with the 2004 version. Energy cost savings ranged from 7.9% to 33.6%, based on computer modelling of 16 prototype buildings in 17 different climate zones. These include energy use and costs from plug loads. Without plug loads, site energy savings are 32.6% and energy cost savings 30.1%. Including plug loads, the site energy savings are estimated at 25.5%, and energy cost savings 24%.

However, in a worst-case scenario – such as a high-rise apartment in Miami, Florida – site energy savings were just 3%; while in a best case – a secondary school in Minnesota – the standard achieved 51% site energy savings.

Among the new areas covered by the revised standard were process loads, changes to the building envelope including continuous air barrier and cool roof requirements; a lowering of interior lighting densities with the addition of occupant sensing controls; and mandatory daylighting requirements.

Most mechanical equipment

'When we are asked "what are the savings?," it is almost impossible to give a simple answer'

UK faces 'stark' energy choice

Britain has a 'stark choice' to make over its energy future – do we want to keep the lights on or be nuclear-free?

This was the message conveyed to the CIBSE Patrons group by the institution's technical director, Hywel Davies.

By 2018, only about 10% of Britain's current electricity capacity would be delivered by its own nuclear power plants, leaving a huge gap that may be very hard to fill by renewables alone, Davies said during a group meeting. 'The government is talking about decarbonising the grid, but that may not be possible without a sizeable increase in our future nuclear capacity,' he said.

'Clean coal technology is not proven. Offshore wind has real potential, but there is a long way to go in creating the necessary infrastructure, and on-shore wind keeps running into planning objections. We have a serious problem

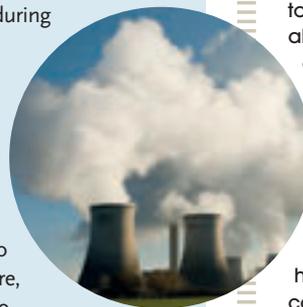
when our planning system conflicts with government policies.'

Energy imports will have to rise and liquefied natural gas (LNG) is seen as a key energy source, but Davies described LNG's carbon emissions factor as 'scary'. France will be asked to

provide more nuclear-generated electricity to the UK, but its own programme for rebuilding nuclear generators is in difficulty, he added.

The uncertainty surrounding our energy policy could have a huge impact on the work of the building services sector, according to Davies: 'Our approach to individual building design and the equipment chosen must be dictated by the wider energy picture – we need clarity in order to be able to make the big decisions.'

For more information visit:
www.cibse.org/patrons



'We need clarity to be able to make the big decisions'

High electricity consumption in US buildings, such as these in Miami, Florida, is a cause for concern



efficiencies are higher in the 2010 standard, energy recovery is required in more applications, economisers are required in more climates, and more energy saving controls are required. ASHRAE's standards committee sought to reassure conference delegates that economic considerations were taken into account for each new provision.

Meanwhile, it also emerged that the US Army has adopted a policy for all its facilities worldwide to become 'zero energy, waste and water' by 2020. All military construction and renovation projects will use the society's Standard 189.1 for the design of green buildings as a baseline. Among the areas addressed by the army will be siting and orientation of buildings and other structures, energy efficiency, water consumption and energy monitoring. A spokesman confirmed that this would include installations in active 'war zones' such as Afghanistan.

'The great advantage of having the army championing our sustainability standard is that they are used to taking orders,' said Peterson, who chaired the committee that created the standard. 'Once a policy is adopted it will be rolled out through all of the facilities across the world. We can be certain about that.'

For more information visit:
www.ashrae.org

Embodied carbon 'ignored' by firms

The concept of embodied carbon is still being ignored by the majority of players in the construction industry, according to analysts.

A survey of global senior figures by Faithful+Gould found that 80% believe embodied carbon – that is, carbon created by the construction process – is dismissed because reducing it is either unimportant or too expensive.

In all, 166 leaders were surveyed, with 53% saying embodied carbon had no value. By way of contrast, reducing operational energy was a priority because cost-savings were obvious and enhanced a building's 'green credentials'.

But, according to Faithful+Gould, embodied carbon mitigation would save far more energy than operational savings alone.

In Brief

JOBS GROWTH PREDICTION SOFTENS GLOOM

Analysts Hewes and Associates predict the construction industry may not return to growth until 2014, following figures showing that output fell by 3.3% in the fourth quarter of 2010. Separately, a Construction Skills Network survey suggests that, while up to 75,000 jobs could go in 2011, about 200,000 new positions could be created between 2013 and 2015.

www.cskills.org/csn

HURLEYPALMERFLATT TARGETS ACQUISITIONS

Multidisciplinary consultancy hurleypalmerflatt says it has completed a deal with ISIS Equity Partners to provide £14m funding for future acquisitions, as it seeks to expand its geographical reach.

ATKINS CONSIDERS JOB CUTS

Global engineering group Atkins has indicated it might shed up to 300 jobs this spring as part of continuing 'restructuring'. Separately, Atkins' sustainability division has merged with consultancy Faithful+Gould's carbon consultancy business. The service, operating under the Faithful+Gould brand, will target the green consultancy market.

RECORD FALL IN EMISSIONS

Latest figures released by the government show the most significant drop in UK greenhouse gas emissions for two decades. Emissions fell by 8.7% in 2009 compared with the previous year. Carbon dioxide levels fell by 9.8% in the same period. These reductions coincide with a decline in industrial output due to the recession, with the construction sector suffering a bigger decline than most.

Call for papers

CIBSE is seeking papers for a technical symposium to be held in September.

The event will provide an opportunity for the research and development community to showcase and disseminate their work to peers and the wider group of building services professionals. The event has been designed to be accessible to both the accomplished and the developing research community, with opportunities to share experiences and foster and develop contacts.

CIBSE is currently inviting for consideration abstracts of papers on research and development topics, including:

- All types of engineering services in buildings;
- Targeting and monitoring of resources in building design, construction and operation;
- Renewable and sustainable energy resource and utilisation in the built environment;
- Improving operational effectiveness and reducing environmental impact;
- Environmental assessment and certification;
- Regulating the construction and operation of buildings; and
- Process advancements that contribute to the successful performance of buildings in satisfying the needs of building occupants and owners.

For more information see: www.cibse.org or contact nhughes@cibse.org

Diary date

CIBSE national conference
One building a minute – the great refurbishment challenge
● 7 April 2011, London
www.cibse.org

Awards success

● First Building Performance Awards

February saw a glittering awards night, which brought the great and the good together to celebrate achievements across the industry. I refer, of course, not to the Oscars, but to the CIBSE Building Performance Awards – with a new name, new look and new awards categories (see pages 18-19).

The awards showcased the top industry talent, and showed that despite difficult times for the industry, we are still reaching excellence in the projects we're working on.

I want to offer all the winners, runners-up and those shortlisted huge congratulations for what they achieved. Credit is also due to everyone who entered – the calibre of entries this year was the highest we've had, which says a lot for the continued effort by individuals and companies to achieve their best, despite being squeezed.

I believe we, as an industry, shouldn't underestimate the importance of entering awards and giving ourselves that pat on the back in recognition for a job well done – not to mention that the kudos in getting shortlisted and winning can only be good in raising profile and reputation, and potentially leading to more opportunities.

Now, more than ever, we are being challenged to focus on what can be achieved, what energy savings can be made, or improvements realised – all with fewer resources. Through recognising where companies and individuals have excelled, we can ensure that the lessons learned are shared and the knowledge is passed on for us all to gain from – which, again, will lead to efficiencies.

I was also pleased to see the Graduate of the Year award being re-presented on the night – giving the winner, Michael Gardner, further recognition. I would urge any graduate engineer with drive and passion for the industry to enter this year's competition. Equally, the newly renamed Employer of the Year award (formally Champion of Champion award), recognising employers who have shown excellence and innovation in developing the engineers of the future, should be mentioned, and companies encouraged to enter.

Returning to the Oscar's theme, I recently saw *The King's Speech*; this may be tenuous but it

seemed to me that George VI had to really dig deep to overcome his internal issues, with the support of others, to provide leadership at a time of national crisis. Can you see the link with our industry and the challenges we face? Even when we think there is no hope of being heard, we have to get our words out, and make that communication with the support and

encouragement of others.

We are all aware of the commercial pressures, and of the challenges that this year brings. However, I strongly believe that now, more than ever, we should be embracing the achievements made and thanking those who continue to excel and strive for excellence. I believe that our package of awards goes some way to counteracting the doom and gloom we read about in the press, and support all those in the industry who continue to work so hard in difficult times.

Stephen Matthews, chief executive

'We are all aware of the commercial pressures, and of the challenges that this year brings'

For more information visit: www.cibse.org/awards

International global bonds enhanced

CIBSE has signed two mutual recognition agreements to strengthen international links.

In November, CIBSE and Engineers Australia signed a mutual recognition agreement in Canberra, Australia.

The agreement permits mutual recognition of registered members of each organisation. CIBSE

members must be registered as EngTech, IEng or CEng. The agreement also promotes, facilitates and extends social and professional links between the two organisations.

Also, during a visit to Hong Kong last year, president elect Andy Ford and chief executive Stephen Matthews signed a

mutual recognition agreement, recognising associate members who are IEng-registered as equivalent to HKIE associate member in the building services discipline.

The existing mutual recognition agreement with HKIE, for MCIBSE CEng, was also renewed for a further five years.

Brainstorming on carbon reduction

● More changes proposed to Carbon Reduction Commitment scheme

CIBSE plans to respond to the government's call for proposals to simplify the Carbon Reduction Commitment (CRC) Energy Efficiency Scheme. The institution would like your ideas and proposals for simplifying the scheme.

This consultation is being carried out to identify ways to improve the effectiveness of the scheme to drive energy efficiency in large private and public sector organisations. It also aims to address the complexity of the initiative, and reduce the administrative burden for business.

Its guiding principles are that the scheme should:

- Capture the full range of large organisations to extensively cover emissions;
- Whenever possible, align emissions responsibility with the energy user;
- Be legally robust and enforceable;
- Use existing company law;
- Be flexible enough to accommodate major business changes during each phase of the scheme;
- Ensure that the scheme obtains board level engagement; and
- Accommodate a range of organisational structures, including joint ventures and private equity/venture capital funds.

For more information on the consultation, please



'We would like your ideas and proposals for simplifying the scheme'

refer to the CRC website at www.decc.gov.uk

A useful document referred to in the consultation is the projected savings attributable to the CRC scheme in annex G of the June 2010 DECC energy and emissions projections.

If you have ideas or suggestions for CIBSE's response to the consultation, please send them to cbreslin@cibse.org by 9 March.

For more information: www.decc.gov.uk

Subscriptions outstanding

There are still some members who have yet to renew their membership: we want to remind you that payment for your CIBSE 2011 subscription was due on 1 January 2011. To ensure that you do not miss out on any of the benefits of membership, we would urge you to pay promptly. Paying your subscription will only take a minute and we can process your payment in a number of ways as follows:

- Online at www.cibse.org/payments;
- By returning the remittance slip on your renewals letter; or
- By contacting the CIBSE subscriptions department on **+44(0)20 8772 3655**.

We hope that you choose to renew your subscription. Opportunities for CIBSE and CIBSE's members are significant at the moment, and we are working to ensure that members have the skills and knowledge to take advantage of this. We will be rolling out new products and services during this year to assist you in your professional life. The first one of these is the CIBSE national conference, offering the opportunity to learn more about refurbishment, at the member discounted price of £235 + VAT.

- If you are having difficulties paying your subscription, please discuss this with the membership subscription team at memberships@cibse.org, or by calling **+44 (0)20 8772 3655**.

Skills survey: a reminder

We would like to encourage everyone who received a copy of the Skills Audit survey to make the time to complete and return it as soon as possible. This is the first time that such a comprehensive survey has been attempted, and we hope the results will help in determining future direction for institution policy, training and education.

To read more about the survey, see Doug King's article in the February issue of the *CIBSE Journal*.

Recognition for Hong Kong members

Three CIBSE members have received awards in recognition of their invaluable contribution to the CIBSE Hong Kong branch.

Ronald Chin received the Gold Medal Award, KK Lam received the Silver Medal Award and KY Leung received the Bronze Medal Award. The awards were presented by president-elect Andy Ford during his visit in November.

Chin has been heavily involved in the work of CIBSE HK during the past 10 years. He was chairman between 2004 and 2005, and has continuously served as an honorary adviser since 2006.

Lam has served the branch committee since 2003,



From left: Stephen Matthews, KK Lam, KY Leung, Ronald Chin, Andy Ford, and Dr TM Chung

organising technical activities, running scholarship programs for students and conducting technical research for members' benefits. Leung has served the branch committee for more than

eight years, diligently working on the financial management for the region and helping to register CIBSE HK branch as a limited company and charity organisation in Hong Kong.

Site manoeuvres

A final definition of 'zero carbon' new homes is some months away – leaving developers uncertain about what to build. But the government says it is keen to get the policy right rather than rushing it, and it has more green plans up its sleeve. **Bob Cervi** reports

The inaugural annual conference of the Zero Carbon Hub would seem like an appropriate time for the government advisory body to unveil its long-awaited definition of 'zero carbon' homes – particularly as the Housing Minister, Grant Shapps, attended the event in London. But both Shapps and the Hub's leading figures could only disappoint those keen to know what the final policy on zero carbon new homes will be.

Some of the industry sector speakers at the event regretted that they would be unclear for some months yet as to what to make of the 'final piece of the jigsaw', as Shapps put it, of the full definition of zero carbon: that is, what role should be played by 'allowable solutions', which include off-site renewables such as wind turbines or combined heat and power (CHP) plants.

Shapps said it was right for the industry to be given more time to work on the allowable solutions question: 'My challenge to you is to come up with an approach to allowable solutions which delivers real, additional carbon savings in a cost-effective manner – workable allowable solutions. For my part, I want to put the framework in place to make allowable solutions work.'

He stressed that he also wanted the government's 'localism' agenda to include the development of off-site renewables: 'We'll have national regulations and codes, but to make things simpler on the ground, we're exploring the possibility of having a local framework, whereby the local authority can choose from things which have been previously agreed with industry – but on a local level, providing the ability for localism but without having to start from scratch on each occasion. We're exploring that and will see where it gets us.'

Shapps added: 'In terms of allowable solutions, it seems to me we are right that a local authority

Housing Minister Grant Shapps throws down the gauntlet to delegates at the conference as UK Green Building Council chief Paul King looks on



Housebuilder Events

can say, "we are an area in the country that happens to be on the coast and wind power is particularly advantageous to us, and therefore we want to pick from local solutions that involve some wind power being generated, not necessarily on-site but down the road". We have to have the flexibility to have different allowable solutions in different places.'

Neil Jefferson, chief executive of the Hub, indicated that it would take a few months more for the body to reach its final conclusions on what would be the right level for allowable solutions – that is, the maximum proportion of the whole zero carbon solution that can be delivered off-site.

However, it is already clear from documents issued by the Hub that it effectively favours a raising of the proportion of the zero carbon

“My challenge to you is to come up with an approach to allowable solutions which delivers real, additional carbon savings in a cost-effective manner

target to be delivered by allowable solutions over that proposed by the previous Labour Housing Minister John Healey.

Healey had suggested that the 'compliance' level for on-site services (heating, ventilation, lighting and hot water) should be 70%, leaving off-site renewables to deliver 30%. In its *Final Report* last month on the issue of 'carbon compliance' for on-site renewables, to which CIBSE has contributed,

the Hub suggests that on-site compliance could range from 60% to 44% – which would imply a much higher proportion from off-site renewables (see box, right).

One key reason for this change, it was indicated at the conference, is to enable there to be a bigger role for off-site allowable solutions that may serve more than one dwelling – such as a wind turbine or CHP plant serving a local community, possibly as part of a district power/heating service. Another might be that it is simply not cost effective to deliver more than this proportion (60% to 44%) of on-site renewables.

Stephen Stone, chief executive of the housing developer Crest Nicholson, complained that, while his industry had made strides in delivering lower-carbon homes, it was being disadvantaged by a lack of information: 'I know a lot of people are doing a lot of work

on it, but we still need to fix the price of carbon, and we still need delivery mechanisms for allowable solutions. So we're a bit out in the cold at the moment in trying to move on with our business.'

Another housing group chief who spoke at the conference, Mark Clare of Barratt Developments, also pointed to the importance to the construction sector of having a final policy on on-site and off-site compliance.

Like Stone, he also stressed the importance of having 'one rule for all' when it comes to these regulations. Stone expressed concern that the government's 'localism' agenda could mean local authorities applying different standards from each other when it comes to specifying low carbon homes.

John Slaughter, a director at the Home Builders Federation, echoed these concerns and warned against the zero carbon homes policy leading to a 'proliferation of standards', which would add to builders' costs. 'We need an answer on what to do with allowable

solutions as soon as possible,' he said.

But Ray Morgan, chief executive of Woking Borough Council in the south of England, defended the idea of applying national standards and solutions with an element of local choice. 'Can we stop having national solutions for everything?' he asked. 'I hope we get a set of standards that local authorities can choose from.'

John Tebbit, deputy chief of the Construction Products Association, argued that current types of low and zero carbon homes are expensive 'prototypes' that have too much 'bolt-on technology' and are not consumer friendly. The industry needed to work together to produce genuinely affordable and consumer-focused zero carbon homes, he said.

Don Leiper of EO.N Energy Services stressed the importance of partnerships between energy companies and both house builders and local authorities, in order to develop the necessary local infrastructure needed for zero carbon new homes. 'But first we need to be clear about the

parameters and price of allowable solutions,' he said.

The Housing Minister used his keynote speech to announce that the government wanted to extend its Green Deal, currently aimed at making existing homes more energy efficient, to new properties. The idea, Shapps said, was to help developers to recover some of the costs of building more energy efficient homes.

'But I want to know what you think as an industry,' he told the conference. 'I invite you to come up with a system that is fair and works for both the developers and the home buyer or occupier.'

Shapps added that he wanted more testing of new homes to make sure they perform as they were intended to.

He said: 'I've been surprised at what has been said about the potential shortfall between design and performance. But I strongly welcome the willingness of the industry as a whole to address this and move towards delivering performance as built, and not just as designed.' **CJ**



RECOMMENDATIONS

Zero Carbon Hub's proposals for on-site renewables

The carbon compliance limit for on-site renewables should apply to 'built' performance (post-construction), not 'designed' performance

The built-performance emissions from new homes should not exceed:

- 10 kg CO₂ (eq)/sq m/yr for detached houses (60%)
- 11 kg CO₂ (eq)/sq m/yr for other houses (56%)
- 14 kg CO₂ (eq)/sq m/yr for low-rise apartment blocks (44%)

An industry/government group should be established to oversee the process of measuring and addressing the potential gap between 'designed' and 'built' performance

Source: Zero Carbon Hub, Final Report. www.zerocarbonhub.org

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Rewarding building

excellence

The best performers in the built environment were honoured last month in CIBSE's brand new awards ceremony

The first CIBSE Building Performance Awards saw some of the biggest names in the industry recognised for designing and constructing excellence in sustainable and aspirational buildings.

In total, 13 awards were presented at a ceremony hosted by BBC newsreader Huw Edwards, at the Grosvenor House Hotel in London last month.

The awards aim to raise industry standards by recognising those who are designing and managing the UK's most sustainable and innovative projects and products. They rewarded the best examples of actual low carbon performance in practice, allied to excellence in the design, construction, and operation of buildings of all types.

During his opening speech, CIBSE president Rob Manning said: 'For three years CIBSE held the Low Carbon Performance Awards; we then decided it was time for a slight change of emphasis and the Building Performance Awards were born. The aim was to make an awards evening for the whole of the building services industry. The standard of entries this year has been excellent and the range of organisations entering more varied than ever before.'

Before the 2011 awards were presented, the Graduate of the Year Award was re-presented to the 2010 winner, Michael Gardner. He was selected by a panel of judges from a shortlist of six young building services engineers following an evening of presentations last year, addressing the question: 'What tools does the modern building services engineer need to help society create a sustainable world?'

www.cibseawards.org

“The standard of entries this year has been excellent and the range of organisations entering more varied than ever before – Rob Manning

The judges

JON ASHFORD
Sainsbury's



Jon is head of energy and sustainability at Sainsbury's. He is also a member of the policy committee at the UK Green Building Council.

PADY CONAGHAN
Hoare Lea



Paddy is a former senior partner and now consultant with Hoare Lea.

HYWEL DAVIES
CIBSE



Hywel is technical director with responsibility for technical development of CIBSE's publications, guidance, and policy for engineers.

DAVID FRISE
HVCA



David is head of sustainability at the Heating and Ventilating Contractors' Association.

BILL GETHING
Consultant



Bill is an independent architecture and sustainability consultant, formerly a long-standing partner at Feilden Clegg Bradley Studios.





Hundreds packed into the Grosvenor House Hotel in London to discover who had won in the first CIBSE Building Performance Awards 2011



DOUG KING
King Shaw Associates



Doug is founder of consulting engineers King Shaw Associates and a Visiting Professor at Bath University.

ROB MANNING
CIBSE



Rob is president of CIBSE and a director of AECOM, where he heads up the company's healthcare sector.

ALAN TULLA
SLL



Alan is the current president of the Society of Light and Lighting (SLL). He holds the SLL Diploma in Lighting.

THE WINNERS

BUILDING OPERATION

Sponsor: Gratte Brothers

Winner: British Land Group, York House

Judges: 'Their tenants were engaged in the process of cutting energy use and provided feedback that was acted upon. The reduction in energy use was impressive.'

BUILDING SERVICES CONSULTANCY OF THE YEAR

Sponsor: Balfour Beatty Engineering Services

Winner: Atelier Ten

Judges: 'They have shown, through numerous examples, their approach to monitoring carbon emissions of projects. There is also evidence of good practice in their own work, as well as important investment in recruiting and training of staff.'

CLIENT OF THE YEAR – LARGE

Sponsor: Imtech

Winner: Better Buildings Partnership

Judges: 'They have grabbed the low-hung fruit and have increased energy efficiency impressively. This has brought down the carbon footprint across a whole array of properties.'

CLIENT OF THE YEAR – PUBLIC SECTOR

Sponsor: Elta Fans

Winner: Metropolitan Housing Trust

Judges: 'They have shown the way on best practice by getting energy demand down before installing energy efficient equipment. We can learn lessons right across the country.'

COMMISSIONING PROJECT OF THE YEAR

Sponsor: The Commissioning Specialists Association

Winner: EDP Consulting, Co-op foodstore

Judges: 'The commissioning process was well planned, well integrated and implemented to the service design.'

INTEGRATED PROJECT TEAM OF THE YEAR

Sponsor: CMR

Winner: Hoare Lea

Judges: 'This team showed a wide range of involvement from professionals, including contractors, suppliers and facilities managers.'

NEW BUILD PROJECT OF THE YEAR

Sponsor: Hays Building Services

Winner: JPW Construction, Canolfan Hyddgen

Judges: 'Much hard work has been done to get the energy demand down – and the energy monitoring data has been provided to show that this has been achieved. There is also clear evidence of good user feedback.'

PASSIVE (ENERGY-RELATED) PRODUCT OF THE YEAR

Sponsor: CIBSE Journal

Winner: Laing O'Rourke and BDP

Judges: 'This is a good concept, and one that takes buildings off-site and into the factory, offering quality at lower cost and high safety.'

ENERGY-USING PRODUCT

Sponsor: Flakt Woods

Winner: Zehnder

Judges: 'They give clear evidence to show how their product compares with others. This is a worthy winner.'

REFURBISHMENT PROJECT OF THE YEAR

Sponsor: Vaillant

Winner: Ernest Griffiths, Elizabeth II Court

Judges: 'This has a simple structure and has used technology where appropriate. It offers sensible solutions without gilding the lily.'

TRAINING FOR BUILDING PERFORMANCE AWARD

Sponsor: SummitSkills

Winner: ABS Consulting

Judges: 'ABS is a professional training deliverer. It actually achieved what it said it would – produced reasonable outcomes. This is training that is aimed at improving building performance.'

LOW CARBON CONSULTANT OF THE YEAR

Sponsor: Carbon Trust

Winner: David Grace

Judges: 'Across seven projects David has produced a net carbon saving of 94,042 KgCO₂/yr.'

CARBON CHAMPION OF THE YEAR

Sponsor: Remeha Commercial

Winner: Metropolitan Housing Trust

Judges: 'Refurbishment is a huge challenge and their entry is a significant demonstration of what can be achieved by a relatively small organisation with the commitment and determination to make a real difference.'

Energising debate

Persuading clients of the benefits of refurbishing their buildings is not enough – they also need to confront issues around the cost and supply of energy, says one expert who will address this year's CIBSE national conference

When the building services industry addresses sustainability, one aspect is often overlooked – the uncertainty of fuel sources in the future. This is according to Professor David Fisk, of the Department of Civil and Environmental Engineering at Imperial College London.

Fisk will be speaking at CIBSE's national conference on 7 April on 'Obsolescence, fuel pressures and refurbishment'.

'Although we may have made a brave start on the diplomatic arena, saving the planet – or not – is largely going to be done by much larger and more powerful economies than ours. If anything, worrying about zero carbon 2050 has tended to fog dialogues with clients about much more immediate energy issues,' says Fisk.

'While in the self-sufficient 1970s we were pleased to burn UK coal just to give the Welsh Valleys employment, there has been a precipitous decline in domestic primary energy production. Energy looks like a different animal if you have to pay to import it.'

Chinese demand for coal to feed its burgeoning industries is pushing up energy prices around the world, he adds.

The conference – called 'One Building a Minute – The Great Refurbishment Debate' – will be looking at the urgent need to transform existing buildings into low carbon constructions in order for the UK to meet its 2050 carbon emissions target. As the conference's title implies, one building a minute will need to be refurbished in order to achieve an 80 per cent reduction in emissions over the next 40 years.

Fisk believes that we need to act now to plan for energy price hikes in the future. 'A lot of our fossil fuelled power plants are lining up to go obsolete this decade. New nuclear plant isn't expected until after that and it does not promise to come cheap,' he says.

'Filling the gap won't come cheap either. Clients may think that high prices are painful for everyone and not a competitiveness issue, but these prospective prices are high enough to pick out good buildings from bad. Not all bad buildings are going to be all that old.'

The issue of communicating the benefits of refurbishment to clients will be the focus of a conference address by Kate McCormack and George Adams of contractors SPIE Matthew Hall. In a presentation



Last year's conference addressed a range of issues relevant to the wider industry

on the value proposition for clients needing to win refurbishment tenders, McCormack and Adams will be looking to help building services engineers demonstrate to clients the value that can be achieved from refurbishment projects.

'As well as discussing what clients require, the presentation will outline the process of developing a refurbishment project from a client's point of view. We will indicate where building services engineers need to be involved and will help them identify the key

issues which will govern the client's choices,' explains Adams.

He adds that stakeholders need to know what their choices are to create optimal solutions – and this means whole life analysis: 'The optimisation of building refurbishments can be complex because of many possible choices of technology and construction methods affecting the whole-life results.'

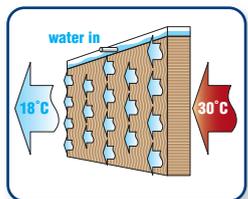
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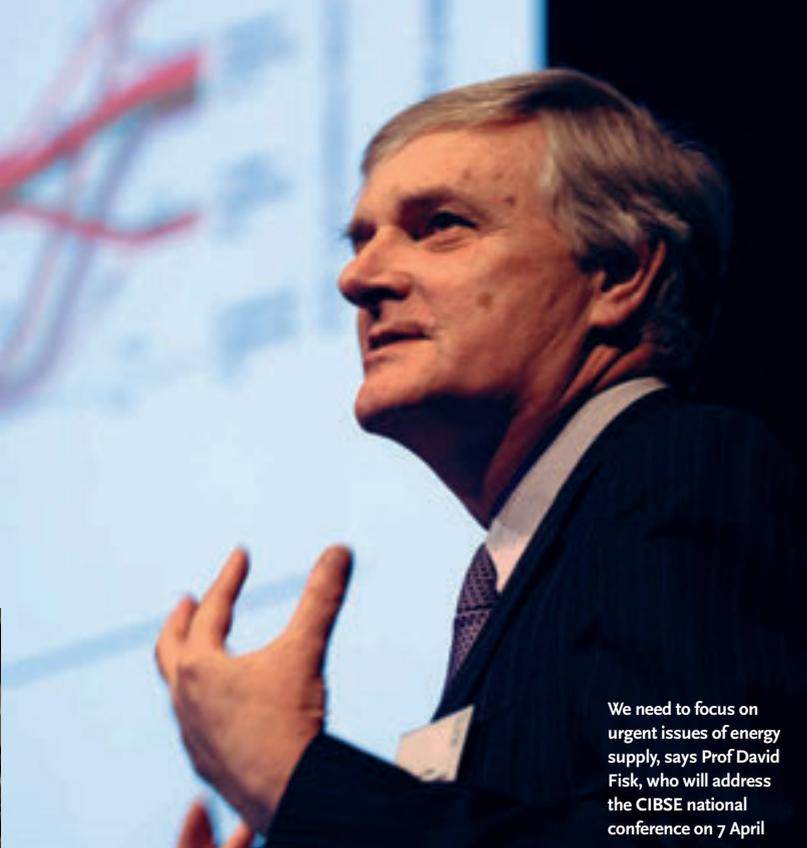
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We need to focus on urgent issues of energy supply, says Prof David Fisk, who will address the CIBSE national conference on 7 April

energy costs; benefits to the users, such as efficiency and comfort; energy conservation; and surveys and assessments.

'Sustainable refurbishment should encourage efficient construction materials and use of sustainable technology, as well as an extension of the building life cycle and environment reducing waste and carbon emissions,' Adams suggests. 'Energy efficient technologies can both decrease the greenhouse effect, encouraging environmental

benefits, and reduce total life cycle costs. Energy and economics work together.'

Adams and McCormack will reflect, in their presentation, on change indicators in the real world, such as performance related contracts and more clients seeking whole life answers.

'In order to design and implement building refurbishment based on sustainable principles, it's important to understand these key criteria from concept to implementation and operations,' says Adams.

'Suitable decisions must be made starting from the definition of the requirements to the study, design, technology, build and maintenance phases with post completion review and adjustment. Fully understanding how an existing building operates is vital to successfully carrying out energy efficient refurbishment contracts.

He concludes: 'Understanding how the facility has been constructed, analysed, how it operates and is used, and how it consumes energy are the foundations to designing a strategy for its improvement. Then the new statement of requirements must be worked up with the client.'

Other topics to be covered at the event will include district heating systems and the use of control technologies. The conference will end with a panel discussion entitled

6 We will indicate where building services engineers need to be involved and will help them identify the key issues which will govern the clients' choices

'Knock it down and start again', in which a developer, a building services engineer, an architect and an energy expert will debate the merits of refurbishment versus new builds. Representatives from RIBA and the Technology Strategy Board are expected to be among the panel members.

The one-day conference, taking place at the Grand Connaught Rooms, London, will be followed by a dinner hosted by the CIBSE Young Engineers' Network.

To find out more, and to book your place at this year's conference, and for the full programme, visit: www.cibsetraining.co.uk/conferences **CJ**

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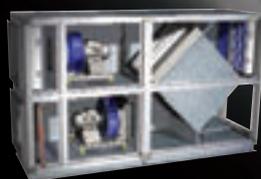


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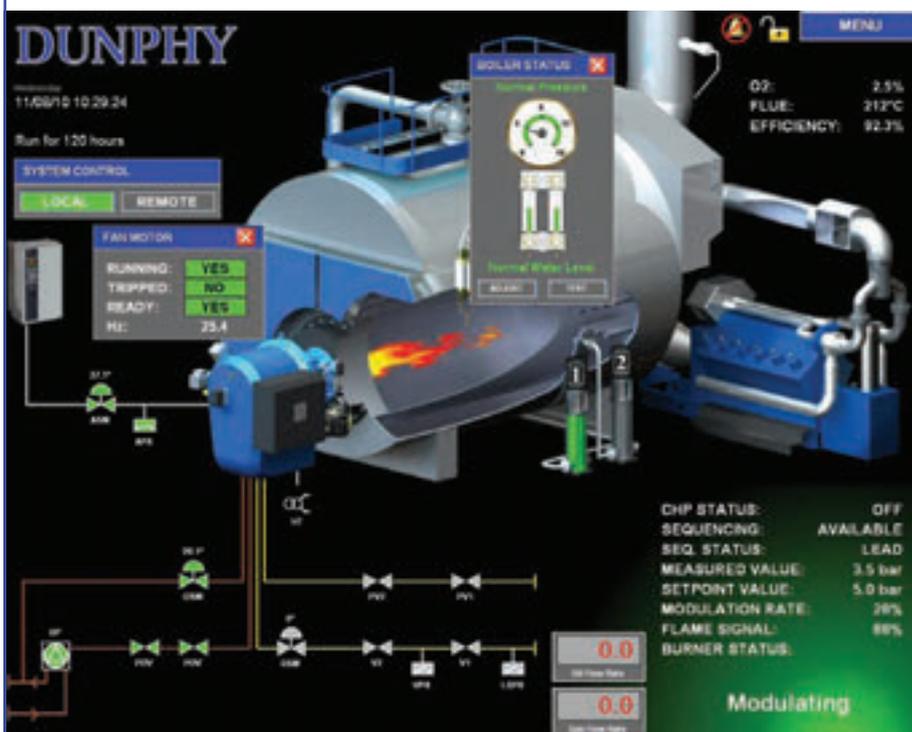
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SIMPLER SOLUTIONS



The zero carbon new homes of the future will need to be both affordable and simple to use – which means applying energy efficient building fabrics rather than relying on technologies, says housebuilding boss **Mark Clare**

In December 2006 the Housing Minister of the day, Yvette Cooper, set out the ambition to head for zero carbon, with a target for all new homes to reach 'zero carbon' standards in 2016. At the time no one knew whether we could get there – or even what it meant. Since then we have had a couple of prime ministers and at least five housing ministers, but the direction of travel has remained the same.

During this time a huge amount of intellectual capital and resources have been applied, not least through organisations such as the Zero Carbon Hub and the UK Green Building Council. We haven't cracked definitions of 'zero carbon' yet, but we are getting closer, and I hope we will see something that is workable soon.

When it comes to renewables, while I think that progress is being made on technology in terms of which solutions work and which ones don't, I am afraid that in five years' time we may be accused of installing too much technology that is out of date, inefficient or just unmaintainable. Barratt is already having trouble organising low-cost maintenance solutions for customers on some sites.

I believe we are using too much technology when we should be focusing more on the fabric and using less energy. I get frustrated when I hear planners insist on photovoltaics or solar thermal, when a fabric solution will deliver.

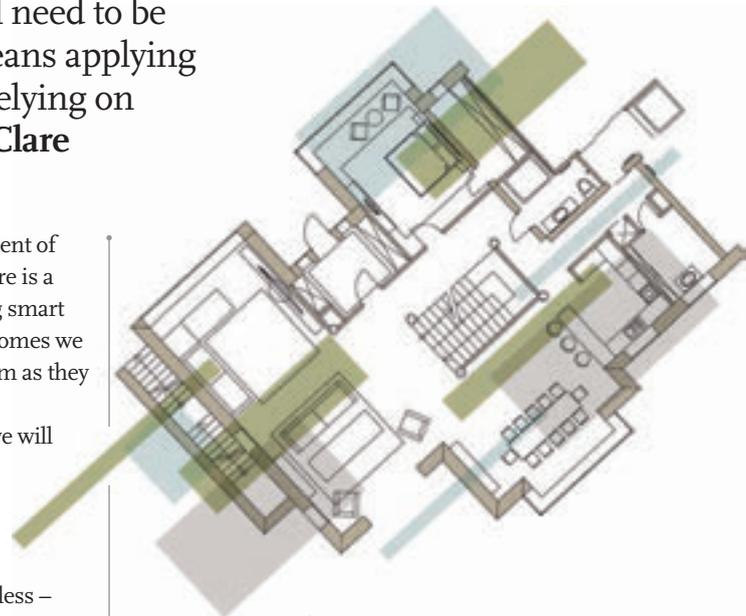
This is our industry's equivalent of greenwash. I also believe there is a big opportunity to start using smart controls, to ensure that the homes we are designing actually perform as they should.

However, by 2017, when we will be delivering zero carbon homes, I would expect technology to have moved on dramatically to allow us to do a lot more with a lot less – using technologies like fuel cells, for example.

When it comes to the cost of low carbon homes, some would say that, if we can't reduce the cost of delivery dramatically, the industry will simply shrink further and only build top-end homes where customers can afford it. I don't subscribe to that theory. This country needs many more new homes, and we have to find a way of delivering them at an affordable price.

We need to start by doing more through the fabric, as that is the cheapest way. We need to continue investing in programmes like AimC4, and collaborating more to deliver better solutions for everyone. We must also continue to work with our supply chains, to deliver lower-cost solutions for 'on-site' renewables over the next five or so years.

We also need customers and



We must not fall into the trap of delivering something that meets standards but not the expectations of customers

valuers to understand the benefits of living in a much more efficient home, and hopefully at some point take on board that there will be a cost to everyone of bringing the second-hand stock up to a reasonable standard.

Research tells us that people are not yet convinced about the benefits of living in a low carbon home. They are concerned about overheating, airtightness and all of this new technology breaking down. We have got to start talking to them about better homes that are more comfortable to live in, with lower running costs.

We must make sure that low carbon new homes are simple to operate and perform as they should. We must not fall into the trap of delivering something that meets standards but not the expectations of customers.

MARK CLARE is group chief executive of Barratt Developments. This piece is an extract from his speech to the recent Zero Carbon Hub annual conference

Your letters

This month: We do not need expensive energy efficient systems for our existing properties

Be open about the pros and cons of green technologies

I agree with your view that projected energy efficiency targets, and the associated campaigns for improvements to existing properties, are invariably over-ambitious and unrealistic (Editorial, page 5, February *Journal*). It is generally capital costs – and potential rental costs – that govern sound investments in respect of prospective new developments. The incorporation of expensive energy efficient systems, which would only be of benefit to the future occupants/end-users, are therefore not an attractive proposition. Apart from this, the tenancy of a building is liable to change during its lifespan, and the efficient economic life cycles of new building services are often unknown, or difficult to predict.

Any enhancement of thermal insulation standards, natural ventilation, and daylighting provision are generally beneficial, and do not necessarily require an input from a prospective tenant/end-user. However, the suitability of any systems that only operate efficiently under constant load conditions cannot be assessed without detailed

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Illustration: Russ Tudor

knowledge of the potential occupancy pattern and future building usage.

This means that energy campaigns can only realistically be targeted at energy consumers, and it is imperative that any potential customers fully appreciate the different characteristics of the various systems available, to enable them to make an informed judgement of their suitability. It is essential that consultants, product manufacturers, and installers present clear factual information to prospective clients in the promotion of any new technological developments, including the actual capital costs and potential running costs without the benefit of grants, feed-in tariffs, and so on, which will eventually disappear.

Barry Lambert FCIBSE

On the contrary, Prof Dwyer

In his otherwise excellent investigation into the world of

Energy campaigns can only realistically be targeted at energy consumers

combined heat and power (February *Journal*, page 38), Prof Tim Dwyer suggests there is a lack of evidence to back up the claims of ‘mini’ CHP (up to 50kW_e).

On the contrary, there is a growing mass of data that actually support Tim Dwyer’s own case that CHP will deliver excellent value for money, but only if it is appropriately used. In many cases, consultants, contractors, manufacturers and end-users can dial directly into their CHP engine via an on-board modem to find out what it is delivering and at what cost. This also satisfies Tim’s other concern that consulting engineers are not allowed the necessary time or resource to analyse the systems they specify.

As a manufacturer, we continually analyse the live data obtained from installations to troubleshoot problems, and to increase our own understanding of how and where CHP works most effectively. For



OLD IS THE NEW NEW

Run-down estates and houses can be made very liveable – and improving them is much more sustainable than building new dwellings, says designer **Wayne Hemingway**

If we're not careful, the housing we build today will become the slums of the future. High-density developments that have been built in the last 10 years can look more like prisons than homes.

I wrote an article in the *Independent*, where I coined the phrase 'Barratification' and the 'Wimpification of Britain' – it was an attack on the mass house builders for not delivering on liveability. Wimpey asked me to come to a meeting and I thought they were going to take me to court for defamation of character, but their chairman was very

enlightened and he talked about sustainability and housing that was going to last for the long term. I explained that this kind of housing will only last for 20 to 25 years. It doesn't matter how many combi-boilers you put in it, the boilers will last a lot longer than the housing, and that's not very good for the future.

Wimpey gave us the chance to deliver our first housing estate, which we started in 2001. It's called Staiths South Bank in Gateshead, and has won all sorts of awards. The Staiths has made the same or better margin than the sort of housing estate that I'd been complaining about.

Sustainability and liveability have to go together. It's not just about carbon efficiency, it's about economic and social sustainability, too. We spend a lot of time thinking about new housing, but new housing is a fraction of the housing available. If we start to think about the housing that we've got and the housing we live in, we can make it sustainable and make it into the sort of housing that people like.

Even awful high-density, poorly

conceived 1960s developments can benefit from retrofitting and putting in some work to improve their liveability. We're working on a typical Sixties development in Maidenhead, which comprises 180 homes. It's called Evenlode, and 10 years ago it would have been knocked down and developers would have built new housing there. But with the recession, that's not been economic.

So, with this and other projects, we're doing a 're-imagining' project. Internally we're bringing them up to the standard that they need to be and we're making the outside spaces liveable. For

example, at the moment, the paths go right past people's front doors. So we're putting in a privacy strip with some trees and some box hedging and a bit of timber.

The costs are not prohibitive but the results are priceless. And we're making the flats look more like individual housing by clever cladding solutions.

Sustainability is the future. Even if someone said tomorrow that 'there is no global warming, we got it wrong' (and I think we accept now that this won't happen!) we would still want to go in that direction because people want to save money. None of these are new ideas – they are used in other countries, and many have been used by previous generations here. We just need to educate local planning authorities and the government. It can be done.

● WAYNE HEMINGWAY MBE is co-founder of Red or Dead and Hemingway Design, which specialises in 'affordable and social design'. www.hemingwaydesign.co.uk

VOICES FROM THE WEB

'I really hope CLG [the Department for Communities and Local Government]/Trading Standards do pick up the pace or a landlord takes legal action against an EPC consultant that has not put a reasonable amount of time, experience and effort into producing an EPC. Badly produced EPCs are no good for the client or the consultant'

'There is something wrong with the industry. We have quoted for EPC work and been blown out the water by other practices on cost. I can only assume that the whole process is not being taken seriously enough by bargain basement companies offering EPCs for fees that would not cover even one day's work'

'How can companies that carry out proper surveys, proper calculations and proper reports [for EPCs] compete? We can't'

Source: CIBSE's forum at www.cibse.org

example, a CHP unit in a residential home in Dundee is running for almost 23 hours a day, which proves the engineering team got their sizing calculations right. There is an ideal level of base heating load in the building to keep the engine running almost continuously and generating low carbon, low cost electricity.

Because of the increasing carbon emissions of our electricity grid, CHP is now delivering even more carbon savings and, as Tim correctly suggests, there is pressure on consultants to use CHP to satisfy planning requirements. That is why we invest considerable time and effort in working with design engineers to avoid the pitfalls of oversizing or incorrect application of the technology.

David Shaw
Business manager, BAXI SenerTec UK

Back-check design statistics

I read Prof Doug King's Masterclass on 'Avoiding overdesign' with interest (*February Journal*, page 51). A few years ago I examined the occupancy of a civil service office space with a view to assessing the validity of assumptions for occupation. My interest at the time was the potential savings in lighting costs from presence detectors and related systems. Correcting for projected actual use delivered significant increases in payback times.

In regard to the article's use of Gaussian distributions for the analysis of natural variation, I'd suggest adding a qualifying note pointing out that some systems – for electrical power, for example – suffer failures approximating to the power law distribution. This makes extreme events more likely to occur. Whenever statistics are used for design, it is prudent to do some back-testing, thus accounting over the expected life, to ensure that the calculations are valid.

R A Lough

GETTING TO GRIPS WITH REGS PART J



New requirements for flues in voids have been introduced for buildings where boilers are installed away from external walls and connected to fan assisted flues, writes **Hywel Davies**

The revisions to Part J and to Approved Document J (AD J), which came into force in October 2010, include new provisions for flues that run in voids and cannot be visually inspected. When such a concealed flue is connected to a boiler that is not operating correctly, particularly if it is not burning the fuel completely, carbon monoxide may be produced in the boiler and pass into the flue. If the flue is also faulty, then the carbon monoxide, which is a colourless, odourless gas, may escape into living accommodation. Carbon monoxide is readily absorbed by haemoglobin in preference to oxygen, and can therefore cause death by asphyxiation at very low doses.

Following a number of incidents of carbon monoxide poisoning, the Healthy and Safety Executive and Department of Communities and Local Government have amended the rules relating to both new and existing premises where flues may be required to pass through voids. In addition, and following an extensive industry-wide review, Gas Safe Register has introduced a revised Technical Bulletin 008, covering room sealed, fanned-draught chimney/flue systems concealed within voids. This was issued on 1 December 2010, replacing TB 200, which has now been withdrawn. The provisions of

TB 008 took effect from 1 January 2011. As a result, all existing premises with flues in voids require immediate attention by a registered gas engineer. Where there is currently no means of visual inspection of the flue within the void, then an urgent safety check and a risk assessment are required. If the system meets all aspects of the risk assessment, it may remain in operation, pending the installation of inspection hatches as soon as possible, but no later than 31 January 2012. Any installation that does not satisfactorily meet all the requirements of the risk assessment will be deemed 'at risk', and therefore should be disconnected pending the installation of inspection hatches to the void.

After 1 January 2013, installations without adequate means of access for inspection of the flue must be classified as being at least 'at risk', regardless of any other risk management measures that may have been put in place.

Appendix 3 to TB 008 provides a detailed risk assessment checklist, which covers:

- Existing access facilities to the chimney system;
- Any previous history of flue related problems;
- Availability of carbon monoxide alarms in each room along the suspected route of the flue, and those which have a working life that extends beyond 31 December 2012, with no record of previous activation; and
- Operational checks on the appliance. For an installation to be deemed to

be in a state of satisfactory operation it must meet every requirement in the risk assessment.

If it does not, then the installation is 'at risk' or, in certain cases, 'immediately dangerous', and should, with the permission of the user or responsible person, be disconnected from the supply, with a suitable label attached and a warning notice issued. Where the installation is found to be 'immediately dangerous', a RIDDOR report should also be prepared, containing the phrase 'flue in void'.

For new premises, the combustion appliances are covered by Part J

of the Building Regulations. It is vital that designers are aware of the new provisions of Part J, and its equivalent in Scotland and Northern Ireland, and follow the new requirements immediately on all new projects. Work in progress will have to be reviewed to assess whether any changes are required

Failure to follow the guidance will lead to a design which will not meet the requirements of TB 008 and will therefore lead to an installation deemed to be 'at risk' or 'immediately dangerous'

to bring it up to date. In particular, it is no longer acceptable for a flue from a single room sealed appliance to pass through a void in another dwelling, as it will not be possible to ensure access at all times.

Approved Document J, paragraph 1.47, gives guidance on the steps to be taken when it is necessary to install a flue in a void. Although this element of the Approved Document is guidance, in this instance failure to follow the guidance will lead to a design which will not meet the requirements of TB 008 and will therefore lead to an installation deemed to be 'at risk' or 'immediately dangerous'.

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

WEB LINKS

Gas Safe Register Technical Bulletin 008: Room-sealed, fanned-draught chimney/flue systems concealed within voids. Issued 1 December 2010, replacing CORGI TB200. Visit: www.consortiumprocurement.org.uk

Update to HSE safety alert issued 2 October 2008 www.hse.gov.uk/safetybulletins/fluesinvoids.htm

For more information about carbon monoxide poisoning, visit: www.hse.gov.uk/gas/domestic/co.htm

Approved Document J, Combustion Appliances www.planningportal.gov.uk/uploads/br/BR_PDF_ADJ_2010.pdf

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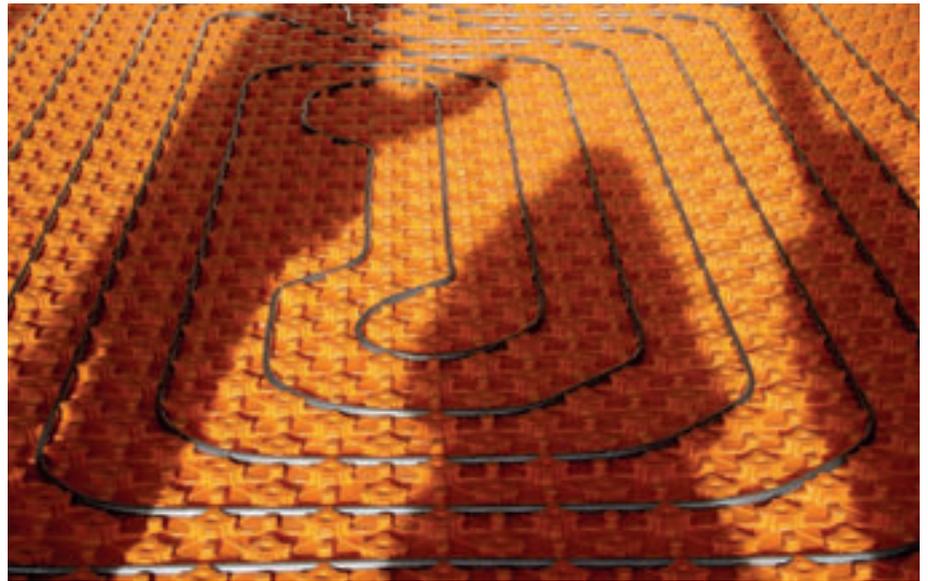


The finished product ...
the Collins' family eco
home is finally complete



Green shoots

Homeowners across Britain are taking many routes to cutting their carbon emissions. **Carina Bailey** looks at one project where the family decided to start afresh – encountering various challenges along the way



says Collins. 'We built it because we wanted somewhere exciting to live.'

Even with good loft and cavity wall insulation – and a high-efficiency condensing boiler – the energy consumption for the former home was around 35,000 kWh/yr. And even though the Collins family don't have a full-year's figures for the new house, the indications are that it should consume around 15,000 kWh/yr.

System choices

With a mixture of both passive and active features, the 250 sq m, single-story building is heated using a ground-source heat pump (GSHP) system. Six pipes have been buried vertically down to 40m deep to provide space heating via an underfloor system, while solar thermal collectors on the roof and an immersion heater supply hot water. There is no gas supply.

Collins doubts the viability of fitting GSHPs in a retrofit project – unless it already has underfloor heating: 'A heat pump is very suitable to use with underfloor heating because it's most efficient when you don't raise water temperature too high.'

'Although you could use a heat pump to go up to 50C to 60C, like you might use in a radiator, it would be very inefficient and wouldn't be worth doing financially. We personally wanted underfloor heating because it's comfortable and completely unobtrusive.'

Collins chose ground-source heat pumps over a gas boiler because he wanted to avoid burning fossil fuels wherever possible.

'The electricity to power the heat pump is



The Collins' experience of building an eco-home from scratch has given them an understanding of what sorts of low carbon and low energy features work well together

I can see the arguments for houses having a lot more prefabrication and I'm surprised there isn't more of it

Retired mechanical engineer Ian Collins has learned a number of lessons since he began building his £600,000 dream eco-home from scratch five years ago. Constructed in the garden of his former home in a conservation area of Cambridge, the new flat-roofed structure will have a smaller carbon footprint than the family's 1930s detached home, which was subsequently sold.

Both homes are comparable in size, though Collins describes his new house as being 'handicapped' because it is single storey – a planning-permission requirement – which of course doubles the amount of roof and ground area.

Ian and his wife Sue were inspired to build their very own eco-home because of their strong interest in design and creative architecture. 'We wouldn't have built the house if we were just environmentalists,'



A series of problems during construction meant that it took nearly two years to complete



Ian Collins and his wife, Sue, took an active role in overseeing the construction's progress

coming from wind power; the company we buy electricity from builds wind farms. We're trying to make the energy source as renewable as possible, rather than burning fossil fuel.'

But heat pumps are expensive. Collins says you could easily spend £15,000 on the technology and drilling the bore holes. However, he does believe they will pay for themselves in the long run, now that the Renewable Heat Incentive has been confirmed by the UK government.

But there are risks attached to applying a GSHP system, he concedes: 'If it goes wrong, if the circuit leaks, it's very hard to do anything about it.' Therefore, he says, all the pipe joints were welded together rather

than just using ordinary compression fittings, to make them as strong as they could be.

The Collins family chose their systems, which include solar heating, by conducting their own research and holding discussions with their architect at Mole Architects, based in Ely, Cambridgeshire.

The home's passive features include south and east-facing glazing to collect heat from the sun, and it is very well insulated, achieving an airtightness of 7.78 m cu/hr/sq m/@50 pascals. This requires the timber-framed structure to have a mechanical ventilation system with heat recovery to ensure the correct number of air-flow changes are made per hour.

There is also a green roof, with 60% of it covered in about 1cm of soil and water-hardy plants, along with a rainwater collection system and a 4,250 litre water-storage tank, which Collins admits he would make even bigger if he were to do the project again.

Contractor challenge

Collins says the development was originally expected to take a year to build, but a series of time-management issues and one major problem with the installation of the underfloor-heating system meant that it actually took two years. The problem lies, he says, in contractors' lack of experience with new green systems.

'I think there was a project-management

Eco-community Cambridge group spreads wings

Being green in the built environment is a phenomenon that is spreading the length and breadth of the UK. Nationally there are scores of individual groups mushrooming to help ordinary people reduce their energy consumption in retrofitted or newly built homes. Cambridge Carbon Footprint (CCF) is just one such example of a voluntary group that helps householders make real cuts to their carbon emissions. CCF last year showcased a

number of properties that it regarded as good examples of green projects. One of these was the Collins' new build in Madingley Road.

CCF was founded by Rosemary Randall, director, and Andy Brown, trustee. CCF's work includes holding Carbon Conversations groups to help people discuss the issues around cutting carbon.

CCF's Climate Friendly Homes scheme aims to help householders take practical steps to reduce

their emissions. Under the scheme, surveyors who help with the service are trained by CCF in conjunction with the Cambridge University Environmental Consulting Society.

More than 300 people have been on CCF training courses since its inception five years ago. These courses are now being offered via other groups in areas such as Oxford, Bristol and London. www.cambridgecarbonfootprint.org

issue. Building a house that's complex with lots of systems in it places much more of a demand on the project manager than just building a conventional house. And there aren't many people out there with experience of pulling all those systems together in one property.'

Another major reason why the project was delayed related to problems with the installation of the underfloor-heating system. It added months to the schedule, and resulted in parts of the floor being laid twice. Plus the original contractor that Collins hoped would drill the bore holes had to subcontract the job because it ran out of time after completing the house's foundations.

Collins believes there is still a big variation in the quality of contractors available to build such eco-homes in Britain.

He explains: 'Personally, I can see the arguments for houses having a lot more prefabrication and I'm surprised there isn't more of it. I'm surprised so much is still done in a relatively crude way onsite; it's the only product that's manufactured where you use it.'

'You can't just say "make me a nice house" and walk away. Certainly as an engineer I can have these conversations with people about what these systems do. But I think that, for non-technical people, the lesson is to be really clear about what you want the system to do, and make certain that the person supplying it understands and can convince you their system can do that.'

Collins also pointed out that a lot of the

materials needed for the project had to be supplied from outside the UK. Often, when they arrived they were the wrong item or were damaged. Delivery problems with beams, for example, caused an eight-week delay when new ones had to be sought from a different contractor.

In terms of running his new home, the complexity of the controls that are required for the heating system, for example, has

proved to be quite a challenge for the whole family.

'It's not very user-friendly and we've too much choice. There are three programmes on the heating circuits, and each one can be programmed for numerous on-off times.

It could be different every day of the week. And because the underfloor heating is slow to respond, you need to switch it on some hours before you want things to get warm – we have to guess what those timings are.

'I would have thought there's scope for a much more intelligent system that can work these things out for itself. I'd almost like to see a learning control system where you, as a user, don't need to get so buried in the detail of all the controls.'

Collins says he spent three hours with the system installer trying to learn how the system works. However, he believes his heating issues stem more from the fact the installer didn't understand how the heating system and building fabric would interact – something which, he says, the industry needs to tackle if it is serious about ensuring a building performs like it says on the tin. **CJ**

I'd like to see a learning system where the user does not need to get so buried in the detail of all the controls



TECHNOLOGIES INSTALLATIONS AT THE HEART OF ECO-HOME

A Microgeneration Scheme-certified contractor chose the makes of heat pump and solar panel, based on their own experience because, according to homeowner Ian Collins, there is not much comparative information available to consumers to help them choose.

The air testing was done by a specialist contractor who attached a special unit to the front door aperture with a big fan attached, pressurised the house and looked at the leakage rate.

The ground-source heat pump was supplied by Kensa – a 2.5kW three-phase pump that supplies both the underfloor heating and the hot water cylinder. The heat output is nominally 10kW.

The underfloor heating and controls were supplied by a German company, Schluter. The system was chosen because it can be installed in a thin screed (only 31mm thick) to give a reasonably quick response. The mechanical ventilation and heat recovery system is an Itho Eco4 unit, chosen for low running costs (a DC fan that uses only 50W).

The solar hot water system is a 30-tube Thermomax DF100 system with a Resol controller, which turns a circulating pump on when the collector temperature is 6C more than the temperature at the bottom of the dual coil, 255 litre hot-water cylinder.

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QUALITY CONDITIONS

Recovering heat from air conditioned spaces is important for saving energy, but success can depend on several factors, writes **Tim Dwyer**

The challenge when recovering energy from vitiated air being discharged from an air conditioned building is to maximise the true benefit in all seasons. A system that is designed to recover energy based on the needs of winter conditions, for example, may possibly not provide any benefit or, worse still, may actually add to the operational energy use in summer.

The advantages of recovering heat will depend on whether it is sensible heat (that is, increasing or reducing the incoming air dry bulb temperature), latent heat (increasing or reducing the incoming air moisture content) or a combination of both. Where the savings are made in sensible heat, this would typically offset the need for boiler power. For latent heat, it would reduce or completely replace the need for humidification: the

actual benefit, both in cost and carbon, will depend on the primary fuel.

If the energy saved offsets the need for electricity (as is frequently consumed by local humidification units) then the benefits are many times more attractive (both in cost and carbon) than if gas was the primary energy.

Inevitably, all energy recovery devices (ERDs) will interfere with the airflow in some way, and so impose pressure drop – and hence additional fan power – on the airside system. And in many cases this additional fan power – that would normally be electrical (kWe) – will be a permanent part of the system in operation, even when the ERD is not being productive. So, aside from any additional capital cost and maintenance requirements of the ERD, the energy consumed by the extra fan power



will need to be factored into the overall assessment of system effectiveness, and the true benefit will need to be determined.

In a 'summer' mode of operation where outdoor air has a higher enthalpy than the discharged air, the savings through the operation of an ERD will be made in the plant that supplies the chilled water or direct refrigerant to the cooling coil. The refrigeration plant will typically be electrically powered. However, due to the coefficient of performance (COP) of vapour

compression refrigeration equipment, each kWth of air cooling saved will conserve around 0.33 kWe electrical power (this will depend on the actual refrigerant equipment and its operating efficiency).

The primary fuel and the determination of its cost and carbon impact will be dependent upon the systems used. So, for example, if the cooling was provided by absorption chillers that were powered from process 'waste' heat, any savings in the cooling cost and carbon would be relatively small

compared to cooling being provided by an electrically powered vapour compression refrigeration system.

Heat recovery

There are a number of ERDs offered 'as standard' by most air handling unit (AHU) manufacturers. However, the performance of ventilation energy recovery systems will normally depend on the extract ventilation system that feeds it. For example, when recovering sensible heat from air being removed from the occupied spaces, it is particularly advantageous to remove the air at a point where there is a specific convective heat load. This may be through a light fitting (typically using the ceiling plenum) or from above a piece of electrical equipment that would otherwise convect its unwanted heat into a specific area of the conditioned space. This will increase the return air temperature above the normal room temperature providing greater opportunity to increase the temperature of the incoming air.

Recirculation heat recovery

The simplest way of recovering energy from ventilation and air conditioning systems is to recirculate a proportion of the extracted vitiated air to mix with the incoming outdoor air. This can usefully increase or decrease both dry bulb temperature, and the moisture content of the, now mixed, air entering the AHU as shown in Figure 1.

Appropriate control using enthalpy or dry bulb sensors ensures that recirculated air is used only when it is beneficial to do so. This ➤

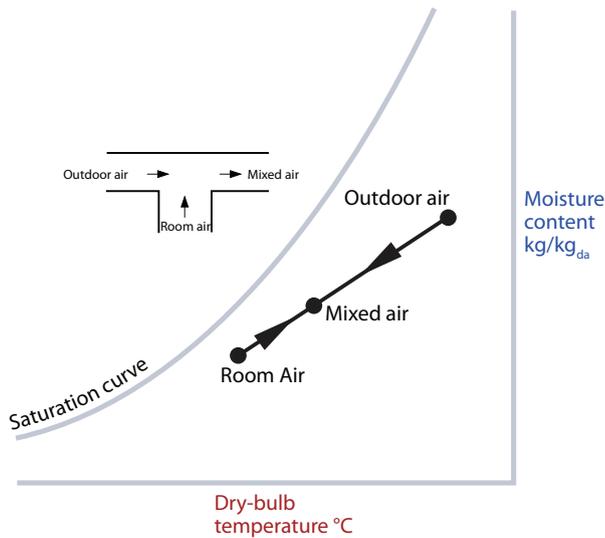


Figure 1: Recirculating air to moderate outdoor air summer conditions

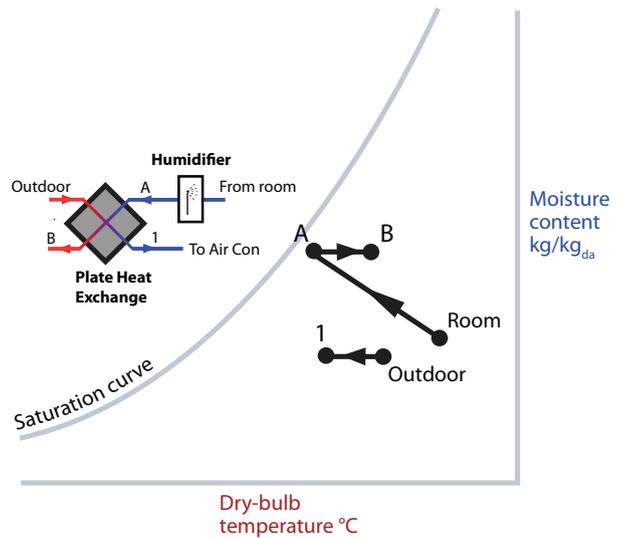


Figure 2: Washing the vitiated air to enable cooling heat recovery

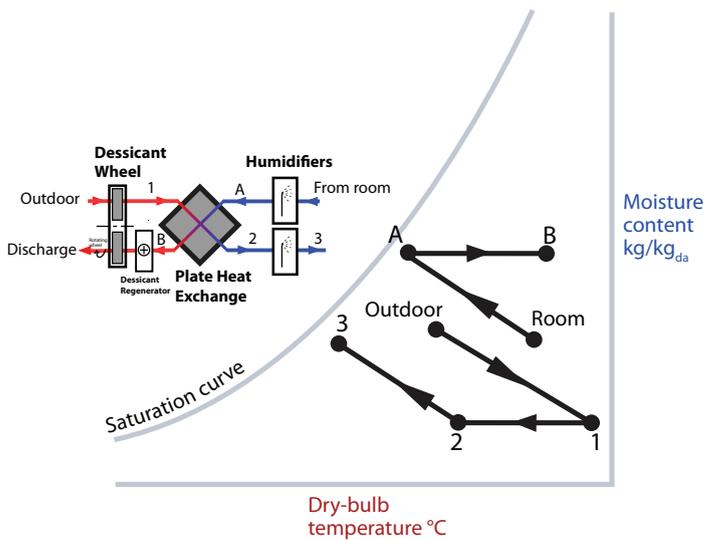


Figure 3: Enhanced heat recovery employing desiccant wheel

loss through the fully open dampers that provide the modulating fresh air control.

Heat recovery without cross contamination

There are many cases where it is not possible to use recirculated air (due to noxious internal contaminants or process requirements) but there are several well understood heat recovery methods to prevent cross contamination of the air. Probably the most commonly used are the plate heat exchanger (or recuperator), the thermal wheel and the run around coil.

Traditionally these units exchanged sensible heat, affecting the dry bulb temperature of incoming airstreams by sensible heat passing through sets of metal, glass or plastic dividing plates to contraflowing airstreams on the other side or, in the case of a runaround coil, via a heat exchanger in each air stream connected by water (or ‘refrigerant’) pipework. If one airstream is cooler than the dew point of the other, there is also a chance that condensation will form and the heat absorbed from the water condensing in the warm air will transfer to the other airstream as sensible heat – this would typically take place in winter with cold outdoor air and warm (moist) indoor air. In ‘summer’ operation, the heat recovery device will act to cool the incoming warm air by exchanging heat with the cooler outgoing air.

Air washing

This summer cooling effect may be enhanced by ‘washing’ or humidifying the outgoing air. This is particularly beneficial where outdoor conditions are moderate and

The opportunities for heat recovery extend far beyond the simplicity of recirculating air. But it is imperative that the total energy consumption is considered over the whole operating period

would typically mean that there would be a minimum amount of outdoor air (and hence maximum recirculation) when the outdoor conditions were extremely cold or extremely hot – in which case, the proportions of fresh and recirculated air would be modulated by comparing the conditions of the air being extracted with that of the outdoor air, with the aim of ensuring that the mixed air entering the AHU is at the most economical condition.

Modulating the outdoor air rates in UK air conditioned general offices, for example, can mean that there will be little or no refrigeration requirement when outdoor temperatures fall below 10°C, known as ‘free cooling’. During ‘mid-season’ conditions, the fresh air may be modulated to maximise the benefit of the cooler outdoor air. The additional fan power – above that of a full fresh-air system – is limited to the pressure



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Recovering energy from vitiated air being discharged from an air conditioned building presents a challenge when it comes to maximising the benefits in all seasons

➤ already below the room air temperature, as shown in Figure 2 – a condition where a stand-alone heat exchange could not pass any useful cooling to the incoming air.

This could be achieved by spraying a fine water mist into the air, using ultrasonic humidifiers, or by passing the air through a wetted pad. This will adiabatically increase the moisture content in the air, so reducing its dry bulb temperature whilst roughly maintaining its wet bulb temperature. The incoming air benefits from the reduced dry bulb temperature on the other side of

the ERD (that is now below the incoming air temperature) with additional sensible cooling; but there will be no transfer of the moisture, as the two air streams are physically separated and the moisture laden air will be carried in the extracted air to discharge from the system outlet louvre.

The principle of adiabatic cooling can be enhanced by more sophisticated systems, but its use to date appears to be relatively limited in air conditioning heat recovery. These opportunities were comprehensively described and discussed by Van Zyl & Warwicker at the CIBSE national conference in 2003 (downloadable at <http://www.cibse.org/pdfs/3dwarwicker.pdf>). For example, further benefits may be achieved (at the

“ The challenge is to maximise the benefit of recovered energy in all seasons

cost of additional fan power and capital equipment) by using desiccant wheels in conjunction with the ERDs, as in Figure 3.

Desiccant wheels appear physically similar to thermal wheels, but the ‘honeycomb’ that makes up the packing material is coated with a desiccant material used to absorb water vapour from one air stream and reject it to the other. The airstream that is being dried will also gain sensible heat as the vapour is absorbed by the warm desiccant material. The resulting air at point three in Figure 3 is sensibly cooler than the outdoor air although, once again, the room temperature that is being used to provide the cooling effect is initially at a higher temperature than the outdoor air.

To make this system work the desiccant needs ‘regeneration’ (that is, drying) and this requires heating energy that will make the overall system operation less efficient. However, since this heat recovery is working at ‘summer’ conditions, there may be an opportunity to provide the regeneration heat using solar energy as described by Höfker et al in the paper: Desiccant Cooling with Solar Energy (freely available from <http://www.cibse.org/pdfs/desiccant.pdf>).

The opportunities for heat recovery extend far beyond the simplicity of recirculating air. But it is imperative that, whatever mechanisms are used, the total energy consumption, including all ancillary devices and especially additional fan power, is considered over the whole operating period. **CJ**



Jargon buster

ABSORPTION CHILLER:

A chiller that is primarily driven by heat rather than mechanical energy and employs pumped absorbent chemicals to absorb and release refrigerant vapour to provide cooling.

AIR HANDLING UNIT:

A set of modules, either pre-assembled or ‘bolted together’ in situ typically including the supply and extract fans, filters, heating and cooling coils, humidifier, heat recovery unit and motorised dampers – that connects to the intake and extract ductwork to supply conditioned air and remove vitiated air.

COP:

Coefficient of performance is a measure of the efficiency applied to refrigerating machines. Vapour compression refrigeration systems used for air conditioning applications would typically have a COP of 3 and above (ie produce 3 kWth cooling for each kW_e of electricity used to drive the compressor). Absorption systems will have a COP of around 1 but can use waste heat to provide power.

DRY BULB (SEE ‘WET BULB’):

The temperature of air measured using a simple thermometer (the thermometer’s sensor or bulb should be silvered or protected from the effects of local radiant heat, so that it measures only air temperature and not radiant temperature). Measured in degrees Centigrade.

ENTHALPY:

Known as ‘Specific Enthalpy’ – this is a measure of the amount of energy contained in the air compared to completely dry air at 0 deg C dry bulb. Air with a higher temperature and/or higher moisture content will have a higher enthalpy. Colder air will have a negative enthalpy. Measured in kJ/kg.

HEAT RECOVERY:

The term used to describe the recovery of heat from air that would otherwise have been discharged from a ventilation system. In summer this would typically be used to reduce the dry bulb temperature of the incoming by allowing the outgoing cooler discharge air to absorb some of the sensible heat from the incoming air.

In winter the flow of heat is reversed and there may also be potential to increase the moisture content of the incoming air from the more humid discharged room air (providing an exchange of latent heat).

FREE COOLING:

Typically in mid season, by modulating the dampers in the AHU to provide the cooling for the supply air using cooler outdoor air, rather than the cooling coils.

VITIATED AIR:

Air that is being removed from a room that has given up its heat (or ‘coolth’) and/or collected the airborne contaminants (gases and particles) and needs to be replaced with conditioned supply air.

WET BULB:

Measured as with dry bulb temperature but with a wetted wick around the bulb and used (in conjunction with dry bulb temperature) to determine the amount of water vapour in the air (its moisture content and saturation) – electronic sensors can simulate a ‘wet’ bulb. Measured in deg C.

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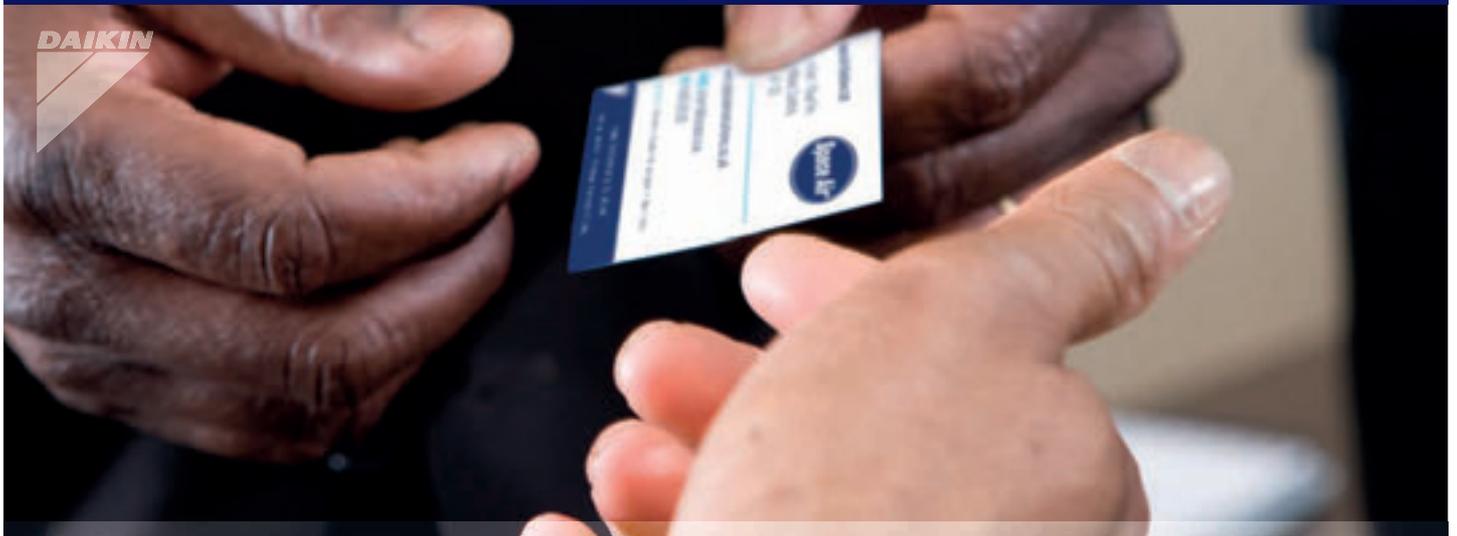
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ENERGY COUNTERS

The inspection of air conditioning systems is crucial to ensuring they can operate at maximum efficiency. But how effective are current inspection procedures in Europe, and how can these be improved? An EU-backed initiative has sought to provide answers to these questions. By **Ian Knight** and **Roger Hitchin**

Regular inspections of air conditioning systems with an effective rated output of more than 12 kW have been mandatory under the European Energy Performance of Buildings Directive (EPBD) since January 2009. The purpose of the inspection is to try to improve the energy efficiency of such systems. However, to engage the owners/operators of the systems in the aim of achieving this improved energy efficiency, it is essential to answer one question: is this inspection just another administrative burden, or does it really provide some useful insights into possible energy savings?

A pan-European project to study aircon inspections has been conducted in the past few years with a view to understanding where the inspection process identifies real energy conservation opportunities (ECOs), as well as helping to improve

the cost-effectiveness of the aircon inspection process in the diverse markets of EU member states. The HarmonAC (harmonizing aircon inspections) project monitored and measured energy use in 42 aircon systems and their components in eight countries (*see box, page 41*).

The findings of the study provide many important insights into aircon energy usage, and identify some of the obstacles to the wider use of high-quality aircon inspections. They have also led to the development by HarmonAC of tools for use in the inspection process, and for the training of inspectors. Below are some of the key findings of the HarmonAC project, based on information in its *Final Report*.

Benefits

The opportunities for saving energy in aircon systems appear substantial and occur regularly across all system types in all areas of Europe. Average savings of 35% to 40% were identified in both the largest and smallest systems. Energy savings of 50% or above in an aircon system component were >

Significant savings can be made in all types of aircon system, but the benefits are not always clear to system owners or operators



found, and up to 10% of a total building's electrical energy use. However, the current aircon inspection procedures appear to identify only a small percentage of the potential savings available in many systems.

The reason for this is that many energy conservation opportunities were not possible to find without long-term monitored data specific to the aircon system components.

In addition, only real consumption data for the system inspected allows the inspector to calculate energy savings and benefits with sufficient authority to convince the owner that this might act as a basis for a decision to invest time and money into improving efficiency.

Furthermore, among the energy conservation opportunities that can be implemented most easily are those measures related to operation and control of the aircon system, but these can again often only be identified with detailed performance data. Unfortunately, although this data, which is specific to a system, significantly influences the potential identification of ECOs, only a few aircon

system owners/operators have access to this level of system data at present.

Cost

The major cost factor within the inspection process is the time taken by the inspector. Field testing showed that there is generally a good correlation between floor area and time taken to complete an inspection.

The average time needed for an inspection is around one day for small packaged systems, and

up to three days for the largest systems. However, these timings assume that most of the system and building details required are available – and this is rarely the case, especially for systems that are being inspected for the first time.

Standards

As currently written, the European Standards covering aircon inspections are perhaps too time consuming, ask for details and information that are generally difficult or impossible to obtain for the large majority of systems, and cannot

address some of the major opportunities for reducing energy use in aircon systems. The current inspection process is also flawed due to:

- A lack of trained inspectors to undertake the inspections needed;
- A lack of existing information about installed aircon systems, making the inspection process either very expensive or incomplete; and
- A lack of high profile penalties being imposed for non-compliance.

The above three factors have led to very low-cost 'compliance' inspections dominating the market.

Owners

Owners can help support good-quality inspections in a number of ways. Information on the system and the building should be gathered and structured well in advance of the inspection to give the inspector a good overview on the system and prevent him/her having to search for documents while on site.

The inspector should be accompanied by an experienced and motivated member of the technical staff to answer questions, help with measurements and provide access to parts of the system that the inspector is not

Building owners can help to support good quality inspections in a number of ways



Apart from inspections there are many practical things that can be done to improve the energy use in aircon systems

able to touch for reasons of insurance. This will save time and significantly improve the quality of the inspection report and recommendations.

The implementation of an energy monitoring system capable of recording the consumption at the level of the aircon system components will not only increase the quality of the inspection recommendations and help to quantify (monetary) savings, but will also help the owner to achieve long-term reductions in energy consumption.

Conservation

The most frequently occurring ECOs were missing or incorrectly set time clocks, incorrect thermostat settings, blocked filters and the potential to upgrade the system to a more efficient one.

Current aircon inspection procedures identified only a small percentage of the potential savings available in many aircon systems. Many significant ECOs were not possible to find without long-term monitored data specific to the aircon system components.

Many of the easiest and cheapest ECOs to implement are those that are related to the operation and control of the aircon system. But, again, the faults related to these issues often cannot be found without detailed monitoring data to show their existence.

The costs of implementing physical changes to systems were generally likely to be prohibitive compared with simply accepting the additional running costs of the more inefficient systems. This means that many ECOs are, in practice, unlikely to be implemented even if identified and quantified.

This means a large part of the potential energy efficiency of an aircon system is 'locked in' during its design and equipment selection stage.

Conclusion

The HarmonAC project has shown that the energy savings are potentially very significant in all system types. However, energy saving benefits from well-run systems are not clear to either owners or operators. There are also still many obstacles to achieving an effective inspection, and there are insufficient inspectors to undertake all the inspections needed.

Despite this, there are still many practical things that can be done to improve the energy use in aircon systems outside of an inspection – principally the establishment of energy benchmarks against which owners can test their systems, and by introducing mechanisms that provide the aircon system owner with a very clear and

simple message that it is cheaper to run their systems efficiently than to have an inspection.

The project findings have also reinforced and quantified what was already considered to

be 'good practice': to achieve good indoor conditions and good energy efficiency, it is necessary to have good operation, maintenance and control of an aircon system, as well as good record keeping and choice of the correct type and design of system for the end-use activity.

HarmonAC hopes that, by helping to demystify the energy consumption of aircon systems and having examined the inspection process strengths and weaknesses in detail, everyone can benefit from revised regulations, standards and operating practices that will help move Europe towards achieving cost-effective improvements in aircon system energy consumption in practice. **CJ**

A copy of the HarmonAC final report is available at www.harmonac.info

● **DR IAN KNIGHT** of Cardiff University School of Architecture and **ROGER HITCHIN** of BRE were involved in the HarmonAC project



THE HARMONAC PROJECT

Through undertaking monitoring and measurement of the energy use in 42 air conditioning systems and their components in eight* EU member states, HarmonAC has produced an evidenced-based report on the energy conservation opportunities (ECOs) generally available in air conditioning systems.

These case studies have been compared with ECOs found from field trials of aircon system inspection procedures, which are based on EN15240 – the CEN Standard for aircon inspections. This comparison has enabled conclusions to be reached about how many of the ECOs that are available would be able to be identified and implemented in EU states as a result of the Energy Performance of Buildings Directive inspection process.

Other outcomes from the project include a guide to ECOs for aircon systems, a teaching package resource for use by trainers of aircon inspectors, and six computer-based tools for use during aircon inspections.

An online searchable database of the case studies and field trials undertaken during HarmonAC provides information on measured energy consumptions from aircon systems and their components from across Europe, and, where applicable, the savings achieved in each system.

Visit <http://paginas.fe.up.pt/~harmonac/site/?option=case>

* Ten project partners from eight countries took part in the HarmonAC project, which was backed by Intelligent Energy Europe, an initiative of the European Commission. The countries were: Austria, Belgium, France, Greece, Italy, Portugal, Slovenia and the UK, which was represented by the Welsh School of Architecture at Cardiff University, and the Building Research Establishment.

Source: www.harmonac.info

CLASS ACT

A new eco-friendly school has largely forgone the benefits of mechanical ventilation in favour of naturally generated air flow, writes **Mark Jansen**

Loxford School of Science and Technology, a £38m Building Schools for the Future project on the site of an existing school, was developed by the designers from lessons learnt on previous schemes. This meant forgoing the carbon-reduction benefits of specifying a heat-recovery system, in favour of a simple user-operated system with openable windows and minimal mechanisation.

Located in the London borough of Redbridge and occupied since September

last year, the building, which has space for 2,000 pupils, has achieved a BREEAM Excellent rating. It was also shortlisted in the New Build Project of the Year category of the CIBSE Building Performance Awards 2011.

The school design aimed for low energy consumption through passive measures such as natural ventilation, night-time cooling and a pre-cast concrete envelope, with an improved air tightness value of 4.36 against a Building Regulations requirement of 10. The overall objective was to exceed carbon reduction targets set out in regulations by 20 to 25%.

The architectural designer, Aedas, has won financial backing from the Technology Strategy Board (under its Building Performance Evaluation Programme) to carry out a detailed post-occupancy evaluation. The post occupancy evaluation (POE) will serve as a benchmark to provide a system for measuring the building's



The design for Loxford School, which opened in September 2010, aimed for low energy consumption through passive measures



Loxford school: sectional perspective

Servicing and ventilation strategy



6 We wanted as passive an approach as possible, to reduce carbon emissions and keep energy costs down

performance. 'We wanted as passive an approach as possible, to reduce carbon emissions and keep energy costs down,' says Michael Pangalis of Max Fordham, the consulting engineers on the project. 'Natural ventilation, exposed concrete soffits and a solar shading strategy work to regulate the internal temperature in the summer.'

Site constraints mean that the building takes the form of two long classroom ribbons stretching north to south, with long façades facing east and west. The two ribbons are separated by a series of courtyards and pods accommodating library, dining hall, and other larger volume spaces. The building orientation created potential problems of excessive solar gain in the ribbon classrooms, especially during the afternoon.

To compensate, the windows feature solar-control glass. Vertical solar shades are also fixed along the length of the external façade, just to the south of each window, to reduce glare caused by direct sunlight and to shorten the periods during the school day when blinds need to be drawn. Although

the shades inevitably have an impact on the amount of daylight entering the room, they are perforated to allow diffused sunlight to pass through. The size of the perforations was calculated using computer models and physical testing by building a mock-up on site.

Louvres fixed in front of the openable windows allow fresh air to enter the classroom while keeping the windows secure. Project architect Michael Hoehenwarter says: 'Aedas made a special point of engaging with the manufacturers early on and to insist that achievable free areas were calculated for each window type and opening mechanism. This helped to ensure that adequate fresh air would enter the classrooms.'

Judit Kimpian, head of sustainability at Aedas, claims many schools' natural ventilation systems are ineffective because the openings are too small, due to security concerns and mechanical restrictions. Aedas believes it has resolved this issue.

Says Kimpian: 'Inside, the blinds on each window stop short of covering the fresh air >

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FACTFILE

LOXFORD SCHOOL OF SCIENCE AND TECHNOLOGY

RATINGS: BREEAM Excellent and Energy Performance Certificate B

CARBON REDUCTION: Design seeks 20-25% reduction in CO₂ levels against 2006 Building Regulations

POST-OCCUPANCY EVALUATION: Funded by Technology Strategy Board and beginning early 2011

PRE-CAST CONCRETE ENVELOPE: Helps achieve air-tightness value of 4.36, against Building Regulations requirement of 10

SOLAR GAIN: External 'fins' beside windows provide shading to reduce solar gain and glare

GROUND-SOURCE HEATING AND COOLING: Uses ~60 closed loop boreholes running about 100m deep beneath the sports pitch, to supplement winter heating and provide cooling in summer

CHILLED BEAM COOLING SYSTEM: Used for IT suites and server rooms

NATURAL VENTILATION: Used in conjunction with night-time cooling from exposed concrete soffits for most classrooms

CO₂ SENSORS: Provide teachers with 'traffic light' warning system on air quality in classrooms, to maximise efficiency of natural ventilation and heating

METERING: Heating, lighting and power all sub-metred to enable energy use to be monitored

portal, to encourage opening them, both during the day and in the late afternoon for night-time cooling.'

CO₂ sensors in classrooms use a traffic-light prompt system to advise teachers on the internal air quality: too much CO₂, and the light indicates that the windows should be opened. The lights also warn if there is too much fresh air coming in during cold periods, reducing the efficiency of the heating system, so the opening should be reduced.

On the courtyard side of the classrooms, above the main circulation spines, there are actuated panels, controlled by the building management system that open to allow cross-ventilation. In those parts of the school where there are three- and four-storey atria between the ribbons and the pods, louvres have been built into the roofs to create a stack effect, drawing air through the building.

Around 80% of classroom ceiling areas have exposed concrete soffits, which absorb heat during the day and release it at night as part of the passive night-time cooling

the space heating during winter. The designers believe it will reduce the school's carbon emissions by 10%. Redbridge Borough Council chose this in preference to a biomass boiler.

Mechanical ventilation with heat recovery is used in internal areas that do not have access to the façade. Chilled beams provide comfort cooling in areas with high heat gains such as the IT suites. Water circulates

between the chilled beams and the boreholes beneath the sports pitch via a heat exchanger located in the plant room. In this way heat is removed from the classrooms and rejected to the ground. A similar strategy is used to cool down the IT server areas using water-cooled

variable refrigerant flow air-conditioning units.

Loxford also features efficient lighting design. The row of luminaires nearest the external windows in each classroom is controlled separately from the row at the back. Daylight and occupancy controls also aim to reduce energy used by lighting

Aedas made a special point of engaging with manufacturers early on, to ensure that adequate fresh air would enter the classrooms



strategy. In the remainder, a raft of acoustic attenuation material hanging from the ceiling provides a mask for pipework and a conduit for the lights, giving the ceilings a clean look. This pattern is repeated throughout the building.

'We gave primary consideration to the coordination of the exposed services with the building elements to achieve an integrated strategy both visually and functionally,' notes Pangalis.

The school has a ground source heat pump system consisting of deep vertical boreholes beneath the sports fields, which, in tandem with gas-fired boilers, provides

throughout the building. Stands to support future solar panels across most of the roof space, together with the necessary risers, have been included in the final build.

Sub-meters have been installed to measure separate elements of energy consumption such as heating and lighting. The building management system (BMS) offers the ability to broadcast the energy consumption figures over the school's computer network to better inform the occupants. Once the ground source system goes live and the post-occupancy evaluation begins, the team will be able to see exactly how well its designs are working. **CJ**

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Many innovative sustainable designs for schools have been developed in recent years, but some argue that the procurement process now needs to be streamlined. The image shows Richmond School in North Yorkshire, a BSF refurbishment project designed by Atkins

LESSONS IN DESIGN

Britain's construction sector faced great uncertainty last summer when the new coalition government cancelled a major school-building renewal programme and pledged to find a better alternative. So, several months later, what are the prospects for the sector? **Mark Jansen** reports

The decision by Education Secretary Michael Gove to scrap the Building Schools for the Future (BSF) programme in July 2010 was bad news for a construction industry already hit hard by the collapse of the commercial property market. Launched under Tony Blair's government in 2004, more than a hundred local authorities were participating in the £55bn BSF programme at the time of its passing.

Gove justified his action by arguing that BSF was 'inflexible' and 'needlessly complex'. Some in the industry agree with him. The good news is that investment in new schools is likely to continue, but there will be far less money and the procurement process is likely to be drastically overhauled, say observers. School construction will become much more standardised, with fewer sustainability 'frills'.

Back in July, Gove announced a comprehensive review of capital investment in education, headed by Sebastian James, group operations director of the electrical retailer DSG International. Builders, architects and engineers were among those invited to comment on how schools construction can be made more efficient.

James's final report was still awaited as *CIBSE Journal* went to press but most observers already agree on the direction of travel. 'It will all be very, very basic,' says a senior executive at a construction firm working in the sector, who did not wish to be named. 'There will be no touchy-feely stuff like there has been over the last two or

three years. There will be less emphasis on things like BREEAM and carbon reduction. School designs will be standardised, there won't be anything that will "wow" people.'

Capital expenditure for schools has already been slashed. In December, the Department for Education announced that £2.1bn would be available for schools in 2011-12. According to the Local Government Association (LGA), this is almost 75% less than in the previous year, once all the various programmes have been added together.

'This £2.1bn will meet some of the most urgent needs but, given the shortage of pupil places in some areas and the condition of some school buildings, some schools and young people are going to be disappointed,' says an LGA spokesman. The James review will inform capital allocations for 2012-15.

The National Association of Head Teachers, along with some contractors, expect the government to increase spending on schools in the longer term. Policy adviser Sion Humphreys believes £15bn will eventually be made available to invest in schools over the next four years, based on Department for Education figures. This sum will cover new buildings, refurbishments and related capital costs.

'It is estimated that half of that £15bn will go on new academy and free schools,' he

says. But Humphreys adds that some of that money is already earmarked for existing BSF projects, and there is also a growing need to build new primary schools because of demographic changes.

'There won't be a lot of money left for the existing estate, so by 2015, there's probably going to be a lot of fairly dilapidated stock,' Humphreys predicts. Philip Watson, design director and head of education for

Atkins, believes firmly that the procurement of new schools has to be streamlined. Projects should come to the market in batches rather than singly, to allow the lead contractor to secure efficiencies in the supply chain, he says. In addition, the bid process must be shortened.

Under BSF, bids could take 18 months, but new Academy school building programmes in Doncaster and Suffolk have whittled the process down to just 13 weeks, says Watson.

'Why should we design toilets and sports halls and classrooms from scratch every time? There is no reason why these things can't be standardised,' insists Watson.

'We have acquired a big body of knowledge on building schools now; there is no reason we can't use it to reduce design times and the errors that designers and contractors tend to make if they've got to start from scratch,' says Watson, adding that standardisation would enable contractors to

Why should we design toilets, sports halls and classes from scratch every time? There is no reason why these can't be standardised



The future procurement of new schools is likely to adopt more of a no-frills approach, according to some experts. The computer image shows Shotton Hall Academy in Peterlee, Durham. The new BSF school was designed by Atkins

➤ reduce costs throughout the supply chain.

He has observed designers and engineers using 'lots of gymnastics' to achieve targets such as maximum temperatures in a school: 'I think we have relied too much on add-ons to the building design to make the environment work,' he says. 'There needs to be a more consistent way to achieve a good environment for teaching and learning.' For example: 'Conversations about whether a school was naturally ventilated, mechanically ventilated or a mix, always seemed to go on and on. In our experience, hybrid solutions, where you're driving fresh air around a building, is probably cheaper than natural ventilation, where

you're having to spend money to create things like stack vents, actuated windows and a building management system that automatically opens windows when temperatures reach a certain level.'

Standardisation can mean better buildings, Watson argues: 'If you standardise some of the components and use off-site construction methods, you can have high-quality design that is potentially pre-assembled, contractors get familiar with how those components come together and actually it can improve build quality.'

Some observers believe sustainability will be less of a priority. Garry Scott, building services associate at Ramboll, says: 'Most of our BSF input has either completed or stalled at present. Many of the live BSF projects we are working on are subject to cuts of 20% to 40%, with a big impact on sustainability. Typically, planning policy is being diluted and energy targets and

Many of the live BSF projects we are working on are subject to cuts of 20% to 40% – with a big impact on sustainability

renewables are being dropped as an option – a worrying trend.' Scott adds: 'We are endeavouring to be innovative, however – trying to meet targets at minimal cost, considering low-tech solutions such as passive design.'

Some believe that wider use of building information modelling (BIM) to produce 3D designs will help to reduce costs. Phil Cusack, regional director at AECOM, says: 'Head teachers sometimes don't really understand two-dimensional drawings, but they do understand a three-dimensional model. BIM can also be used as a design tool for sub-contractors and suppliers.'

While the industry awaits the outcome of the James review of school procurement – with reports that it could be delayed till the spring – there is little doubt that the government is determined to cut design and construction costs of schools. This could mean a cap on the size of new projects. We can also expect ministers to look to the industry to come up with 'creative' ways to make these reductions and savings. So designers would do well to be thinking about these new challenges now, ahead of the expected shake-up in procurement. **CJ**

How well built are the new schools?

Building Schools for the Future (BSF) came in for strong criticism from the architectural watchdog, CABE. In 2008 it reported that 87.5% of the designs were either 'poor' or 'not yet good enough'. Only three of the 24 school designs checked by CABE were either 'good' or 'excellent'.

The challenge of designing and building numerous new schools, with strong input from head teachers and governors, proved to be a big one. In 2007 the Labour government had already acknowledged that changes were needed. A 'readiness test' was introduced, whereby councils had to prove they were ready to manage such big projects before being allowed to spend BSF funds.

Four years on, there seems

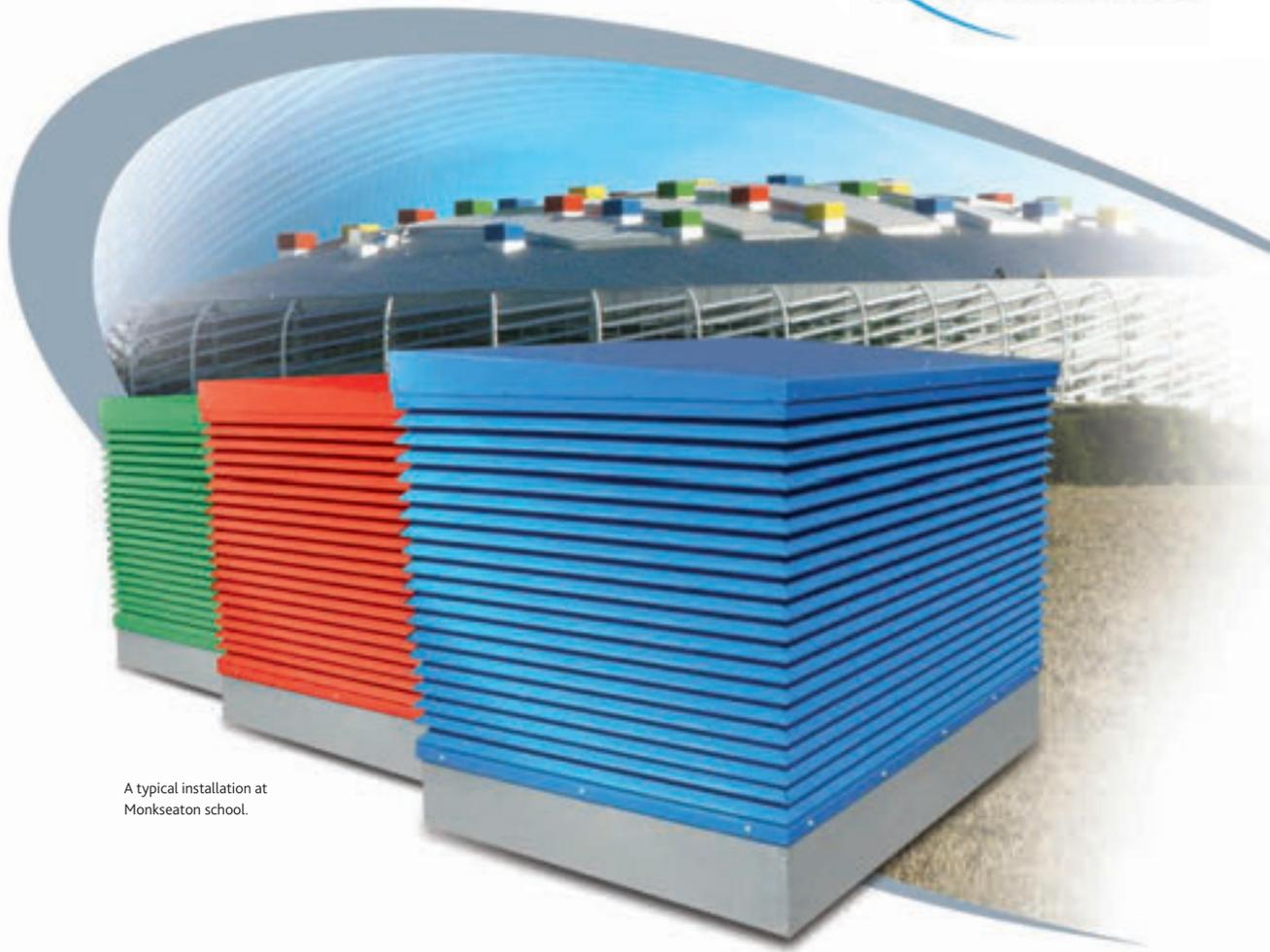
to be little evidence that the new schools are not fit for purpose. 'The education sector was faced with this huge capital expenditure, which it had no prior experience of,' says Sion Humphreys, policy advisor at the National Association of Head Teachers (NAHT). 'There were lots of problems, but it did give schools a say in the planning of the new buildings, so they reflected the curriculum and where the school was going.'

Humphreys says most NAHT members are happy with their new buildings: 'There have been some cases where the atria get too hot in the summer, for instance, but those are extreme cases and I don't think they are typical.'

A spokesman for the Local

Government Association agrees: 'We thought there was waste and bureaucracy [with the BSF programme]... we would prefer to see a simpler formula,' he says. '[But] for the staff and pupils who got new schools, in many, many cases, it has been a much better experience than to continue in schools that need improvement.'

An evaluation of BSF by PricewaterhouseCoopers, commissioned by the Department for Children, Schools and Families and published in February 2010, found that 'The vast majority of head teachers in open BSF schools are very positive about the benefits they are deriving from their new or refurbished buildings.'



A typical installation at Monkseaton school.

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BACKGROUND NOISE

Taking acoustics fully into account when designing new schools can make a significant difference to the well-being of their various users, writes
Jo Edwards

Research indicates that the acoustic properties of rooms used for teaching can have a significant impact on the educational experience of students and teachers. The main concern is high levels of noise in classrooms, which can have a detrimental effect on children's performance at school, particularly in relation to tasks involving language skills. It is also well documented that teachers have a high risk of developing voice strain and other voice problems when they teach in high-noise environments for extended periods.

Acoustic design is concerned with the enhancement of sound and the control of

noise or unwanted sound and is sometimes seen rather as a black art, due to the extensive use of logarithms and complex terminology. In addition, the cost of acoustic control measures can appear prohibitive. However, the main principles relevant to education buildings are straightforward and – providing the considerations are taken into account early in the design process – the cost impact can be controlled.

The brain interprets sound in terms of its loudness (amplitude), pitch (frequency) and character (temporal variation). The threshold of hearing occurs at 0.00002 Pascals (Pa), but the threshold of pain is not reached until a sound pressure amplitude of



Nicholas Hare Architects/Martin Charles

Reverberation time control at Alexandra Park School, London

200 Pa is exceeded. This means that in terms of pressure, the amplitude range of hearing of the human ear is 10,000,000 to 1. The use of the decibel (dB) to describe the sound pressure level (loudness) is a simple way of reducing this range to a more manageable scale of 0 to 120 dB using a logarithmic scale.

Figure 1 indicates the wide range of frequencies and sound pressure levels audible to humans, demonstrating the reduced sensitivity at low frequencies. 'A weighting' of sound pressure levels (dB(A)) is a method of accounting for this

6 High levels of noise in classrooms can have a detrimental effect on children's performance

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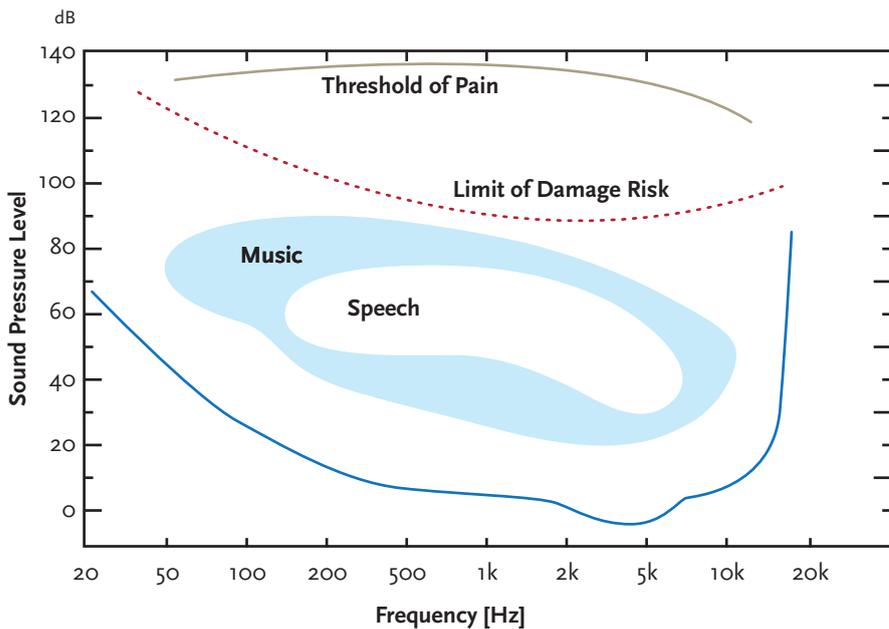


Figure 1: Range of audible frequencies and sound pressure levels

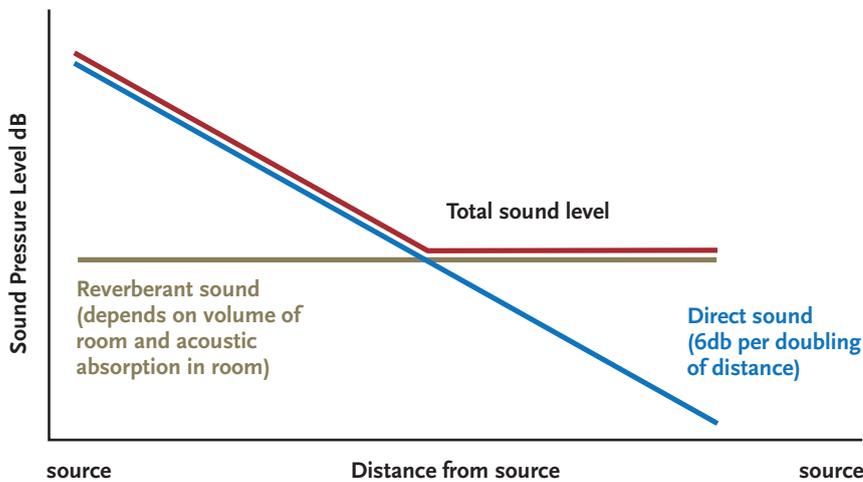


Figure 2: Representation of the direct and reverberant sound fields in a room

To avoid over-design, it is vital to agree with clients and BREEAM assessors that RTs are compliant with the criteria in a furnished state

variation in sensitivity of human hearing to frequency.

In education buildings, the three most commonly discussed acoustic parameters are: reverberation time; the noise level in teaching rooms, due to external noise intrusion and internal building services noise; and the sound insulation of separating elements such as partitions, floors and doors.

The first two of these considerations is discussed with respect to the benefits of early inclusion in the design process.

Reverberation

Reverberation time (RT) is the time taken for sound within a room to decay by 60 dB after repeated reflections from the room surfaces. A large cathedral may have an RT of around eight seconds and a recording

studio closer to 0.5 seconds. RT is relevant to education buildings as it contributes to the intelligibility of speech in a room. The sound field within a room is described by a combination of the 'direct' sound, which comes straight from the source, (teacher) to the receiver (student), and the level of 'reverberant' sound the student hears (see figure 2).

If the reverberant sound level is close to or higher than the direct sound level, the clarity of the direct sound and therefore the information being imparted by the teacher will be masked by the reverberant sound. The longer the RT, the higher the reverberant sound level will be relative to the direct sound, and the poorer the level of speech intelligibility.

The RT in a teaching room tends to be controlled by the use of acoustically absorbent surface finishes, such as mineral fibre or perforated metal ceiling tiles, or, where exposed soffits are required, suspended acoustic baffles or lighting rafts with integrated absorption.

Understanding the testing requirements at the beginning can be of significant benefit in terms of design requirements. For instance, strict compliance with Building Bulletin 93 – required to gain BREEAM – calls for school tests to be undertaken in unfurnished rooms (see box on page 56). In an unfurnished room, standing waves often occur because of parallel surfaces such as walls or floors and ceilings. If the same room is furnished, the furniture breaks up the sound field, resulting in a shorter RT.

In the practical teaching situation the room will be furnished, therefore measurement of the RT in an unfurnished room gives an unrealistically high result. In order to compensate for this, additional absorption treatment would need to be introduced to the room. For example, Figure 3 presents measured data for the same classroom in the furnished and unfurnished state. If the room had been designed for compliance unfurnished, an additional 10 sq m of acoustic panels would have been required in the room. This would have a significant cost if rolled out through an entire new building. To avoid this potential over-design, it is vital to agree with clients and BREEAM assessors that the design basis is such that RTs are compliant with the criteria in a furnished state.

In the background

As with a long RT, if the level of background noise due to external noise intrusion or

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COMPLIANCE RULES AND REGULATIONS AFFECTING ACOUSTICS

Since 2003 the acoustic design of schools has fallen under the requirements of Building Regulations Part E^[1]. Building Bulletin 93^[2] provides appropriate criteria and standard examples, with the recommendation that an acoustician is employed to review more complex considerations.

Also relevant is BREEAM^[3] for education buildings. The current 2008 version provides assessment criteria both for schools and further education establishments, making reference to BB93 and to BS 8233^[4]. Pre-completion testing is not a statutory requirement under BB93, but is required to demonstrate compliance with BREEAM credit criteria.

1. Office of the Deputy Prime Minister (2000), The Building Regulations 2000, Schedule 1, Part E
2. Department for Education and Skills, Building Bulletin 93, *Acoustic Design of Schools, A Design Guide*
3. Building Research Establishment (2008), Building Research Establishment Environmental Assessment Method Education 2008 Assessor Manual
4. British Standard Institute (1999), British Standard 8233: 1999 *Sound insulation and noise reduction for buildings – Code of practice*

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For more information about the work of the CIBSE School Design Group, and for details of how to join, visit www.cibse-sdg.org

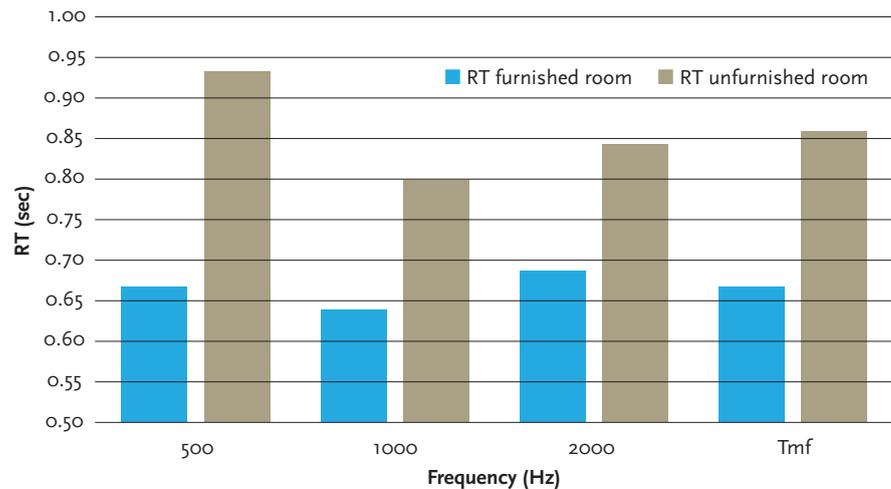


Figure 3: RT test data for a furnished and unfurnished room

internal building services is high, then this will reduce speech intelligibility by masking speech information.

If external noise levels are high, then compliance with the BB93 noise intrusion criteria can mean that an alternative, usually mechanical, ventilation strategy to open windows is introduced. This has a significant impact on

layout, space requirements and cost, as well as affecting the overall BREEAM rating of the building. Therefore, it is in the client's interest to ensure that a mechanical system is actually required.

A lack of standard information regarding the sound-reduction performance of facades with open windows can make this a design risk item. The most current state of knowledge on the issue is presented in a report undertaken by Napier University for UK Department of Environment, Food and Rural Affairs (DEFRA) to inform planning guidance or the acoustic performance of windows. The report* concludes that, while there is general agreement that an open window provides a sound insulation of between 10 and 15 dB, there is disagreement as to whether this is a weighted single figure or an average over a given frequency range, a sound-reduction index or a level difference. Further investigation by Napier University provides more detail regarding the sound reduction performance of windows with different-sized openings, but as this is based on typical window and room sizes for residential accommodation, it is not directly applicable to education buildings,

meaning a significant level of interpretation is required.

Our review of this information in relation to a school building in east London, which was exposed to typical urban levels of road traffic noise, indicated that using the standard range of sound reduction performance assumed for open

windows would result in compliance with BB93. However, risk remained due to this variation in the standard parameters and assumptions used.

Therefore, a more detailed assessment was undertaken using the Napier information, but normalised to the appropriate open area to ventilate the rooms in

question. This indicated that the risk of non-compliance was extremely marginal, but that acoustically rated passive trickle vents could be used to achieve the requirements while still maintaining adequate ventilation, providing the client with a robust, non-mechanical, system.

This type of detailed assessment, while adding a small cost and time to the early design process, can significantly reduce the risk of non-compliance on completion. Retrofitting an alternative design solution would be significantly more costly and difficult than the designed-in solution. **CJ**

* *Open/Closed Window Research, Sound Insulation through Ventilated Domestic Windows*, The Building Performance Centre, Napier University, on behalf of DEFRA (2007), NANR116

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Heat interface units

Requirements for low carbon energy solutions for homes have prompted a rethink on how heating and hot water needs are serviced in the UK residential market – leading to a growing demand for heat interface units. This CPD module will cover some of the issues surrounding the design, selection and system integration of these units

Multi-dwelling development schemes historically have incorporated individual heating plant into each dwelling as the norm, typically in the form of a combination boiler or direct acting electric heating system with hot water storage. As the residential new build sector transitions towards 'zero carbon' development by 2016, there are increasingly stringent environmental targets placed upon new developments through the Code for Sustainable Homes, Approved Document L of the Building Regulations and Planning Policy Statement 22.

In the case of multi-storey dwellings, compliance with current requirements poses a set of challenges, as it can be difficult to incorporate low to zero carbon technologies in self-contained installations on an individual dwelling basis, and using individual boilers will prove increasingly challenging to apply to meet CO₂ compliance terms. With this in mind designers and specifiers are increasingly looking towards a centralised heating plant strategy, whereby the integration of low to zero carbon technologies can be appraised in a

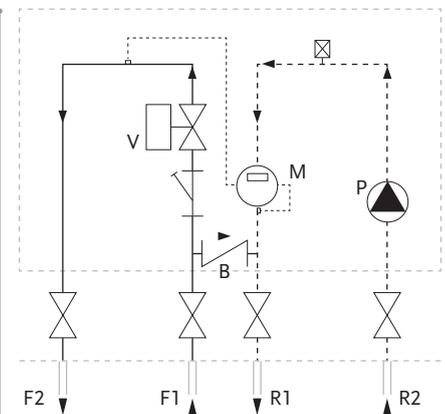
more holistic manner without the constraints imposed by an individual dwelling approach.

Of course, when dealing with a central plant scheme serving multiple dwellings, important considerations are end-user time and temperature control together with metering/billing of individual energy use. These considerations can be addressed with the application of heat interface units (HIUs).

An HIU, sometimes referred to as a 'heat box', is an integrated solution for delivering and recording the heat consumed by an individual dwelling served from a centralised heating plant or district heating scheme. HIUs provide localised control and metering in a self contained package, allowing simple integration of individual dwellings into a larger heating and hot water system.

These units can be installed either internally within each dwelling, or recessed into the dividing wall between dwelling and landlord space, allowing ease of access for inspection and maintenance.

HIUs are broadly split into two categories: heating only, and heating with domestic hot water production (DHW).



Key
 P Circulating Pump
 M Heat Meter
 V On/Off Valve
 B Differential Bypass Valve
 F1 Flow from Central Plant
 R1 Return to Central Plant
 F2 Flow to Dwelling
 R2 Return from Dwelling

Figure 1: A typical heating-only heat interface unit

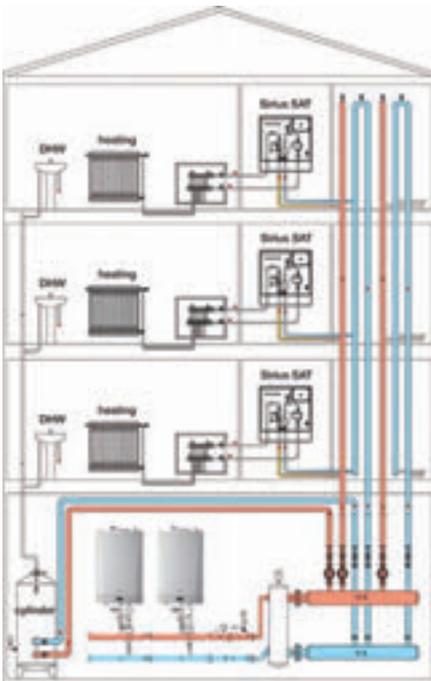


Figure 2: Schematic arrangement showing heating only HIUs fed from a central boiler cascade with domestic hot water from a central calorifier

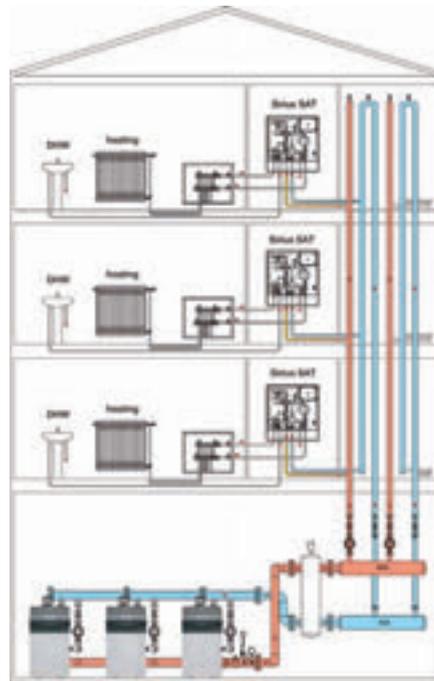


Figure 3: Schematic arrangement showing heating & DHW HIUs fed from a central boiler cascade

to allow instantaneous generation of DHW at each dwelling, in the same way as a combination boiler. In order to generate DHW at a useful temperature and flow rate, the primary hot water feed onto the plate heat exchanger should be in the region of 75°C. This may be at odds with the dwelling heating system operating regime where, in the instance of underfloor heating for example, the flow temperature required may be much lower. For this reason a mixing valve (V2) is introduced to blend primary water from the central plant with return water from the dwelling heating system, thereby allowing the HIU to satisfy differing demands dictated by DHW and space heating. In addition, a three port control valve is required to divert flow between the DHW plate heat exchanger and dwelling heating circuit; this valve is controlled on a hot water priority basis. An example of the system is shown in Figure 3.

Again variants are available incorporating a two heating zone capability for larger dwellings, or the inclusion of an adjustable balancing valve in place of an integral circulating pump.

In addition to DHW generation via a plate heat exchanger, HIUs offering primary outlets to feed a hot water cylinder within the dwelling are also available. A further variation is a heating only unit with an inbuilt DHW litre counter, thereby allowing a centralised hot water strategy but with the ability to monitor and charge for local usage within each dwelling.

Both of the schematics described so far show HIUs working with a direct connection to centralised pipework distribution; dependent upon the size and height of the building, it may be beneficial to consider hydraulic separation. With a directly connected system there is the potential for a leak, or failure of heating pipework within a dwelling to drain off a proportion of the primary heating system for the whole building. In the case of a particularly tall building, static head may also dictate the need to separate central distribution hydraulically from dwelling systems to protect emitters and fittings from excessive pressure. To address these concerns, some manufacturers provide HIUs that incorporate a further plate heat exchanger to achieve separation of the water content in the dwelling and central pipework systems. When introducing separation,

► Heating-only HIU

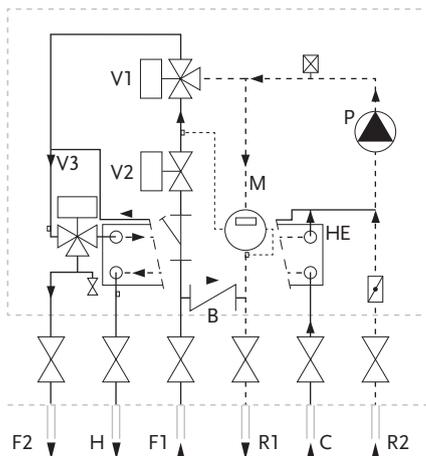
The heating-only HIU variant is fairly simple (see Figure 1): the central plant feed firstly runs through a differential bypass valve, which provides a hydraulic bypass to the return circuit in the event of no demand from the dwelling system; a motorised two-port valve provides on/off control under the dictates of the dwelling programmable thermostat or single channel programmer; and from here the system flow distributes to the dwelling circuit and heat emitters. On the return side a small circulating pump overcomes the resistance of the dwelling system and a heat meter, measuring volumetric flow rate and temperature difference across flow and return to derive energy use in kWh.

In this arrangement (see Figure 2) domestic hot water is served from a central plant room, either via calorifiers or direct gas fired water heaters.

There are variants available on the heating-only HIU principle, incorporating a two heating zone capability for larger dwellings, or the inclusion of an adjustable balancing valve in place of an integral circulating pump, in this instance hydraulic design of risers and distribution will differ (more on this later).

With the heating-only HIU there is no facility to interface or measure DHW consumption, therefore the second category of HIU introduces hot water functionality.

As can be seen in Figure 4, left, components and hydraulic layout are largely similar to the heat-only variant, but with the introduction of a plate heat exchanger



- Key
- P Circulating Pump
 - M Heat Meter
 - V1 On/Off Valve
 - V2 Mixing Valve
 - V3 DHW/Heating 3 Way Valve
 - HE DHW Plate Heat Exchanger
 - B Differential Bypass Valve
 - F1 Flow from Central Plant
 - R1 Return to Central Plant
 - F2 Flow to Dwelling
 - R2 Return from Dwelling
 - C Cold Water Inlet
 - H DHW to Dwelling

Figure 4: A typical heating and DHW HIU with plate heat exchanger

however, it is important to consider that the dwelling side will require provision for expansion, together with a filling loop and pressure gauge. It is always necessary to provide a circulating pump and there is the efficiency loss of heat transfer across the plate heat exchanger to take into account.

In all arrangements one of the primary drivers for the integration of HIUs is metering; the arrangements for this will vary with manufacturer but fall largely into two groups.

Hard-wired HIUs transmit data via a network of data cabling installed in the building fabric to a central hub. Wireless options are also available, using network nodes to boost data transmission over larger buildings, again collecting data to a central hub. At this point data can be collected by a reader device, routed to a network via a PC or transmitted via a node to the GSM telephone network. This then allows either local or remote meter reading with real time energy use, aggregate kWh consumption over pre-determined time periods and, in some instances, fault status or error notification.

With many HIUs the heat meter within the unit can display real-time consumption, which may be accessible by the occupier.

Selection criteria and design considerations

The decision on which type of HIU to employ will largely be informed by the overall building energy strategy. If sufficient CO₂ mitigation is included in the space heating provision, then HIUs incorporating DHW production via a plate heat exchanger may be the best option. However, as the predominant energy requirement in new buildings tends to be hot water production, it may be necessary to address separate space heating and hot water strategies. In this instance it can be simpler to integrate low to zero carbon technologies in a central location; for example solar or heat pump to pre-heat the cold water supply to direct gas fired water heaters. In such instances a heat only HIU, perhaps with a DHW meter, may represent the most sensible option.

Regardless of HIU type, it is recommended that one central boiler plant is a cascade system – owing to the possibility of a wide diversity in loads – and therefore able to readily modulate across a range of

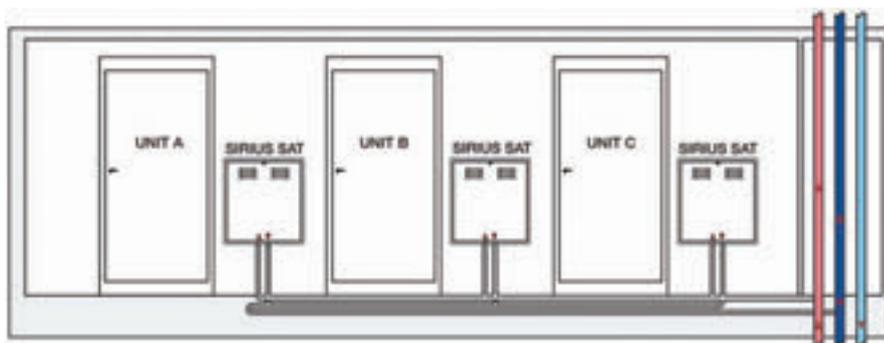


Figure 5: When deriving pipework distribution and pump sizes it is recommended that horizontal branches at each floor level are piped in a reverse return layout to assist with hydraulic balancing and to ensure even distribution of heat between dwellings

outputs. In all cases boiler plant must be capable of delivering peak space heating load. However, HIUs incorporating plate heat exchanger for DHW generation require special consideration. It may be the case that space heat load for each dwelling is in the region of 3 to 5 kW, whereas the plate heat exchanger is likely to require 35 kW or more at peak DHW flow rate. Clearly this leads to a huge disparity between heating and hot water loads, so designers must research and adopt appropriate diversity factors when determining plant capacity, in order to arrive at an economical and energy efficient solution. In most cases occupant lifestyles and typical use profiles will determine the appropriate diversity factor.

For example, in the case of private accommodation, it is likely that the morning showering period between 6am and 8am represents the peak demand for hot water generation and this load will be in excess of space heat requirements. In such instances a buffer vessel in the central plant room could be incorporated to smooth out peaks in demand pattern, reduce peak plant loads and reduce boiler capacity.

Required supply temperature will also inform plant selection; if heating-only HIUs are proposed, it is possible to match the main plant temperature regime to that required by the dwelling emitters. If heating and DHW HIUs are proposed, then it will be necessary to distribute from central plant at 75C to 85C.

When deriving pipework distribution and pump sizes, it is recommended that horizontal branches at each floor level are piped in a reverse return layout, both to assist with hydraulic balancing and to ensure even distribution of heat between dwellings (see Figure 5).

As previously described, HIUs are available with circulating pumps or balancing valves. In the latter case it is necessary to include a dwelling heating

circuit index run calculation, thereby increasing the central pump set duty. Feedback from installation sites would indicate that hydraulic balancing and commissioning is simplified when HIUs including circulating pumps are installed.

Benefits of using HIUs

In comparison to the traditional approach of individual systems within dwellings, there are many benefits with a central plant approach incorporating HIUs:

- No individual gas boilers in dwellings, reducing risks associated with gas distribution pipework, saving on installation costs and reducing the need for individual flue terminals (with associated plumbing);
- Annual gas safety inspection is typically restricted to the plant room;
- Reduction in operating costs owing to reduced boiler service;
- If installed facing into landlord areas, HIUs reduce maintenance access issues;
- Meter reading and energy billing can be carried out remotely from a central location – this can be very attractive to councils and those with a large portfolio of buildings;
- Capital installation and whole life costs can be lower for a centralised scheme;
- Effective integration of low to zero carbon technology can be far simpler with a central scheme and overall energy efficiency can be increased; and
- Gas consumption is reduced through central plant efficiencies.

When appropriately applied, heat interface units offer a robust and cost effective solution to heating and hot water delivery in modern, high density, multi-dwelling developments. The application of associated consumption based metering and billing can act as a positive incentive not only to reduce energy consumption, but also to assist in tackling fuel poverty and providing affordable warmth to priority groups.

© Jeff House and Tim Dwyer

Module 26

March 2011



1. When are new domestic properties aiming for 'zero carbon' development?

- A 2014
- B 2016
- C 2018
- D 2020
- E 2022

2. What is the primary function of the Differential Bypass Valve included in the HIU?

- A To ensure that the supply water is always hot
- B To allow the water to bypass to the central plant return circuit when there is a no demand from the flat
- C To keep the pressure across the flow and return on the dwelling side of the HIU within reasonable limits
- D To provide a differential pressure signal to the on-off valve
- E To make sure that the dwelling pump can recirculate water

3. Which of these is least likely to be included in a HIU?

- A Control valve
- B Pump
- C Heat meter
- D Calorifier
- E Differential pressure valve

4. Why is it suggested that the primary hot water should be at least 75C in a DHW HIU?

- A To ensure that legionella is not a problem
- B To be able to feed the dwelling heating system at a correct temperature
- C To be able to generate hot water at a useful temperature
- D So that underfloor heating can be properly serviced
- E So that the calorifiers in the basement can heat adequately

5. Which of these statements is most likely to be true?

- A Using HIU will mean that each meter will need to be read in separate locations
- B The heating load supplied by the DHW HIU is likely to be significantly greater than the DHW load
- C Reverse return is primarily used to ensure that pipe sizes are more consistent
- D Balancing of systems with HIUs is made easier when they do not include a pump
- E Properly installed system with HIUs are likely to reduce carbon emissions and costs compared with traditional systems

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● For more info visit www.aircraftairhandling.com



Nuair and Breathing Buildings to collaborate to offer a complete ventilation solution

Two leading names from the ventilation industry are to join forces to offer customers an alternative to choosing between natural or powered ventilation. Nuair, the UK market leader in the design, manufacture and distribution of powered ventilation and air movement solutions, has teamed up with natural ventilation expert Breathing Buildings, in what they believe is the first collaboration of its kind to offer customers a full range of both powered and natural ventilation systems.

● For more information call 02920 858286 or email e-stack@nuair.co.uk

Advanced Air Fan coils installed at Canary Wharf's State Street Bank

The State Street Bank building at Canary Wharf is one of the first major projects to install the highly-efficient EPIC fan coil unit, as manufactured by Advanced Air. Its energy saving credentials, such as specific fan power (SFP) as low as 0.2w/l/s, was a major factor in the selection of this product, which has a unique fan deck arrangement with horizontally mounted fans utilising ECM motors. These motors incorporated a 'smart card' and factory-set air volumes, which meant no on-site commissioning was necessary.

● For more information call 01842 765657 or visit www.advancedair.co.uk



Fighting bacteria with Hitachi's 'S-Series' air conditioning

Healthcare and dental practices can strengthen their fight against cross-infection by installing Hitachi's innovative 'S-Series' room air conditioning range – the RAS SX8. The S-Series destroys 99.9% of airborne viruses and bacteria, while delivering the most comfortable level of heating and cooling. As well as having the ability to create a healthier environment, the sleek, wall-mounted S-Series is also highly energy efficient and cost-effective to run – meeting and surpassing all installer and end-user demands.

● For more information call 01628 585394 or visit www.hitachi.com



New FLIR i3 thermal imaging camera breaks price barrier

The new FLIR i3 is the lowest ever priced, fully-featured thermal imaging camera. See building problems easily and in an instant – it really is as simple as point, capture and discover. In a single image the FLIR i3 provides 3,600 measurement points so you can really see the full extent of the problem. Image quality is excellent too. The FLIR i3 is ideal for building inspection and energy management – the more tasks you add, the quicker the payback.

● For more information call 01732 220011 or visit www.flir.com



MT32 fast-tracks petrol station refurbishment for BP

Electrical contractor Active Connect is all geared up to install Marshall-Tufflex's MT32 prefabricated modular wiring solution in BP company-owned petrol stations around the country, following a successful trial of the system at a site in Surrey. The BP Connect Service Station in Woking underwent complete redevelopment to update its facilities and incorporate a new M&S Simply Food outlet onto the site. Active Connect was charged with designing and installing all power and data systems for the project.

● For more information visit www.marshall-tufflex.com



Holborn R22 contract reduced downtime for Nationwide

Air conditioning specialist Holborn Building Services is helping the Nationwide Building Society to upgrade the air conditioning systems in several retail branches, removing the old R22 systems, and replacing them with modern R410a units that offer more energy efficiency and central control. R22 gas is being phased out because it has ozone-depleting potential, yet there are still many thousands of systems in operation across a host of UK industries.

● For more information call 01707 282880 or visit www.mitsubishielectric.co.uk/aircon



Naco's 'knock down' solution ideal for hospital refurbishment project

Naco, part of Ruskin Air Management, has designed and installed a louvre façade at the Prince Charles Hospital in Merthyr Tydfil. The façade has been strategically placed to screen roof-based plant as part of a £30m refurbishment. The two-phase project, currently in its second year and taking four years in total, includes a completely new infrastructure. All works have to be carried out while the hospital is in full operation, which clearly presented technical challenges to the building services team.

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

Oventrop helps with mixed-mode services solution to reduce carbon

Oventrop valves have helped South Gloucestershire Council to gain an 'Excellent' rating from the internationally recognised Building Research Establishment Environmental Assessment Method (BREEAM) for its new offices in Yate, South Gloucestershire. The new offices are part of the council's strategy to save residents £1.3m a year for 60 years by not having to pay for expensive leased offices. It will also reduce the carbon footprint. Oventrop valves have been used throughout the project.

● For more information call 01256 330441 or email sales@oventrop.co.uk



Fully filtered fresh air from Clivet UK

There are many commercial and industrial premises where a constant supply of full fresh air is desirable. This is particularly important in premises where it is necessary to compensate for the extraction of fumes and vapours. Clivet UK is now offering a packaged roof-top air-conditioning unit that will provide fully filtered fresh air when required. The ClivetPack FFA is a reverse air-air direct expansion heat pump with all components pre-assembled within the unit, making installation simple and economical.

● For more information call 01489 550626, email a.mayes@clivet-uk.co.uk or visit www.clivet.com

Improved NVx product range launch

Powmatic has recently launched an improved range of high-efficiency, gas-fired suspended unit heaters. The NVx range has been introduced with enhanced features to facilitate ease of installation for contractors.

National product manager Brett Smith states: 'We have always prided ourselves on working in partnership with the contractors in our industry. Listening to their practical feedback has enabled us to engineer-in features that will lower installation times and costs. Many of these improvements also improve unit servicing.'

Some of the features include: additional suspension points that are used temporarily during installation; an access door hinged on the opposite side now opens to the rear of the unit; gas inlet pipes are now factory-fitted as standard; and an improved controls layout within the electrical panel section. End-users also benefit from other improvements to the unit, including a new design casing with reduced height; reduction in noise levels; improved throw; and the introduction of 'unit running' indicator light.

Smith continues: 'As a committed UK



manufacturer, we feel strongly about leading the market with economical and energy efficient heating equipment. The improvements we have made to the NVx range continue to prove our commitment to the trade and their end-user clients.'

The NVx range will be launched at the beginning of February 2011. The phased introduction will commence with units rated at 75kW, 60kW and 30kW respectively. Other sizes in the range will be introduced later in the month.

● For more information call 01460 53535 or email sales@powmatic.co.uk



JCC Lighting – low-energy LED lighting for First Choice Holidays

Lighting manufacturer JCC Lighting has been appointed by First Choice Holidays as its lighting partner, to supply lighting solutions in their new concept holiday superstores, and their shop-in-shop pods located in large department stores throughout the UK. The most recent store to open is the Greenford superstore in Middlesex. This high-profile project required low-energy lighting solutions, in particular LED lighting, to save energy, and reduce maintenance and re-lamping costs.

● For more information call 01243 829040, email sales@jcc-lighting.co.uk or visit www.jcc-lighting.co.uk



LED Eco promises a brighter future, cost savings and pay-back in 12 months

Retrofit LED lights offer a long lifespan, very low power consumption and can provide dramatic cost savings. Surrey-based LED Eco Lights is so confident of the difference its LED lamps will make that it quotes a pay-back time of as little as 12 months. Widely recognised as one of the UK's leading LED lighting services specialists, the company also offers free lighting audits to identify where companies can save money.

● For more information call 0845 218 3786 or visit www.ledecolights.com



Prysmian expands its Afumex LSX range

Prysmian has expanded its Afumex LSX range to include three core 6m sq m and four core 6m sq m. The range is designed for power and lighting circuits where a screened, low-smoke, halogen-free and reduced flame propagation cable is required. Developed and manufactured by Prysmian near Southampton for more than 20 years, the ever popular Afumex LSX cable continues to be the choice of installers, designers and clients. The entire range is BASEC approved to BS8436.

● For more information call 0238 029 5029 or email cables.marketing.uk@prysmian.com

Going retro with Dimplex Smartrad and air source heat pumps

When an off-gas farmhouse in Norfolk needed a new heating system, owner and tenant agreed that energy-efficient low carbon warmth was the way forward. Dimplex SmartRad fan convactor radiators with a Dimplex air source heat pump offered a straightforward retrofit solution. The home, built in the late 1980s, had used an oil boiler to power a wet central heating system, but a combination of rising fuel prices and increasingly erratic heating performance prompted the decision to switch to renewable energy with SmartRad heaters.

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



Samsung air conditions the senses at new R&D complex

A world-leading designer and manufacturer of hi-tech sensor systems has installed a Samsung DVM (digital variable multi) heat recovery air conditioning system in its new offices and state-of-the-art research and development complex. New contracts and recent expansion has seen Gill Research and Development, in Hampshire's New Forest, refurbish and double the floor space of one of its industrial units, for which Samsung's DVM VRF system now provides efficient heating and cooling.

● For more information call Richard Lockwood on 01932 455000, email r.lockwood@samsung.com or visit www.samsungac.com

Newey & Eyre launch expert energy-saving team to reduce waste

Newey & Eyre is to kick-start 2011 by establishing a dedicated team of energy experts called Energy Saving 24/7. The eight energy specialists will be operating across the length and breadth of the UK and working with nationally-based clients to develop and provide schemes specifically aimed at reducing energy wastage and carbon emissions associated with lighting. Heading up the initiative is Steve Kearney, who said: 'Saving energy and reducing carbon emissions are becoming a key priority for energy managers and specifiers across the private and public sector.'

● For more information call 01905 791500



BACnet Control from Titan Products

Titan Products has developed a range of application specific controllers. Designed for every control requirement, the controllers offer total flexibility. The BACnet range includes fan coil, VAV, room, natural ventilation and plant-room controllers, as well as BACnet to Modbus gateways. The controllers can be used as stand-alone or as part of an integrated building management system, and have an option for a built-in display. Each controller can be used in conjunction with Titan's RDU (room display unit).

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



BG Controls helps Cancer Research UK save money with EFT Control System

Building controls specialist BG Controls is helping Cancer Research UK's Cambridge Research Institute (CRI) to save money by installing an EFT Control System to monitor the energy consumption of its utilities. The institute is housed in the £50m, custom-built Li Ka Shing Centre, located on the Cambridge Biomedical Campus at Cambridge University. This currently houses 21 cancer research groups and associated core facilities. The move will generate savings that can be used more effectively on core services.

● For more information call 01909 517460 or visit www.bgcontrols.co.uk

Turnkey solution from FDS is a safe and secure bet

Fire design and installation specialist, Fire Design Solutions, is to bring its technical expertise to the world of security with the launch of a



turnkey service that manages the installation and interface of fire systems, security alarms and access controls. Gerard Sheridan, from FDS, explains: 'Often the fire and security systems for a building are designed and installed separately. Not only does this impede an intelligent response to integrating the two systems, it can also result in interface problems.'

● For more information call 01322 387411 or visit www.firedesignsolutions.com

One Bryant Park in New York achieves first LEED Platinum certificate

Built at a cost of almost \$2bn, a 55-storey skyscraper is not the most obvious recipient for the very first US Green Buildings LEED



Platinum Certificate in New York. However, the Bank of America Tower achieved this accolade when it was announced last year as the first commercial high-rise to have this award conferred upon it. Peerless Pumps – owned by Grundfos since 2007 – was selected as the pump supplier of choice and accepted the challenge to supply a wide range of pumps.

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

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Esporta takes sustainable route in its health clubs by installing Remeha condensing boilers

Gym and health club chain Esporta has carried out a six-month upgrade of its heating systems with the installation of a combination of Remeha Gas compact, floor-standing condensing boilers into a number of its 55 clubs. The replacement of 7000 kW old atmospheric and pressure jet boilers achieves the dual purposes of reducing greenhouse emissions and cutting gas and electricity consumptions. Esporta has set its brand firmly on track to create a more sustainable business by using technology from Remeha.

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

New ERA in asphalt production

Hanson is set to change the future of asphalt production with the launch of Hanson ERA. The energy-reducing asphalt delivers a 50% reduction in carbon emissions while enhancing durability and improving health and safety. It can also use up to 50% recycled content, while the asphalt itself is 100% recyclable. The Hanson ERA production process allows a wide range of base, binder and surface course materials to be produced at temperatures of 80 to 95C – compared with up to 190C for hot-mix asphalt.

● For more information call 01628 774100 or visit www.hanson.com/uk



Cooper Safety makes testing of emergency lighting easy with Easichack 2

Cooper Lighting and Safety, a business unit of Cooper Safety, has introduced a new version of its Easichack automatic test system for emergency lighting. Featuring innovations such as spur wiring capability, a touch-screen user interface and web access to historical test data, Easichack 2 has been designed to make the testing of emergency lighting as straightforward and cost-effective as possible. The new system provides continuous monitoring of lamp, battery and control-gear functionality, together with programmable test regimes to comply with prevailing regulatory requirements.

● For more information call 01302 303200 or visit www.cooper-ls.com

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Senior Sustainability Engineer, Shanghai

You will have post-graduate design experience and be passionate about low energy and passive building design. Knowledge of Mandarin would be an advantage.

Sustainability Graduate, Madrid

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You will ideally be Chartered and have significant experience, with a particular focus in the data centre/critical facilities sector.

Senior Mechanical Design Engineer | London | £NEG! | ref: 1207

Our client is looking for an experienced Engineer with a track record in the successful design and delivery of hospitals and healthcare facilities.

Electrical Engineers – Rail | London | £perm/Contract | ref: 7378

We are looking for experienced Electrical Design engineers with Rail sector experience. LUL or Network Rail is ideal.

For more information or a confidential discussion please contact Mark Butter

t: 02392 603030

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

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In this role you will provide advice and support to the WAG and the NHS in Wales on all matters associated with hospital mechanical engineering systems. As the PME for WHE you will support the Assistant Director Environmental Management and Engineering on all issues concerning hospital mechanical engineering services, manage the performance standards team and be the principal source of advice and guidance on mechanical engineering issues for the NHS in Wales.

To meet this challenge you will need to be a Chartered Engineer registered with a mechanical or building services institution, with several years experience in mechanical building services engineering.

Your high level of IT literacy must be complemented by excellent communication, team-working and presentation skills. The post will be Cardiff based although travel across the Principality will be required at times.

For further details and to submit your application please visit www.jobs.nhs.uk and refer to the Jobs Section.

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The candidate will principally be responsible for the development of business opportunities for the office and will require good mechanical engineering experience and exposure to low energy design and sustainability issues. The role will also embrace management and operational duties.

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BAR 564/PA

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BAR 571/JA

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BAR 575/PA

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BAR 562/PA



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Associate Director - Electrical Design Engineer

Ref: 11504 Kettering from £50,000 + benefits
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Intermediate Mechanical Design Engineer

Ref: 11188 London/Belfast from £25,000 + benefits
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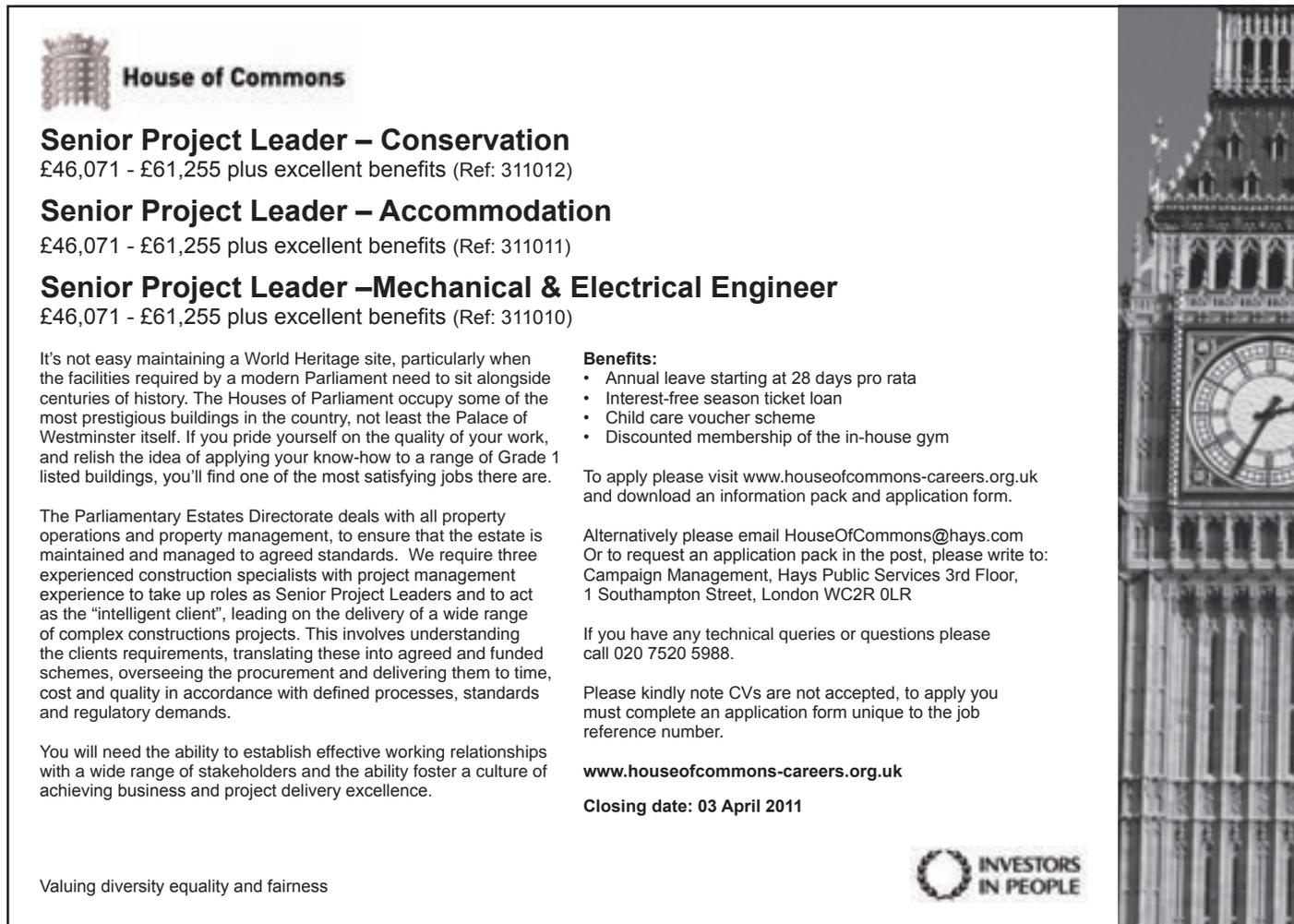
Senior Electrical Design Engineer

Ref: 11743 Manchester from £45,000 + Benefits
Our client is currently looking for a Senior Electrical Design Engineer to join their highly prestigious engineering consultancy. The ideal candidate will have a minimum HNC or equivalent with strong experience in the consultancy field, detailed design skills in electrical building services engineering, and a good working knowledge of British Standards and CIBSE Guides.

If you feel that you are a successful and driven Engineer and can demonstrate the ability to succeed in the role above, then please contact Richard Sutton or Darren Warmington on 01483 768600 or email your CV in confidence to richard.sutton@bsvconsultants.co.uk.

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Closing date: 03 April 2011

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Events & Training

NATIONAL EVENTS AND CONFERENCES

Sustainability Means What?
17 March 2011, Edinburgh
Whole life value; monitoring and more.
www.scocon.org

Sustainability Means What?
23 March 2011, Dundee
Whole life value; monitoring and more.
www.scocon.org

ThinkFM Conference 2011
05-06 April 2011, Nottingham
Focus on facilities management.
www.thinkfm.com

CIBSE national conference
07 April 2011, London
One-day conference focused on the refurbishment challenge
www.cibsetraining.co.uk

The Facilities Show
17-19 May 2011, Birmingham
Seminars, products and more.
www.thefacilitiesshow.com

Institute of Domestic Heating & Environmental Engineers conference 2011
26 May 2011, Hatfield
Focus on government policies.
www.idhee.org.uk

SOCIETY OF LIGHT AND LIGHTING

Is Light a Hazard?
15 March 2011, London
Evening talk.
www.sll.org.uk

SLL masterclass – the low carbon challenge
24 March 2011, Edinburgh
Discussing the low carbon issues.
www.sll.org.uk

CIBSE REGIONS

UV Filtration
04 April 2011, Cardiff
Presentation by Peter Hudson of UVGI.
jno@neiloliver.plus.com

East Midlands region CIBSE AGM
12 April 2011, Nottinghamshire
Further details to be advised.
densel.davy@nitworld.com

Southern region AGM and hospital lighting AGM
14 April 2011, Chichester
Presentation by Iain Macrae.
laurie.socker@gifford.uk.com

CIBSE/OTHER TRAINING

CPD Part L update for LCEAs
10 March 2011, Birmingham
Looking at the updates to Part L.
www.cibsetraining.co.uk

Innovative Thermoplastic Building Service Systems
16 March 2011, Manchester
www.cibse.org/sohpe

Low Carbon Energy Assessor EPC Training
23-24 March 2011, London
Energy Performance Certificate training.
www.cibsetraining.co.uk

Intelligent Buildings Group – full day seminar
29 March 2011, London
www.cibse.org

CPD TRAINING
Visit www.cibsetraining.co.uk, call 020 7675 5211 or email eventbookings@cibse.org

GENERAL INTEREST

Electrical Services Explained
08 March 2011, Bristol

Introduction to electrical services in buildings
11 March 2011, London

Mechanical Services Explained
28 March 2011, Bristol

Electrical Services Explained
10 May 2011, Birmingham

Mechanical Services Explained
16 May 2011, Birmingham

Irish eyes smiling for Dublin get-together

Dublin's Croke Park will be the venue for CIBSE's Republic of Ireland region conference this month.

Entitled 'Sustainable Engineering for the Smart Economy', the conference will be held on 8 March. Croke Park is the principal stadium and headquarters of the Gaelic Athletic Association (GAA), Ireland's biggest sporting organisation.

The opening address will be by Professor Brian Norton, president of the Dublin Institute of Technology. Amanda Gallagher, of BRE Ireland, will speak on BREEAM for Hi-Tech Buildings, followed by Tadhg Hickey, of Arup, on the subject of Free Cooling and Energy Saving Systems for EMC².



Legendary Croke Park will host the conference

Julie Sinnamon, of Enterprise Ireland, will talk about Global Opportunities, while John O'Sullivan, of the Sustainable Energy Authority of Ireland, will speak on 'Energy Efficiency in Industry'.

After each of four conference sessions there will be a chance for delegates to put questions to the speakers.
www.cibseireland.org

Mechanical Services Explained
15 June 2011, London

Electrical Services Explained
21 June 2011, London

ELECTRICAL SERVICES

Electrical Distribution Design
02 March 2011, London

Introduction to electrical services in buildings
11 March 2011, London

Practical approach to LV fault level analysis (two-day course)
14 April 2011, London

BUILDING REGULATIONS

Building Regulations Section 6 (Energy)
04 March 2011, Edinburgh

Part L Building Regulations 2010
22 March 2011, London

Part L Building Regulations 2010
07 July 2011, London

ENERGY EFFICIENCY AND SUSTAINABILITY

Monitoring and Targeting
23 March 2011, London

Energy Surveys
07 April, London

The Carbon Reduction Commitment (CRC)
08 April 2011, London

Smart Metering
12 April 2011, London

Energy Strategy Reports
13 April 2011, London

FACILITIES MANAGEMENT

Introduction to electrical services in buildings
11 March 2011, London

CHANGED DATE!
Introduction to facilities management
11 April 2011, London

Effective Maintenance Management
14 April 2011, London

FIRE SAFETY

Fire Safety Engineering Design
05 April 2011, London

Fire doors, fire doors and more fire doors
12 April 2011, London

Emergency lighting to comply with fire safety requirements
02 June 2011, London

LIGHTING

How to Specify Lighting
15 March 2011, London

MECHANICAL SERVICES

Heating Services Explained (three days)
23 March 2011, London

Air conditioning basics 1: comfort, climate and heat gains
06 April 2011, London

Air conditioning basics 2: the air conditioning process
07 April 2011, London

Design of heating and chilled water pipe systems
11 May 2011, London

PUBLIC HEALTH AND WATER

Rainwater harvesting in the sustainable environment
24 March 2011, London

Introduction to Legionella Control
06 April 2011, London

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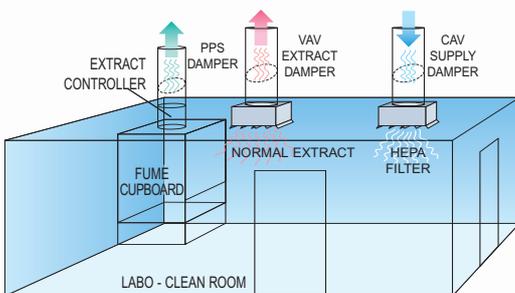


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