CIBSE JOURNAL

The official magazine of the Chartered Institution of Building Services Engineers

February 2010

DOWN TO ZERO
Is this carbon target really achievable?

LIGHTING FOCUS
Concerns raised on LED technology

RED-HOT TOPIC
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AIR CONDITIONING &
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Contents

February 2010

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The images in last month's 'Office solution' feature, p32, should have been attributed to Giles Rocholl

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From the editor

Beware politicians bearing zeros

The ancient Greeks are said to have been troubled by the number zero, which seemed to represent nothing while still having a key role in maths. Canny philosphers, the Greeks. It's a shame the political ruling elite in Britain lack this wisdom. If they did they would never have come up with the notion of 'zero carbon'. Nor would their civil servants still be struggling to produce a viable definition of zero-carbon buildings.

Many in the building services engineering sector recognise that the attempt to achieve virtually 100 per cent low-carbon new homes is probably counterproductive: why go to the extent of reaching for this level, with all the addition of expensive green bling that this requires, when achieving 80 per cent is so much easier and more widely accessible?

As our feature on zero-carbon homes suggests (page 36), the housebuilding industry is still grappling with the cost issues of zero-carbon development, including potentially having to install an array of renewables technology that may not be as effective as hoped. The widescale building of very low-carbon homes – those achieving the higher levels of the Code for Sustainable Homes – could also be stymied as we wait for a fuller definition of 'zero carbon' (so far we have only a part-definition relating to building fabric) and while the Code itself is being reviewed.

This focus on technology for 'zero-carbon' new homes also makes us myopic when it comes to investing in research and development activities aimed at improving Britain's stock of Victorian and Edwardian properties relatively cheaply. We need innovation-promoting bodies like the Technology Strategy Board to give this area a much higher priority (for the obvious reason that most of the carbon footprint of buildings is, and will remain, attributable to already-built structures).

However, amidst all this uncertainty – much of it, hopefully, will be cleared up after the spring general election – another clear message comes out of this month's issue. Which is, a little can go a long way in building services engineering. The case study on page 30 – which showcases one of the winners of this year's CIBSE Low Carbon Performance Awards (see also page 28) – is a prime example of how a straightforward air conditioning inspection for a major new office development can produce improvements and savings that offer payback on the investment within a matter of months. In other words, it's simply a no-brainer.

> **"The focus on technology for 'zero carbon' new homes makes us myopic when it comes to investing in research to improve existing stock"**

So, when it comes to readily available, practicable solutions that won't break the client's bank, forget about getting down to zero: consider a wide range of small changes that can work and can impact now on the total carbon footprint.

Bob Cervi, Editor
bcervi@cibsejournal.com

News in brief

In recession 'until 2011'

New figures from the Construction Skills Network (CSN) predict that the sector will not emerge from recession until 2011. The CSN said that construction output contracted by around 13 per cent in 2009 and job losses during 2008-10 totalled 375,000. A further, but marginal, decline is projected for 2010 before consistent recovery begins in 2011.

EuP directive widened

The Energy using Products (EuP) Directive has been replaced with the Energy related Products (ErP) Directive to widen the scope of products it covers. Previously EuP referred only to products that consumed energy. Now it also relates to products that can impact upon energy consumption.

Beacon schools by 2016

As the *Journal* went to press, the government announced that model zero-carbon schools are to be built and in operation before 2016 across England. The beacon schools will show how zero-carbon can be achieved. Free energy display meters will also be made available for all schools, and from 2013 schools will have to reduce emissions by 80 per cent – a 20 per cent increase on the current requirement.
www.dcsf.gov.uk

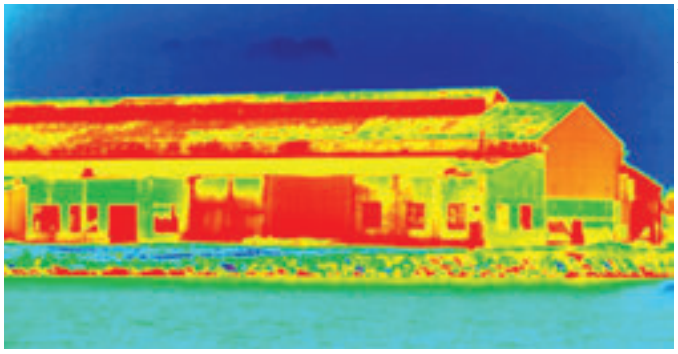
Towers for Finland

Engineering consultancy Buro Happold has contributed to a masterplan to create a new Helsinki neighbourhood. The new blueprint features 10 office and housing towers standing between 100 and 150 metres tall. Buro provided sustainability consultancy advice, and structural and building services concept design for a 'sample' tower to LEED Gold standard.

First BREEAM for Spain

The Factory Retail Centre, developed by Neinver in La Coruna, has become the first BREEAM-certified project in Spain. Its BREEAM assessor and sustainability consultant, Arup consulting engineers, gave the project a 'Good' rating.

DECs fail to give true energy picture, BRE report claims



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Display energy certificates (DECs) fail to provide evidence of real energy efficiency improvements and carbon emission reductions, according to a detailed analysis of thousands of ratings in the public sector.

The BRE Trust investigated the ratings of more than 28,000 public buildings and found that while DECs are valuable, they can fail to show the true picture of energy consumption.

Jon Mussett, principal sustainability consultant at BRE, said: 'DECs are a potentially powerful source of information, but the results are hard to access and difficult to correlate with other datasets in order to draw meaningful conclusions to inform departmental carbon reduction strategies.

'This study found that the DEC ratings for some schools recently refurbished to higher energy efficiency standards under Building Schools for the Future and the Primary Capital Programme appeared to be no better than average. If expected savings are not being made, we need to learn the reasons why.'

However, the study did find that the benchmarks were appropriate and that DECs were generally giving consistent results, as the *Journal* reported last month. But it criticised the fact that up to nine per cent of DEC data is unreliable because of the use of default ratings, particularly for job centres (17 per cent) and school academies (23 per cent).

A further two per cent of DECs were found to have values which were questionable. For example, 37 per cent of A rated buildings – the most energy efficient category – were listed in the database with a score of zero.

A DEC is a record of a building's metered energy usage and associated carbon emissions over a 12-month period, and compares these against established benchmarks to give a rating from A (best) to G (poorest). Energy used in public buildings accounts for four per cent of the UK's carbon emissions. **www.bre.co.uk**

See News analysis on DEC roll-out plan, pages 14-15

New schools affect pupil performance

A survey has found that head teachers believe there is a strong link between the quality of school design and pupil performance.

BSEC, the Building Schools Exhibition and Conference, asked headteachers a range of questions about how modern buildings can affect learning. Around 78 per cent of respondents said they felt that there is a clear link between the quality of school design and levels of pupil attainment. More than 82 per cent of respondents said they were concerned about budget cuts to the Building Schools for the Future (BSF) programme after the general election in the spring, and 62 per cent said that they believe that the building programme strategy is educationally transformational.

Only 26 per cent cited the involvement of a consultant in the design of their school, while 87 per cent listed the services of an architect.

A pleasant pill to swallow

An extension to a biopharmaceutical company in Hampshire, designed and engineered by Morgan Professional Services (MPS), has received a Very Good BREEAM rating.

Overall, the L-shaped, 5,740 sq m three-storey extension at Shire Pharmaceuticals also betters the building regulations target CO_2 emission rate by 31 per cent, according to MPS, which designed the £12.5m building, including the architectural, civil and structural engineering, mechanical and electrical engineering, interior design and landscape design. It provides modern office accommodation for 200 people, including meeting and breakout spaces, and a fitness centre.

Construction skills crisis 'threatens carbon target'

The UK construction industry faces a serious lack of skills that could lead to the country failing to meet its own stringent carbon reduction targets.

A report by the Royal Academy of Engineering (RAE) warned that Britain faces missing its 80 per cent carbon-reduction target by 2050 if the skills crisis is not addressed urgently.

Author Doug King said: 'The sheer pace of change in the regulation of building energy performance has already created problems for the construction industry and the proposed acceleration of this process, aiming to achieve zero-carbon new buildings by 2020, will only widen the gulf between ambitious government policy and the industry's ability to deliver.'

Buildings currently account for 45 per cent of UK carbon emissions but it is estimated that 80 per cent of the buildings that will be occupied in 2050 have already been built.

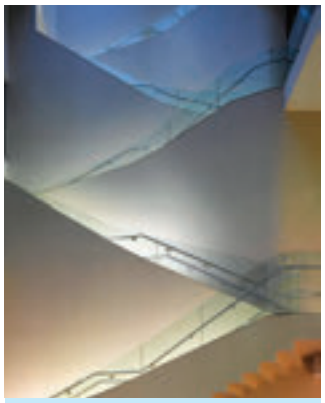
The report also introduces a new discipline, Building Engineering Physics, which supports the architecture, structural and building services engineering professions. It investigates the areas of natural science that relate to the energy performance of buildings and their indoor and outdoor environments.

But, according to the report, few in the construction industry know how to apply the principles of Building Engineering Physics in the design of buildings, and low-carbon design is scarcely taught at university level. And yet undergraduates leaving university in three years' time – and the rest of the industry – will be required to deliver not just reduced-carbon but zero-carbon new domestic buildings.

CIBSE described the report as a robust and timely summary of how the UK can develop a more sustainable building stock.

King is RAE's visiting professor in building engineering physics at the University of Bath.

To view *Engineering a low carbon built environment: the discipline of Building Engineering Physics* visit **www.raeng.org.uk**



Clever lighting in university museum

The 350-year-old Ashmolean Museum of Art and Archaeology in Oxford has been given a makeover to show the pieces of art at their best while reducing energy costs.

Kevan Shaw Lighting Design was tasked with finding a solution and turned to energy efficient reflector lamps from OSRAM's halogen range.

The long-life, dimmable lamps have been installed throughout the museum as part of a £61m development programme. The work is being supported by the Heritage Lottery Fund and this has allowed the museum to double its gallery space.

Universities to be hit with £534m cut in capital grants

The government has slashed universities' overall capital funding budget by £534m for 2010-2011.

During the last financial year, £938m was made available in grants for universities' building projects. But for 2010-11, the Higher Education Funding Council for England (HEFCE), the body which distributes public cash grants to universities, will receive just £404m.

The drastic cut in funding has been blamed on the 'extremely challenging' financial year ahead, according to Lord Mandelson, the Secretary of State for Business, Innovation and Skills, who made the announcement to the HEFCE via letter.

Within that letter he said: 'The economic situation is extremely challenging, and across the public sector we are all facing difficult choices. Looking beyond 2010/11, it is clear that together we face a more challenging public spending climate.'

The letter goes on to add that the total capital grants figure is £250m lower than the indicative allocation given in 2008 because of the capital that was brought forward from 2010-11 funding pot, announced in the 2008 Pre-Budget Report.

HEFCE chairman Tim Melville-Ross, said: 'This year's grant announcement is more challenging than in recent years.

'We shall be considering the implications of the letter at the board meetings on 28 January and 4 March.'

To read Lord Mandelson's letter in full, visit **www.hefce.ac.uk**

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School refurbs set to ease impact of fall in new builds

The rise in refurbishment projects expected to come in the wake of cuts to funding for the Building Schools for the Future (BSF) programme could mean a boost to the sector in the shorter term.

The comment by AECOM's regional director, Phil Cusack, follow claims that local authorities are already making plans for refurbishments rather than new-build projects because of feared budget cuts.

Cusack said: 'Although a programme of refurbishment rather than new build will inevitably lead to reducing workloads with some suppliers, main contractors, architects and structural designers, it could lead to an increase in projected workloads for those organisations specifically involved in building services.'

His colleague, project director Valerie Bragg, confirmed that many authorities fear their budgets will be cut, but equally, sees no reason why building services professionals should be downcast: 'Councils are afraid of funding cuts, yes, and they are trying to move very quickly so money is all committed. But some money will be made available.

'There will still be a lot of work around too, with another round of six authorities to be announced by Labour before the general election, and a large amount of work on academies will also keep the building services industry busy.'

Bragg also expects the primary capital programme to provide a large amount of refurbishment work, and hopes the procurement process will be changed because it is currently very expensive and risky for contractors until a final contractor is chosen.

But construction company, Leadbitter, believes the expected downturn in new builds in favour of refurbishments is simply because BSF concentrated on the most dilapidated buildings first.

'Having dealt with the schools most in need, the programme is now turning its attention to schools that include some newer facilities, which can be refurbished to meet current standards,' said Phil Porter, its strategic initiatives director.

News in Brief

BDP's urban excellence
Interdisciplinary consultancy BDP has received an Interim Client and Outline Design Award for its design services in the Derry City Centre Public Realm project in Northern Ireland. The award by CEEQUAL, the assessment and awards scheme for improving sustainability in civil engineering and public sector projects, recognises environmental excellence and awarded the project an Excellent rating.

All the fun of Meccano
Atkins, Arup, Allies and Morrison will create the only new overground Crossrail station in London by largely prefabricating it off-site. The major elements of the new Custom House station will be transported to site and assembled there, similar to how a Meccano set is built.

Scottish agreement
ConstructionSkills Scotland and the Scottish Construction Centre have signed a Memorandum of Understanding (MoU) to show their commitment to the country's sustainability targets. The agreement outlines plans to educate and up-skill the construction industry on a range of issues, including reducing waste.

Raising awareness
The 'Green futures for existing buildings' project is spending £100,000 to raise awareness about refurbishing existing buildings in a sustainable and environmentally friendly way in the East Midlands. Technical events will be aimed at designers, environmental and facilities managers and contractors.
www.bre.co.uk/greenfutures

Tearing down the city
The UK government's new chief construction adviser, Paul Morrell, has reportedly told *The Times* newspaper that many buildings constructed in the 1960s and 1970s may have to be torn down rather than made energy efficient. Problem buildings include those that are 'semi-industrialised, highly inefficient and badly insulated'.

Decent homes 2010 target will be missed

Hundreds of thousands of homes in Britain will fail to meet the government's 'decent standard' deadline by 2010, a report by the National Audit Office (NAO) has revealed.

The Department for Communities and Local Government's (CLG) Decent Homes Programme aims to improve the condition of homes for social housing tenants and was supposed to be completed by 2010.

But the NAO's report to parliament found that it will only be about 92 per cent complete in 2010, leaving around 305,000 properties in poor repair. It has been estimated by CLG that it will take until 2018-2019 to make all homes reach the required standard. As of April 2009, 86 per cent of homes in the social sector were classed as decent.

Amyas Morse, head of the NAO, said: 'There are risks to both the programme's completion and what has been achieved so far if a reliable funding mechanism is not put in place to deliver the remainder of the programme and to maintain homes to a decent standard.

'Hundreds of thousands of families are still living in properties which are not warm, weather tight, or in a reasonable state of repair.

'The department's efforts have been undermined by weaknesses in the information it holds.'

But the programme was found to have brought wider benefits, such as better housing management, tenant involvement and employment opportunities, as well as improving an estimated one million or more homes.

Earmarked public spending cuts have also led to a campaign group warning that more than half a million affordable homes could be axed from the government's building plans.

The National Housing Federation (NHF) claims that figures set out in the Pre-Budget Report in December imply spending cuts to the housing budget of 17.98 per cent. If implemented over the next decade, it would slash the planned number of new affordable homes by 556,000, but continued long term, it would take until 2038 to build the envisaged one million affordable homes – 18 years later than expected.

The NHF also warned 278,000 jobs and apprenticeships in the construction industry could be lost due to the cuts. It is now calling for housing to be viewed in the same 'untouchable' terms as spending on health, education and policing.
www.nao.org.uk

Small-firm solutions sought

The UK government has announced that it will be launching two new competitions to improve the energy efficiency of buildings and develop new ultra-efficient lighting by spring 2010.

In its new Going for Growth strategy, which aims to 'rebuild' Britain following the global economic crisis, two new Small Business Research Initiative (SBRI) competitions are announced to improve the energy efficiency of public buildings and to develop lighting solutions.

These will focus on small businesses developing innovative solutions to address the challenges faced in the public sector.

It will be led by the government's Technology Strategy Board, which has already provided £9.3m of funding for 277 contracts in areas such as security and defence, healthcare, transport and retrofit demonstrators for low carbon buildings.

SBRI provides fully-funded contracts for business to develop technology-based solutions that address public sector challenges.

Further tenders to improve the energy efficiency of public buildings and develop ultra efficient lighting solutions are planned for 2010.
www.berr.gov.uk

Excellent result in Manchester

A new development in the heart of Manchester, UK, has been awarded the BREEAM Excellent standard for its efficiencies in design and operation. Building services provider SES completed work on the final phase of the £15m Piccadilly Place development with one of its partners, the contractor Carillion. SES completed the design and installation of all the mechanical and electrical services to three levels of underground car park, as well as three mixed-use buildings, forming part of the regeneration project.

Part L changes only partly understood by business

New energy requirements due to be introduced via Part L (2010) of the Building Regulations will catch many commercial property owners and occupiers out, according to a small snapshot poll of senior industry professionals.

The survey, by international multidisciplinary consultancy hurleypalmerflatt, questioned more than 40 leading corporate occupiers, blue-chip developers and architects about how ready they felt they were to meet the new standards required of Part L 2010.

The survey found that fewer than 50 per cent of companies will be fully compliant by 1 October 2010. Fifty-eight per cent reported feeling that communication about Part L requirements has not been clear or easy to understand. Sixty-three per cent said they are still not sure how to implement Part L; while 44 per cent are unclear on how Part L will impact on projects currently in the planning and design stage.

In addition, 68 per cent of property professionals taking part in the poll believed that compliance with Part L will significantly increase costs.

The legislation affecting the design, development and occupation of new and refurbished buildings, expected to come into force on 1 October 2010, will introduce a raft of new measures to cut carbon emissions, typically by 25 per cent in comparison to 2006 standards, subject to the outcome of a government consultation due to be published soon.

Commenting on the results, Stuart Bowman, energy and sustainability director at hurleypalmerflatt, said: 'Part L 2010 will introduce major changes to the way buildings are designed, constructed and operated. However, there appear to be major gaps between what the industry is doing and what needs to be done.

'The good news is it's not too late for firms to get the help they need.'

For more information visit **www.hurleypalmerflatt.com**

The snap-shot survey of 40 companies found uncertainty around Part L 2010

Waterproofing homes could cut energy use by 30 per cent

Scientists have discovered that the energy needed to heat a home can be cut by up to 30 per cent in wet conditions when a silicone-based compound is used.

Experiments were conducted on a purpose-built small-scale brick house by the University of Portsmouth, in collaboration with Safeguard Europe Ltd, a damp and waterproof specialist.

A 40 watt light bulb was used as the heating source. They controlled the outside temperature and humidity and fixed the internal temperature at 20C. The waterproofing chemicals were added to the exterior walls, with the energy consumption required to heat the test house measured before and after application.

With external temperatures of 0C, and 80 per cent humidity, energy consumption was reduced by nine per cent. When the external temperature was increased to 10C energy reduction dropped to five per cent. But a second experiment with 'rain' resulted in a 30 per cent reduction in energy consumption.

The university's Dr Zhongyi Zhang said: 'Moisture increases the thermal conductivity of bricks and mortar. By keeping the brickwork dry we can significantly improve its insulation properties.'

www.safeguardeurope.com

Tests were done on a small-scale brick home using a light bulb as the heat source.

Gillespies

Test-bed of sustainability

AECOM has been appointed lead building engineer to the new £120m Manchester Metropolitan University (MMU) campus, designed by architect Sheppard Robson. AECOM's involvement includes all civil, structural, mechanical and electrical engineering design, as well as sustainability and acoustic design consultancy. The 450,000 sq ft Hulme Community Campus will be environmentally sustainable and a test-bed for research and evaluation of new models of sustainability within an urban environment.

News from institutions

RICS helps shape capital

The Royal Institution of Chartered Surveyors has responded to the Shaping London consultation for the draft replacement London Plan. The London Plan is the vision for improving the city over the next twenty years and covers housing, transport and quality of life for Londoners. The plan for London went out to consultation in October. **www.rics.org**

EPCs one year on

RICS has also reported that, generally, the introduction of energy performance certificates (EPCs) in Scotland has been smooth, although one or two issues still need resolving, such as the central register for non-domestic EPCs. RICS members in Scotland are registered to produce domestic or non-domestic EPCs.

RIBA members honoured

Three chartered members of the Royal Institute of British Architects (RIBA) have been recognised in the Queen's New Year's Honours List. David Chipperfield received a KBE for services to architecture in the UK and Germany, George Ferguson received a CBE for services to architecture and the community in the South West, and Gareth Hoskins received an OBE for services to architecture. **www.architecture.com**

2010 RIBA Awards scheme

The search has begun to find the best examples of British architecture for the 2010 RIBA Awards scheme. All winners will be eligible for a series of special honours at the RIBA Stirling Prize Dinner in London in October.

Water inquiry begins

Engineering the Future, an alliance of engineering organisations, began an inquiry into global water security last month. The Institution of Civil Engineers, Royal Academy of Engineering and Chartered Institution of Water and Environmental Management urged a wide range of bodies to submit evidence. **wwwrae.org.uk**

Light-emitting wallpaper 'could be here by 2012'

Light-emitting wallpaper could start to replace traditional light bulbs as soon as 2012, reducing carbon and revolutionising the way buildings are lit, it is claimed.

Innovation and development company LOMOX says it is pioneering a new OLED (organic light-mitting diode) technology that could mean wallpaper replacing the need for traditional light bulbs.

Operating lifetime has traditionally been a problem with OLED technology, but LOMOX believes it has found a way to achieve significantly longer lifetimes than fluorescent lamps.

The technology will also be more efficient (producing 150 lumens/watt) as it only emits light along one axis, according to the company.

OLED materials have a wide variety of potential applications. As well as being flexible, OLED film requires a very low operating voltage – between three to five volts – meaning that it can be powered by solar panels and batteries, making it ideal for applications where mains power is not available. Lighting in buildings accounts for a sixth of total electricity use in the UK.

Shutterstock

In the future lighting could commonly come from the walls themselves.

LOMOX claims that its OLED technology could potentially be 2.5 times more efficient than standard energy-saving bulbs. It has been estimated that, by replacing current lighting technologies, it could reduce annual global CO_2 emissions by more than 2.5m tonnes by 2020 and nearly 7.4m by 2050 – roughly equivalent to the annual emissions of Birmingham, the company says.

The Welsh company aims to have the first lighting products using its technology available in 2012 and also plans to use the same technology to create more energy efficient television screens.

This development of OLEDs has been made possible thanks to a £454,000 grant by the Carbon Trust, an independent carbon advisory body to government.

See LEDs feature, page 44

Set tougher targets, says trade body

A trade body representing heating and cooling equipment makers is calling on countries to set tougher emissions targets.

The move comes in the wake of the Copenhagen climate change talks last December, which failed to set a legally binding agreement on setting targets for emission cuts.

The European Partnership for Energy and the Environment (EPEE) says it is now all the more important for countries to set higher energy efficiency standards.

Improving the energy efficiency of refrigeration, air conditioning and heat pump equipment, as well as increasing the use of renewable energy technologies, are key priorities for its members, EPEE said.

EPEE sees the creation of the European Commission's new directorate general on energy, to be headed by Germany's Günther Oettinger, as an important pillar of the European commitment to promote the so called 'fifth fuel', energy efficiency. In practical terms, EPEE's main priorities for the coming months include promoting the European Directive on Renewable Energies at EU member state level to ensure all heat pump types, whether aerothermal or geothermal, are recognised as renewable energies; and pushing for the responsible handling of refrigerants to achieve greater efficiency.

www.epeeglobal.org

See Opinion, page 22

Welsh government offices go green

Two new buildings in Aberystwyth, Wales, have installed low-carbon technologies to cut their emissions. The Welsh Assembly Government building, pictured, has natural ventilation, grey water, solar hot-water systems and ammonia chillers for an IT server room. Separately, Ceredigion County Council's offices have mixed-mode ventilation, a grey water recycling system, solar hot water and biomass district heating systems.

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News in brief

Study backs refurb

The economic and environmental benefits of refurbishing existing commercial buildings rather than rebuilding from scratch are outlined in a new report backed by the British Council for Offices. *Can do Refurbishment* is published by Scott Brownrigg in partnership with Hilson Moran and Gardiner & Theobald. **www.scottbrownrigg.com**

Homes to be monitored

The Energy Saving Trust has appointed research body BSRIA to carry out energy monitoring and data recording for solid wall insulation and retrofit field trials in up to 200 existing homes across the UK. The contract will run to April 2013.

Retreat, defend or attack

Retreating inland, creating habitable defence structures and building out into the sea are three options proposed to cope with the extremities of rising sea levels in a futuristic project released by RIBA think-tank Building Futures and the Institution of Civil Engineers. **www.ice.org.uk**

Deep-sea port under way

Around 12,000 jobs in construction and logistics will be created by building Europe's largest combined deep-sea port and logistics park in the River Thames in Essex. The £1.5bn, 1,500-acre site will give deep-sea shipping access. Works have now started.

Leaders of tomorrow sought

The Centre for Sustainability Leadership in Australia is looking for the sustainability leaders of the future in engineering. Those interested are invited to apply for the 2010 fellowship in Melbourne and Sydney. **www.csl.org.au**

Biggest data centre

Europe's largest data centre will be built in Scotland, with AECOM providing technical support to help ensure the 250,000 sqm scheme is sustainable and has a low-carbon performance, according to the consultancy.

Government 'dithering' over CHP could cost 20,000 jobs

The UK government's apparent 'indecision' over providing an incentive to use combined heat and power (CHP) in the UK is threatening the future of 20,000 jobs and an industry potentially worth £1.5bn.

The criticism came from Ian Manders, deputy director of the Combined Heat and Power Association (CHPA), who claimed that the CHP industry 'still has no idea what tariff rate the technology will receive'.

Government officials are in the final stages of setting the subsidies for feed-in tariffs (FiT) in time for the scheme's introduction in April, but have so far failed to confirm a rate for CHP. According to Manders, the government's internal deadline for finalising the FiT rates are only weeks away.

Manders said: 'For at least one green technology that can be used in the home, micro-CHP, current government indecision is threatening the future of 20,000 UK jobs, and an industry with a potential value to the UK economy of £1.5bn.

'The UK leads the world in the design and development of micro-CHP units. However, the government is risking seeing investment, jobs and manufacturing go abroad, to where micro-CHP already receives considerable financial support, such as in the Netherlands and Germany.'

The CHPA, the Heating and Hotwater Industry Council and the Micropower Council have now jointly written to Lord Hunt, the energy minister, to urgently confirm that micro-CHP will be treated in the FiTs as previously indicated by government ministers in parliament.

As the Journal went to press, the government announced it was publishing its final policy on FiTs, as well as a consultation on the renewable heat incentive scheme, in February.

Sunderland Royal Hospital, UK, has installed a new CHP system

'Poo power' helps cut CO_2

Thames Water has found its own novel way to generate electricity and cut carbon emissions – using sewage sludge in the form of 'poo cakes'.

In 2008-09 Britain's biggest water and sewerage company generated 14 per cent of its power needs from either burning sewage sludge or methane derived from it. This saved the company £15m in electricity bills last year.

Thames Water uses two methods to generate power from sewage: thermal destruction with energy recovery, where sewage sludge is burned to generate power; and anaerobic digestion, whereby methane derived from sewage sludge is burned to created heat, which in turn generates power – described as 'poo power'.

Keith Colquhoun, Thames Water's climate change strategy manager, said: 'Our goal is to cut greenhouse gas emissions by 20 per cent on 1990 levels by 2020 – that's about 200,000 tonnes less CO2.'

Hot savings at new landmark

The new £72m Museum of Liverpool is having a combined heat and power (CHP) system installed to save £500,000 worth of energy a year. The trigeneration technology, which creates highly efficient heat, electricity and cooling, will also reduce carbon emissions by 884 tonnes each year – equivalent to the environmental benefit of 88,400 trees. Greater-Manchester-based ENER-G is installing the CHP system and will maintain and operate it for 17 years. The museum will open in 2011.

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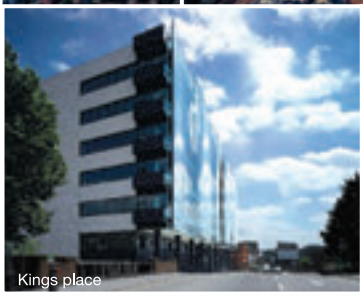
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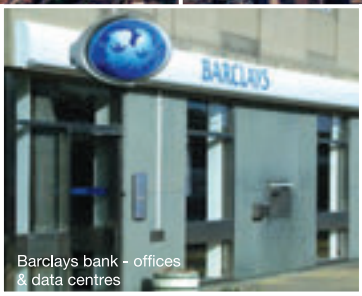

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Putting the private sector in the frame

The UK building services sector has welcomed proposals to extend display energy certificates to all commercial buildings, but details of the plan are still unclear. **Carina Bailey** reports

The UK government's decision to consult industry on extending display energy certificates (DECs) to all non-residential buildings in the UK has been hailed as a potential boost to the refurbishment market.

The move to consult follows lobbying for a full roll-out of DECs by organisations including CIBSE and the UK Green Building Council (UKGBC).

Energy and Climate Change Secretary Ed Miliband made the announcement as part of the Department for Energy and Climate Change's (DECC) official response to the first annual report of the independent advisory Committee on Climate Change (CCC). The report, published last October, assessed the UK's progress in meeting its target of cutting carbon emissions by 80 per cent by 2050.

Ministers appear to have taken notice of a number of recommendations made by the CCC, particularly regarding energy performance certificates (EPCs) and DECs. These recommendations included:

- All non-residential buildings should have an EPC in place by the end of the second budget period (2013-2017);
- All non-residential buildings should have an EPC rating of F or higher by 2020; and
- DECs should be rolled out to all non-residential buildings by the end of the second budget period to give owners and users of buildings a better understanding of their CO_2 emissions. For smaller buildings, automated DECs could be an option in order to minimise the administrative burden on small firms.

The government now says: 'We agree with the CCC that EPCs and DECs are useful in providing more transparency on emissions reductions opportunities in buildings and industry.

'Government will be publishing a consultation paper shortly which will set out proposals for extending DECs to non-domestic buildings.

> **"By allowing the public to see how much energy each building uses, we can encourage further debate on how to green the existing building stock"** – John Field

We will undertake detailed analysis to calculate the relative costs and benefits of requiring all non-domestic buildings to have an EPC in place by 2018 and requiring all such buildings to have an EPC rating of F or higher by 2020.'

But no details about what the consultation will include have been released to date. We also do not have details yet on a publication date or an expected timetable for resulting policy to be implemented.

However, the announcement itself is seen as a positive step. Paul King, chief executive of the UK GBC, said: 'The UK Green Building Council and many in the industry have been calling for the roll-out of DECs to commercial buildings for some time, so this is very welcome news. DECs can provide essential data on which to base decisions – if we don't know how energy inefficient our buildings are, how can we properly manage and improve them?'

The government decision to look

Strategy UK government's policy roadmap

- Government programmes have supported the installation of insulation in around two million homes in the last year and a half, and it is trialling new community-based and whole-house approaches;
- Government will shortly be publishing a 'Household Energy Management Strategy' that will set out new plans to help reduce emissions from households by 29 per cent from 2008 levels by 2020;
- It will also shortly be setting out details of its 'clean energy cash-back' schemes for people and businesses that generate low carbon heat and electricity;
- It is looking at policy options to realise the carbon emission reductions from small firms; and
- It is developing new ways to encourage and support local authorities to increase their role in the transition to the low carbon economy.

at requiring buildings to achieve an F-rated EPC or higher has also been commended. 'Phasing out the worst performing buildings by setting minimum energy standards is essential and it's great that government is coming round to this way of thinking,' says King.

'There comes a point when you have to say that a building cannot be leased or sold without major improvements. The industry needs clarity on future requirements and this helps give certainty on which investment decisions can be based. This can catalyse the refurbishment market, result in more innovation and give green job creation a real boost.'

CIBSE has also welcomed the announcement and leading private landlords such as Land Securities, are already using DECs.

John Field, chairman of the CIBSE Benchmarking Steering Group, says: 'It will be invaluable for showing building occupiers and managers just how well their building is performing. It will also be valuable for larger businesses responding to the Carbon Reduction Commitment Energy Efficiency Scheme (CRC), who will need to measure the energy used in their buildings in order to manage and reduce it.'

Field adds: 'DECs help to make energy costs more explicit for financial officers, and to demonstrate the opportunities for cost and carbon savings. The simple energy and area data needed for a DEC ought to be readily accessible in commercial premises and where it isn't then it needs to be, so DECs provide a ready route to improving current data availability.

'By allowing the public to see how much energy each building uses, whether good or bad, we can encourage further debate on how to green the existing building stock and also motivate building owners, landlords and tenants to take action to make their spaces more energy efficient.'

Employers' body the CBI has also expressed support for the idea.

Other measures announced in the government's response to the CCC report include introducing a new Household Energy Management Strategy, which will set out how the government aims to achieve a 29 per cent reduction in carbon emissions from homes and communities, compared with 2008 levels, by 2020. The main objective of this document will be to discuss the different ways to fund domestic energy efficiency measures. It is due to be published 'shortly'.

The government will also assess potential reductions in emissions from small, non-energy intensive businesses and organisations that are not targeted by policies such as the CRC.

Another recommendation that the CCC made was with regard to a reduction in emissions that would be caused by the economic recession. The CCC urged the government not to add this drop in emissions to its overall achievements. The government has agreed, and so will not be carrying forward any 'over achievement' against the first carbon budget, which started in 2008 and finishes in 2012.

A link to the *Government Response to the first annual Progress Report of the Committee on Climate Change* can be found at **www.decc.gov.uk** in the news section in a press release titled '*Miliband: UK won't let up on climate fight*'.

CIBSE news

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

News in brief

Correction

The January edition incorrectly included Konrad Kislowski in the list of new CIBSE members. CIBSE wishes to apologise for this error and any confusion caused.

Build Up support

CIBSE is supporting the University of Westminster's innovative Build Up programme, which offers free courses for unemployed or under-employed built environment professionals. The programme is designed to develop skills in key shortage areas, allowing eligible participants to re-align their professional careers against the recession. For more information contact the Build Up team on 020 7911 3456 or visit **www.build-up.org.uk**

Workshops on zero carbon for non-domestic buildings

The current Department of Communities and Local Government (CLG) consultation, working towards the government's ambition that all new non-domestic buildings should be zero carbon from 2019, closes on 26 February. There is a related consultation on *Sustainable new homes: the road to zero carbon: consultation on the Code for Sustainable Homes and the energy efficiency standard for zero carbon homes*, which proposes to change the energy section of the Code for Sustainable Homes to align it with changes to Part L (2010) of the Building Regulations, as well as the proposed approach to adopting the 2016 definition of zero carbon (**www.cibse.org/consultation**). CIBSE is holding two free workshops on these zero carbon consultations, firstly in London on 11 February, and then in Bristol on 16 February. To book a place email Samantha McDonough, policy manager, at **smcdonough@cibse.org**

Conference to tackle future challenges in services sector

While icy winds, both arctic and economic, batter the UK, those with an eye to protecting themselves and their firms are ensuring they are up-to-date with the latest industry news by attending key industry events, such as the CIBSE national conference in April.

'Knowing I have to find ways of proofing my business against a whole range of 'developments' has made the event a must-attend for me', explains Andrew Saville, of Armville Consulting. 'Not only does the programme offer me expert insight into what is likely to happen, both economically and legislatively, it will also teach me about scenario planning – which I believe is the key to making sure that whatever strategies I do adopt will work for as broad a range of eventualities as possible.'

As gas shortages loom, companies are focusing on energy security as never before. So the CIBSE national conference will equip building services engineers with an essential briefing on the subject, providing a concise but comprehensive analysis of the problem and the best response to the energy deficit. This will be followed up with technical information that can be used in work proposals on smart grids and internet protocol networks.

Conference speaker Keith Clark.

Of course, while the business community often sees legislation as a threat, for those wanting to provide high-quality building services projects, they are often a major opportunity. However, the legislative terrain is now complex. So expert practitioners are coming to the conference to give their views on how today's legislation will affect the future of the building services industry.

Richard John, who has worked closely with the government for a number of years and has recently returned from delivering a series of lectures at Harvard, will explain the government's strategy drivers for carbon minimisation, how the Department for Energy and Climate Change activities, such as the Carbon Reduction Commitment, interact with the new Part L of the Building Regulations and the development of the European Performance of Buildings Directive. Keith Clark, chairman of the Construction Industry Council, will outline the low-carbon transition plan and look at information gleaned from a low carbon review of the industry. There will also be lots of practical information on how to manage 'reasonably predictable' risks to your business, how to get renewables to work together and why they often don't, the effects of the current economy on contracts and litigation, and the importance of maintaining constructive relationships.

Resilience and building services – how to secure the future takes place on 27 and 28 April at the British Museum, London. **www.cibse.org/nationalconference**

Two veteran members die after a combined 105 years' service

Bryan Lawrence

Bryan Lawrence, fellow and member of CIBSE for more than 60 years, died in November, aged 87.

After serving in the RAF during World War Two, he qualified in engineering and joined the National College of Heating, Ventilating, Refrigeration and Fan Engineering (now part of South Bank University) lecturing in air conditioning for more than 35 years, establishing a reputation as a gifted teacher.

He put together the psychrometric tables for Guide C and, together with Peter Martin, he devised the original IHVE/CIBSE psychrometric chart. He served on many CIBSE committees and contributed to CIBSE guides. After retiring in 1983 he continued to actively contribute to the profession, including becoming CIBSE's acting head of qualifications and membership, and was awarded the CIBSE bronze medal in 1992.

David Kirkby

David Kirkby CEng MCIBSE, a member of the institution for more than 45 years, died at the end of October 2009 aged 64.

A great supporter of the institution's work, David served on the committees of the London and South East region and later the Home Counties South West region continuously from 1980 until the time of his death, acting at various times as chairman and treasurer of both regions. He was also a long-standing member of the benevolent fund management committee and had served for many years as the honorary treasurer of the fund.

Engaging young minds through eco-school status

Member David Wigley recently visited a class of Year 5 pupils (10-year olds) at a local primary school to talk about engineering and demonstrate the Patrons Eco Kit.

As an institution at the forefront of building services, CIBSE has a responsibility to actively engage with educational institutions, and raise the profile of the industry with students of all ages. Knowing schools are keen to gain their green flag and eco-school status, Wigley saw this as a great opportunity to promote ecological practices and an interest in engineering.

Wigley, a member of the Home Counties South-West CIBSE region, arrived early one morning with a PowerPoint presentation, bouncy castle blower and halogen lamp, as well as the Patron's eco-style kit, which comprised of a wind turbine, solar cell, small motor, light and buzzer.

CIBSE is keen to raise the profile of the industry with students of all ages.

Wigley talked to the class about the uses of wind power and solar power, from the time of windmills that ground flour, to windmills that power boats! Then, in groups, the class took turns at operating and investigating the equipment. The pupils were enthralled at the power of the wind turbine and were very quick to don the safety goggles and work out the number of sails required to power the buzzer.

As the class took to estimating the best configuration for the number of sails on the windmills, preconceived ideas were dismissed. Six sails are better than three! The children used the solar panel to investigate voltage generated from distance to source, very quickly working out that close proximity was a huge factor.

The activities were a great success, with the children showing a great deal of interest.

Wigley, who works at Atkins in Epsom, hopes to take this activity into a local secondary school next and he has already been invited to help a local Brownie pack with their science investigator badge.

Ecokits have now been sent to each CIBSE region. Members should contact their region chairman if they would like to make use of the kits.

YEN Champions Awards 2010 entries sought

This year's CIBSE YEN Champions Award is now inviting entries.

The prestigious awards are aimed at companies who show particular commitment and innovation in recruiting and developing young engineers. They help to promote the good practice of companies within the industry, and aim to encourage other companies to make the most of – and nurture – young talent.

The award will once again be open to any employer of young engineers within the building services sector, and CIBSE is particularly keen to see more entries from contractors this year.

With the prize of a trophy for each winning company and £1,000 in CIBSE training vouchers, courtesy of sponsor Baxi Commercial Division, it's a great opportunity for companies to be rewarded for their achievements in pushing their young engineers.

Building on the success of last year's event, CIBSE has announced that this year there will be three categories of award: for large, medium and small companies. Last year's award for larger companies was won by AECOM, with Australian consultancy Steensen Varming taking the prize for smaller companies.

The winners will be announced at a ceremony in early July, to be held in central London. The date and venue are still to be confirmed.

For further details and to enter, visit **www.cibse.org/yen** Enquiries should be emailed to **yen@cibse.org**

HSE to examine lift inspection reporting

The Health and Safety Executive (HSE) is considering improving the way in which thorough examinations of lifts under the Lifting Operations and Lifting Equipment Regulations 1998 (LOLER) are reported.

Six monthly in-service examinations take place to ensure the continued safe use of the equipment and are required for passenger lifts and annually for goods lifts, unless a risk assessment shows the frequency should be reduced or increased. Inspections will also be carried out after substantial or significant changes have occurred, for example modernisation, major repair or after an exceptional circumstance, such as an accident.

There are a number of actions under consideration that may improve the process, for example a common report template and listing of required actions by urgency. CIBSE is working with the HSE to ask facilities managers and other readers who may be acting as 'duty holders' under LOLER to participate in a short survey to ascertain the extent of any problems with reporting under the regulations. Go to **www.cibse.org/loler** to complete the survey and for more information.

Training and development

Submissions

The closing dates for annual submissions to be considered at the May 2010 Training and Development Panel meeting is 12 April.

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

Training and Development forum – 25 February 2010

The annual Training and Development forum will take place at CIBSE headquarter in Balham on 25 February 2010. This is open to all companies with training schemes leading to EngTech, IEng or CEng, whether they have, or are applying for, a CIBSE approved scheme, or have trainees following an individual employer-based scheme. Contact Parvin Begum on 020 8772 3612 or email **pbegum@cibse.org for more information.**

CPD directory update

To be added to the Directory of CPD Course Providers contact Parvin Begum on 020 8772 3612 or email pbegum@cibse.org

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

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

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

For more information on training and development visit the IPD CPD section of **www.cibse.org**

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Letters

Pressurisation is the answer for fire escape routes to save lives

I'd like to back John Hopkinson's proposal that all building escape routes be kept clear and, ideally, pressurised to keep smoke out ('Burning questions', *Journal*, December 2009, page 26). Pressurisation is the only method of smoke control where the objective of the design is to keep fire smoke out of escape routes. Natural or power ventilation of escape routes still mean smoke entering them. Wall vents or smoke shafts have the added disadvantage of being very prone to external wind-induced positive pressures, effectively rendering them useless as a reliable smoke-control system.

Pressurisation, which can be retrofitted, has become the smoke control system of choice for high-rise buildings in countries outside the UK, where, sadly, there has long been a strong lobby against this method. This group has worked tirelessly to maintain the use of much less reliable natural ventilation systems – the 'open slats' mentioned in the article. There are many buildings now that have their escape routes protected by pressurisation, and BS9999 now insists on pressurisation of fire fighting stairs in buildings over 30 metres high, and of serving basements more than 10 metres deep.

We are awaiting an update of Approved Document B of the Building Regulations that would make BS9999 the referral standard for compliance. However, this update is not due until 2016. Here is a task for one of our trade organisations – HEVAC, for example, or even CIBSE.

Jim Wild, CEng, FImechE

Cut the building performance greenwash in the *Journal*

The article about AECOM's work at the KPMG headquarters is downright misleading ('A measure and a half', December *Journal*, page 32). The strapline states that the design 'will exceed Part L (2006) requirements by more than 50 per cent'. The key facts panel states the HVAC and lighting as being '<50 per cent of the carbon emissions of the Part L notional building'. This in no way means that it exceeds the requirements of Part L by 50 per cent. A typical air-conditioned office Target Emission Rate is likely to be around 40 to 42 kg CO_2/sq m. Based on the stated Building Emission Rate this would give a saving of around 12 to 15 per cent, which is not even close to the stated 50 per cent figure and only halfway to what would be required for Part L 2010 compliance. Why doesn't the article state the building's Target Emission Rate and Building Emission Rate so that we can all see and understand the actual calculated benefits of the energy strategy employed?

It would also be useful to know the calculated carbon intensity of cooling supplied by the trigeneration system. Calculations I have completed have shown that, for small systems, cooling generated by this method is as carbon intensive as cooling from cooling towers, which can make it more environmentally friendly to switch off the CHP when there is waste heat being generated. Is the building client aware of how the building is actually going to perform or will they be very disappointed in a few years' time when the energy performance is nothing like as is claimed.

Duncan Campbell

Sustainable energy is a local distribution issue too

I was disappointed that the debate on sustainable energy in December's *Journal* ('Greening the grid', page 20) did not cover the advantages of locally-based distribution networks. In particular, the opportunities for local communities to form social enterprises and reinvest the earnings from renewable energy schemes into their communities. Surely this is the type of enterprise that could be supported now, instead of continued investment in rationalisation and centralisation of our existing electricity distribution system, which, due to the majority of energy involved being wasted, must surely be in question itself?

Paul McIntosh

Make fuller use of our green solutions

The government's target of three million greener, more affordable new homes by 2020 is commendable but there are millions of people who need a solution now.

As an industry, we already have comprehensive technical solutions to eradicate the situation where people have to choose between heating, eating and paying rent. It's critical that we continue to promote next-generation, cost-effective and energy-efficient products to those in public – and private – housing, who can specify for change and a change for the better.

Neil Evans, *general manager, Thermo-Floor*

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

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

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Opinion

Down but not out

Politicians let us down at the Copenhagen climate change summit, but other pressures will provide momentum for major carbon cuts, argues **Richard John**

So what came out of Copenhagen back in December? Well, a non-binding Copenhagen Accord, 'recognised' rather than agreed by the 192 nation states. This is more than the pessimists had suggested (a complete breakdown of talks), and much less than what is needed to keep the Earth with a climate that is no more than 2C above pre-industrial levels. Perhaps, on balance, it was what we should all have expected – for some time, there has been a gap between the science of climate change and the politics of what is actually feasible to achieve.

Politically, how easy was it ever going to be to forge a consensus among 192 nations around which exist the thorny issues of who will finance the move to low carbon, and who will police its effective implementation?

The Copenhagen Accord is not legally binding, neither is there a deadline for transforming it into a formal treaty. The language in the text also shows that 2C is not a formal target, just that the group 'recognises the scientific view' that the temperature increase should be held below this figure.

The deal promises to deliver $30bn of aid for developing nations over the next three years, and outlines a goal of providing $100bn a year by 2020 to help poor countries cope with the impacts of climate change. However, it is unclear where the $100bn will come from, or how it will be administered.

So where does this leave us? Well, globally, still in the absence of a global treaty – or even a roadmap of how we get there – and the climate scientists will argue we are on course to exceed the 2 deg C figure unless we decide to do the least-best option in tackling climate change and attempt to engineer our global climate – so called geo-engineering.

In terms of the UK, and the short to medium term, so long as the various EU/UK commitments to reducing carbon emissions are retained – and there is good reason to believe that they will be – we still face a huge challenge in moving towards a low carbon economy.

Nuclear stations, renewables, energy efficiency, and the switch from fossil fuels are still likely to be the outcome. This is because both the UK government and the opposition see the need for these things – not just to reduce carbon, but also to secure our energy supplies and, longer term, to keep down energy prices in the face of what many suggest will be a world where oil and gas prices at least will increase substantially, and become more volatile.

What remains, despite the recession, is the challenge and skills gaps associated with:

- Meeting the government's target of having 20 per cent of all energy provided by renewables by 2020;
- The move to 'zero carbon' buildings (albeit that we await the final definition of the term); and
- The electrification of transport.

A formal agreement at Copenhagen would have triggered the need for even stronger EU and UK targets, and these in turn may have necessitated a huge stimulus plan for the construction industry to deliver the targets. Even as the targets stand it is likely that, whatever the make-up of the administration in the UK after the upcoming general election, the measures required to decarbonise our energy supply and improve energy efficiency measures will require huge investment in any case.

> **Perhaps the politics of energy security and price will help move us in the right direction until the world can come to its senses and set legally binding and enforceable targets**

So the politics around climate change have been too intractable at Copenhagen. Perhaps the politics of energy security and price will help move us in the right direction until the world can come to its senses and set legally binding, and enforceable, greenhouse gas emission targets. ●

Richard John is director, sustainability, AECOM. He will be one of the speakers on day two of the CIBSE national conference in London, which takes place on April 27-28. For information, visit **www.cibse.org/nationalconference**

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Complementary skill

Consultancies must develop the role of 'operational engineer' to help ensure that commercial buildings are run effectively, says **Roger Smith**

I was one of the first building services graduates in the country to enter the profession at the beginning of the 1970s. Engineering was then a broad subject that attracted many young people. There appeared to be little discrimination between management, costing, design, construction or maintenance engineering. Design was just one of several modules you encountered along the path to becoming a chartered engineer.

However, by the end of the 1970s it was a different story – we had project managers and the engineer was consigned to a box labelled 'designer'. This was supported by the professional institutions which made design the 'route one' to professional engineering qualifications.

This focus on design has led to skill shortages in other areas of the building services industry. Certainly there is a shortage of engineers who understand the practical ways in which buildings and their systems function and need to be managed. There is also a lack of people able to take care of the engineering systems in buildings, run them efficiently, diagnose breakdowns and make informed decisions relating to change.

This has been recognised by CIBSE. In July 2008, Geoff Prudence, CIBSE Facilities Management Group chairman, commented: 'Operational services engineers will be most sought after in an industry already beset by skills shortages.' He recognised that: 'CIBSE should develop a path for building services engineers to move into engineering operational management.' (See *Building Services Journal*, July 2008).

Operational engineer is now the accepted term for those who provide technical advice regarding how to run and maintain engineering systems, meet performance commitments and expectations, comply with legislation, deal with change, manage information and undertake forward planning. These professionals are to be found providing feedback into the design process, planning for aftercare and handover management, and measuring energy for lower-carbon buildings.

The differences in the skills required in an operational engineer and a new-build designer are to do with custom and practice, professional relationships, user expectations and client priorities, rather than technical understanding. By working in an organisation such as Hoare Lea, where engineering is the core business, the operational engineer will be at the forefront of legislation and innovation, and have access to specialist advice and assistance.

Our objective at Hoare Lea is to train operational engineers so that they develop skills specific to working in the facilities management sector. This will enable them to understand the client's business and how their skills can support it. Our aim is not to turn engineers into facilities managers – it is to assist engineers in the development of a set of complementary skills.

> **Our aim isn't to turn engineers into facilities managers but to develop a set of complementary FM skills**

The operational engineer's advice to facilities managers and contractors will play a key role in ensuring commercial buildings are maintained and operated effectively – by, for example, offering advice regarding the management and reduction of energy consumption and CO_2 emissions, as well as advising on the design integrity of tenants' alterations. In so doing, the operational engineer will assist in managing the financial risk to the property manager and landlord.

It is therefore crucial that the industry addresses the skills shortage in this area by providing schemes similar to Hoare Lea's.

By taking steps to ensure that we have enough operational engineers, with the appropriate qualifications, training and experience, we can better serve our clients' business needs and, by improving performance, contribute to reducing the energy consumption of the UK's existing building stock. ●

Roger Smith is partner of Hoare Lea and principal of its engineering management group

IPD SCHEME

Hoare Lea has developed its Initial Professional Development scheme to include a number of specific competence modules related to operational engineering. Recently approved by CIBSE, this facilitates a route to CEng and IEng through operational engineering. Hoare Lea says the scheme provides candidates with training, professional development and experience that will enable an engineer successfully to undertake the role of an operational engineer at an appropriate level. www.hoarelea.com

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Crossing borders

A European directive aimed at helping businesses set up services, has implications for a wide range of activities including building control and energy certification, writes **Hywel Davies**

The Provision of Services Regulations 2009, which came into effect in December, implement the EU Services Directive. The main aim of the directive is to assist businesses to set up services in other European member states, and help them provide services across EU internal borders. The regulations cover not only businesses, but a wide range of 'competent authorities' such as central and local government, and energy assessor accreditation bodies such as CIBSE Certification Ltd.

To achieve this, each member state has set up a single contact point for service providers to use to find the information they need, and then the forms required to complete any legal formalities necessary to do business in that state. Each state has also been required to review all of its current legislation to ensure that it does not impose restrictive rules and practices that may unreasonably hinder service providers from providing services within it.

The directive is intended to facilitate greater co-operation between regulatory bodies across the EU, and so reduce burdens on business. It also aims to build consumer confidence in cross-border service provision by making it easier to access information and by improving the quality of services.

At a business level, if the services you provide are within the scope of the directive, you must make information available to potential users. This includes your business name, legal status, VAT number if applicable and address, including an email address or a number for text messages if available.

Businesses registered on a trade or public register, such as the Gas Safe Register or CIBSE Low Carbon Energy Assessor (LCEA) scheme, must give the name of the register and their registration number, or equivalent means of identification for that register. If your service is controlled by an authorisation scheme, either in the UK or another EU state, the particulars of the relevant competent authority or the businesslink.gov.uk website address (for UK businesses) must be given. So, for example, LCEAs need to state that they are accredited by CIBSE.

Any regulated professional, such as an accountant, architect, or energy assessor, must give the professional body or similar institution with which they are registered, the professional title and the EEA state in which that title has been granted. You must also state any general terms and conditions, in particular any relating to the relevant courts or law applicable to the contract (for example, if it is governed by Scottish law). You must declare any non-statutory aftersales guarantee, if any, not imposed by law. For example, a boiler installer may provide a guarantee that they will make any repairs needed within the first year of installation.

You must state the price of the service, where price is predetermined for a given type of service. For example, the price to join the CIBSE Low Carbon Energy Assessor scheme is predetermined. If not obvious, the main features of the service must be described.

> **Now may be the time to check that you comply – just in case local trading standards come knocking**

Where there is a requirement to hold professional liability insurance, or to offer a guarantee, you must give information about the cover and insurer's contact details and limits to the territorial coverage. You must also give information on any dispute resolution procedures you offer, and on your complaints procedure.

Regulation 8(2) allows this information to be made available in many ways, including supplying it yourself, displaying it at your premises, through a website or by other electronic means.

Regulation 9(1) requires disclosure of information on pricing and how bespoke prices are calculated, if this is requested. You must also declare the relevant professional rules, other activities carried out by your business and any codes of conduct which may apply to the services you provide.

This may all seem rather dry, but if the Office of Fair Trading or local trading standards officers come knocking, it could be very important to be aware of these regulations and what they require of you. ●

Hywel Davies is technical director of CIBSE.

FURTHER INFORMATION

The Provision of Services Regulations can be obtained free of charge from the Office of Public Service Information at www.opsi.gov.uk/si/si2009/draft/ukdsi_9780111486276_en_1

The Department of Business, Innovation and Skills has produced additional guidance, which is available from www.berr.gov.uk/files/file53100.pdf at the time of going to press.

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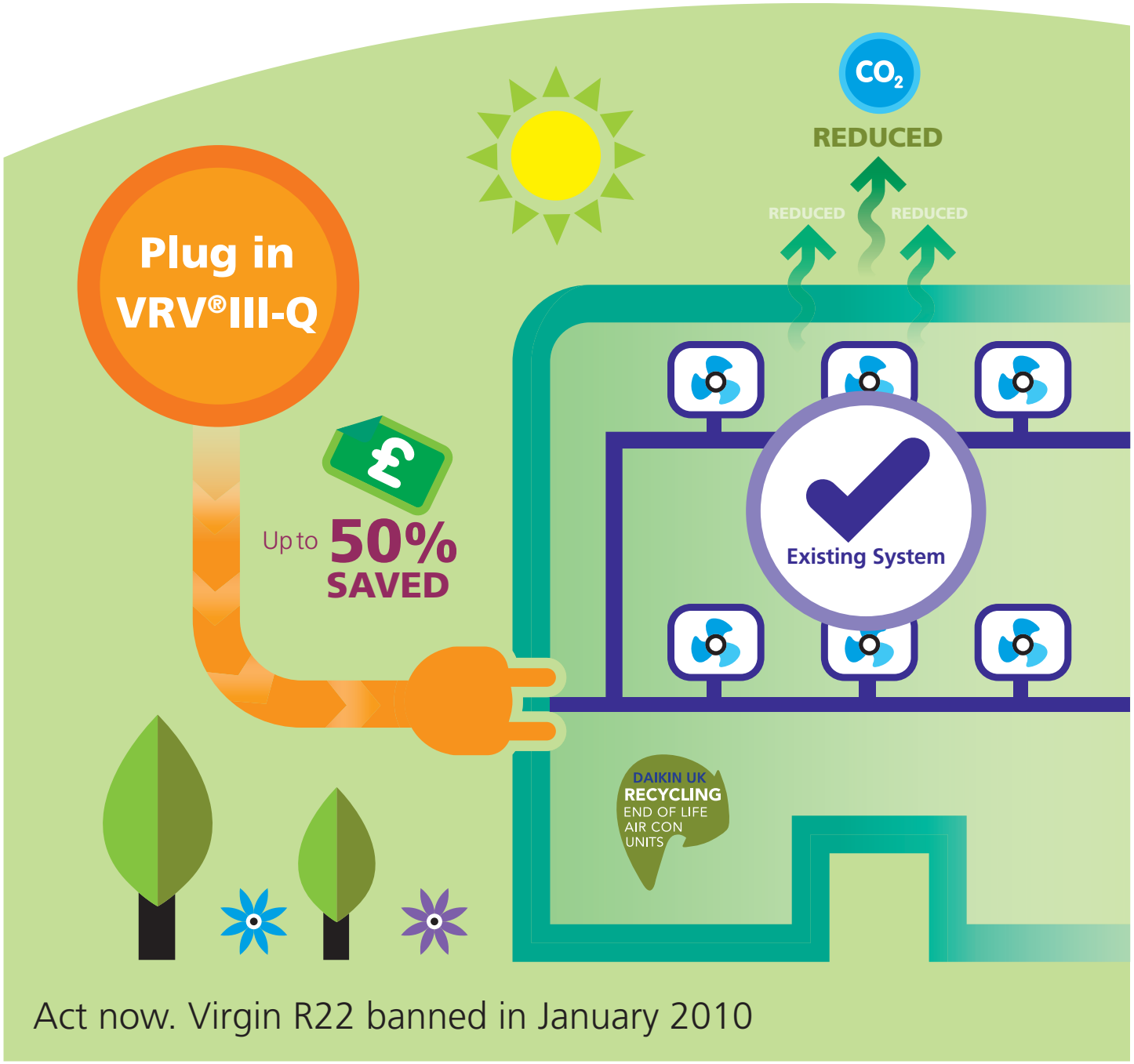

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Winning ways

This year's winners of the CIBSE Low Carbon Performance Awards are a testament to the determination and innovation of organisations and individuals when it comes to increasing efficiency and cutting carbon. Here we list all the winners and runners-up, and give the judges' own verdicts

LOW CARBON PERFORMANCE AWARDS 2010

The past 12 months have witnessed extraordinary level of new UK policy announcements and initiatives in the building services engineering sector. So the 2010 CIBSE Low Carbon Performance Awards, celebrating best performance and innovation in such a challenging year, carry a particular resonance.

The judges this year were particularly impressed by the leadership shown and initiative taken by submissions for the two new awards categories introduced this year, which recognise the contributions of other key players in the industry. The **Contractor of the Year** award is aimed at those companies that can demonstrate a commitment to sustainability in their projects and their own operations.

Similarly, the **Consultancy of the Year** award is aimed at firms whose work demonstrates a commitment to producing aspirational and sustainable buildings. 'Evidence of leadership from the top is important to this award,' the judges said. The winners in these categories, **Atkins** (consultancy) and **Wates Construction** (contractor) clearly demonstrated this leadership.

When it comes to the awards for **New Build Project** and **Refurbishment Project**, the judges have focused on evidence of building performance and how this measures up against the requirements of the Building Regulations. Evidence of occupant satisfaction is a key factor. As the judges put it: 'We're looking not just at what the energy savings are, but also what benchmarks are being used. The savings also need to be about environmental improvements.'

The New Build Project winner, the City Academy school in Hackney, east London, submitted by **Max Fordham** (see the case study in this month's Schools Supplement) is a 'model for building schools, with good carbon savings. It's a high-quality scheme in a challenging urban environment', the judges said.

The Refurbishment award winner was a notably small operation. But the **London Fire Brigade**'s Croydon fire station stood out for 'a whole list of real improvements, including in insulation, biomass heating and automatic night cooling'.

The awards, now in their third year, also recognise the contribution of clients in pushing the sustainability agenda. The **Client of the Year – Energy Performance** award focuses on issues such as educating and motivating staff to be aware of energy-saving strategies, while the **Client of the Year – Low Carbon Operation** award is for clients who can show a firm commitment to minimising actual carbon emissions, backed by operational data. 'Clients should show they are driving sustainability proposals rather than just being seen to accept them,' the judges said.

Swire Properties, Low Carbon Operation winner, was praised by judges for committing its own funds to making improvements for the benefit of others. **Transport for London**, the Energy Performance winner, was 'clearly not just accepting the need for change, they are driving improvements in energy performance. They are keen to set an example'.

Individual energy and facilities managers who can demonstrate such leadership and achievement in their own work are recognised in the **Low Carbon Manager** category. The judges, in assessing the entries, have focused on evidence of actual performance,

energy consumption and carbon emissions. Of the winner, **Stuart Dunkley** at Leicester Marriott Hotel, the judges said: 'This was about leadership in your own environment, with support from an enthusiastic boss.'

The **Champion of Carbon Saving Champions** award, meanwhile, was presented to an individual who, through being involved in the CIBSE 100 Hours of Carbon Clean Up Campaign, has demonstrated outstanding leadership and initiative in changing their work culture as well as helping to reduce carbon emissions. **Glynnan Barham** of Natural History Museum was 'a leader who took the initiative, performing at the upper end of what an energy manager should do'.

Also focused on the Carbon Clean Up Campaign, the **Best Carbon Saving** award went to the organisation whose 100 Hours programme was judged to be delivering the best ongoing carbon-saving performance as a result of the initiative undertaken.

The winner, **Spire Healthcare**, 'followed ideas that were generated by the Carbon Clean-up Campaign and have actually delivered some energy savings', the judges said.

Two further awards aimed at individuals seek to recognise the success of energy assessors in cutting emissions – particularly through the application of Display Energy Certificates and Energy Performance Certificates. In the **Low Carbon Energy Assessor – DEC of the Year** and **LCEA – EPC of the Year** categories, the judges focused on evidence of how the certificates have been applied, including the implementation of recommendations in the accompanying reports. The DEC award winner, **Andrew Gardner** for Sheffield Park Hotel, was praised by the judges thus: 'This was innovative, showing some creative thinking.' Of EPC award winner **Darren Jones**, for the Eland House project (see the case study on page 30 of this issue), the judges said: 'The energy savings identified for this government property led to action which produced payback within a matter of months.'

The **Product of the Year** award seeks to identify the outstanding product innovation launched in the UK in 2008 or 2009. The winning product, **Turbomiser, from Klima-Therm, Cool-Therm, Geoclima**, 'had the most opportunity to save a lot of carbon, and delivered on this', the judges said.

The **Design/Technical Innovation** award recognises innovative ways of delivering low-carbon buildings. Its winner, **Norman Disney Young's HP Enterprise Services: Wynyard Data Centre**, was praised for providing real data on energy savings.

Finally, the **Training Initiative** award is aimed at a company or organisation in the consultancy, contracting or other sectors that can demonstrate best practice in training and continuous professional development. Of the winner, **Nu-Heat Training Centre**, the judges said: 'It was encouraging to see this centre's sustainable technology, and quantifying what they're doing.'

Clearly, all these winners in their different ways have set an example of best practice for others to follow. ●

The judges

Cal Bailey, marketing and sustainability director for NG Bailey

Hywel Davies, CIBSE technical director

Dave Farebrother, environmental director, Land Securities

Simon Hancock, design director, Atkins

Steve Irving, regional director, building engineering, AECOM

Mike Simpson, technical director, Philips Lighting, and CIBSE president

Awards: winners and runners-up

Consultancy of the Year
Sponsored by Baxi Commercial Division

Winner: Atkins
Runners up: AECOM, Delap & Waller, Max Fordham, Mott MacDonald

Contractor of the Year
Sponsored by *CIBSE Journal*

Winner: Wates Construction
Runners up: NG Bailey, Laing O'Rourke

New Build Project of the Year
Sponsored by Imtech Technical Services

Winner: Max Fordham, City Academy Hackney
Runners up: Arup: Acharacle Primary School; Atkins: The Hub'; Norman Disney Young for HP Enterprise Services: Wynyard Data Centre; Tesco: Tesco Ramsey

Refurbishment Project of the Year
Sponsored by Monodraught

Winner: London Fire Brigade, Croydon fire station
Runners up: Transport for London: Palestra; The Bullring Partnership of Weblight, Mitie Engineering Maintenance, DTZ and Philips Lighting: Bullring Shopping Centre

Product Innovation of the Year
Sponsored by CIBSE Energy Performance Group

Winner: Klima-Therm, Cool-Therm and Geoclima: Turbomiser
Runners up: Blygold: Blygold Energy Saving Coatings, Daikin: Daikin Altherma HT (High Temperature) Air Source heat Pump, Kingspan: Kingspan EnergiPanel, Spirax Sarco: FREME

Design/Technical Innovation of the Year
Sponsored by Vaillant

Winner: Norman Disney Young, HP Enterprise Services: Wynyard Data Centre
Runners up: BDP: Waterford Institute of Technology, Marks & Spencer: Non-HFC AHU (submitted by Troup Bywaters + Anders)

Training Initiative of the Year
Sponsored by Summit Skills

Winner: Nu-Heat, Nu-Heat training centre
Runners up: Calor Gas: CPD & development programme, Crownhouse: Crownhouse learning programme, Star Refrigeration: Star Learning Solutions, TACE: TACE Training

Low Carbon Energy Assessor: EPC of the Year
Sponsored by Gratte Brothers

Winner: Darren Jones: Eland House, London
Runners up: Angus Melville: The City Academy; Bruce Elrick, The Hub; Bruce Elrick: Border Schools; Ross Bates: Lambeth College

Low Carbon Energy Assessor: DEC of the Year
Sponsored by Wilo (UK) Ltd

Winner: Andrew Gardner, Sheffield Park Hotel
Runners up: Mahdi Choudhury: Bradshaw Hall Primary School

Low Carbon Consultant of the Year
Sponsored by Mitsubishi Heavy Industries Europe

Winner: Andrew Gardner, CCL Consulting

Client of the Year: Energy Performance
Sponsored by Elta Fans

Winner: Transport for London
Runners up: Imperial College, Lancaster University, Sainsbury's, Tesco

Client of the Year: Low Carbon Operation
Sponsored by E.ON Sustainability Energy

Winner: Swire Properties
Runners up: Sainsbury's (nominated by Red Engineering Design), Transport for London (nominated by Logan Energy)

Low Carbon Manager of the Year
Sponsored by Fläkt Woods

Winner: Stuart Dunkley, Leicester Marriott Hotel
Runners up: Glynnan Barham, Natural History Museum

Best Carbon Saving Programme
Sponsored by Dimplex Renewables

Winner: Spire Healthcare
Runners up: BDP, Natural History Museum, Transport for London

Champion of Carbon Saving Champions
Sponsored by M&E Sustainability

Winner: Glynnan Barham, Natural History Museum
Runners up: Philip Belton, Spire Healthcare, Stuart Dunkley, Leicester Marriott Hotel, The Green Lobby Group, Marriott Hotel Manchester

Making it pay

The UK government department that oversees the Building Regulations set itself the task of increasing efficiency at its headquarters. **Darren Bryant** describes how air conditioning system changes alone enabled the property to raise its energy certificate rating – a task that won his company the accolade of EPC of the Year in the CIBSE Low Carbon Performance Awards 2010

Efficient Air Ltd was set the challenge of inspecting the air conditioning system at a UK government building to show the value of such inspections in improving efficiency at low cost. The building, Eland House in London, is home to the Department of Communities and Local Government (CLG). We found that the savings identified for the property in effect paid for the costs of the inspection and recommendations in a short period.

In figures, the cost of the air conditioning survey was £3,744, and the low-cost actions taken cost £8,200. The payback period of the actions was less than five months, and overall savings made came to a total of £32,642.

When we carried out the inspection, the property had a Display Energy Certificate (which covers operational energy efficiency) with an F rating, one grade above the lowest grading of G. CLG was keen to test whether an air-con inspection could in effect lower energy bills,and reduce the carbon footprint at Eland House, which opened in 1998.

The building's Energy Performance Certificate rating (based on the design intentions) was a C, which underlines the important differences between design and actual operations when it comes to energy efficiency. As a result of this difference, we were asked to develop detailed recommendations for improving the performance of the air conditioning system.

It was agreed that our objectives for the inspection were to:

- Highlight operating anomalies;
- Compare the size and appropriateness of cooling plant with the cooling demands of the building;

>

Simon Weir www.simonweir.com

Eland House, the new-build home of the Department for Communities and Local Government, achieved payback on its investment in improvements to its air conditioning system. This case study won the EPC (energy peformance certificate) of the Year award in the CIBSE Low Carbon Performance Awards 2010

> • Ascertain the effectiveness of current maintenance regimes; and
• Identify no-cost/low-cost initiatives and capital investment opportunities.

One of the barriers we often face is the lack of information about what equipment and systems are being used on a site. Only rarely are we able to find a log book – we found just one in the course of 300 inspections, for example. However, with Eland House we did discover the necessary information on systems, and inspected a range of assets (see Figure 1).

We identified a range of low-cost energy saving initiatives. We found that, if implemented, these quick-wins could yield a 9.9 per cent reduction of the building's energy load – which equates to an annual cost saving of £32,642 and a CO_2 reduction of 238 tonnes (see Figure 2). These modifications are to do with things we find in most buildings, which include:

> "Once the quick-wins have been established, capital investment opportunities can be identified for further payback measures"

- Building management system (BMS) set points not correctly set;
- Heating fighting cooling;
- Humidity levels not correctly set up;
- Refrigerant levels within chillers;
- Lagging missing from ductwork and pipework; and
- Dampers control valves not connected properly.

Figure 1: Assets inspected

- Eleven air-handling units
- Two main water chillers
- Sample of terminal units
- Building management system
- Two direct expansion split air conditioning units

Once these quick-wins have been established, capital investment opportunities can be identified for further analysis of energy saving measures and paybacks on these. Such measures include, for example, equipment that can analyse data and performance of large chiller plant; sub-metering; looking at replacing belt-driven fans with direct drive ones with variable speed; and so on.

Around these capital investments, which tend to have a payback period of two to three years, there are also more peripheral issues to consider, such as solar shading and lighting, which of course impact on the cooling load and plant energy costs.

To look at cooling load in relation to plant size, we used the CIBSE guide, TM44, to help with the assessment of cooling load, basing this on occupancy density and solar shading levels compared with the combined cooling capacity of the equipment installed. With Eland House, the cooling load equated to 2,585 kW, while the combined cooling capacity equated to 2,614 kW of installed plant – which was the appropriate level.

As a result of the changes made at Eland House – resulting in the 9.9 per cent reduction in total building energy load – the Display Energy Certificate rating >

Figure 2: Air-con inspection: low-cost energy saving initiatives identified

Description of works – for more detail, see Figure 3	Energy reduction kWh	Carbon dioxide reduction Tonnes	Annual cost saving	Implementation cost	Payback period (Months)
BMS control adjustment, calibration and policy adoption	277,296	105	£12,474.00	£2,000.00	2
Filter replacements	47,500	26	£3,970.00	£1,850.00	6
Chilled Beam BMS Control modifications	15,000	8	£1,254.00	£600.00	6
AHU 1 - Repair / Replace CW valve	12,500	5	£800.00	£400.00	6
AHU 1 - BMS control adjustments	10,000	4	£650.00	£300.00	6
AHU 2 - Repair / replace control valves	45,000	14	£2,034.00	£500.00	3
AHU 2 - Re-fit control actuator	30,000	9	£1,350.00	£350.00	3
AHU 3 - Repair / replace control valves	12,500	5	£800.00	£400.00	6
AHU 3 - Replacing ductwork lagging	6,000	2	£300.00	£300.00	12
AHU 4 - BMS control adjustments to reduce Air Flow	70,000	38	£5,800.00	£300.00	1
AHU 6 - Repair / replace control valves	2,250	1	£145.00	£175.00	15
AHU 6 - Repairing the damper control	5,835	1.4	£196.00	£175.00	12
AHU 101 - Repair / replace control valves	45,000	14	£2,034.00	£500.00	3
AHU 104 - Repair / replace control valves	8,550	4	£550.00	£175.00	4
AHU 104 - Repair the damper control	2,950	2	£285.00	£175.00	8
	549,881	**238**	**32,642**	**£8,200.00**	**3**

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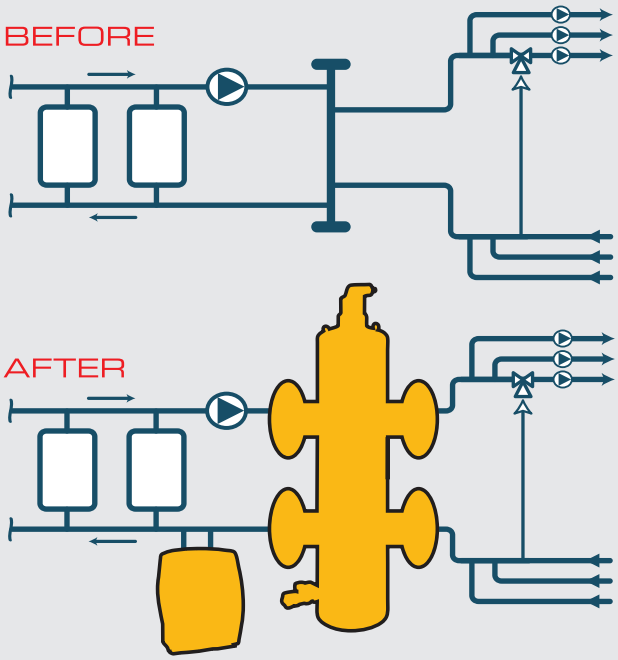

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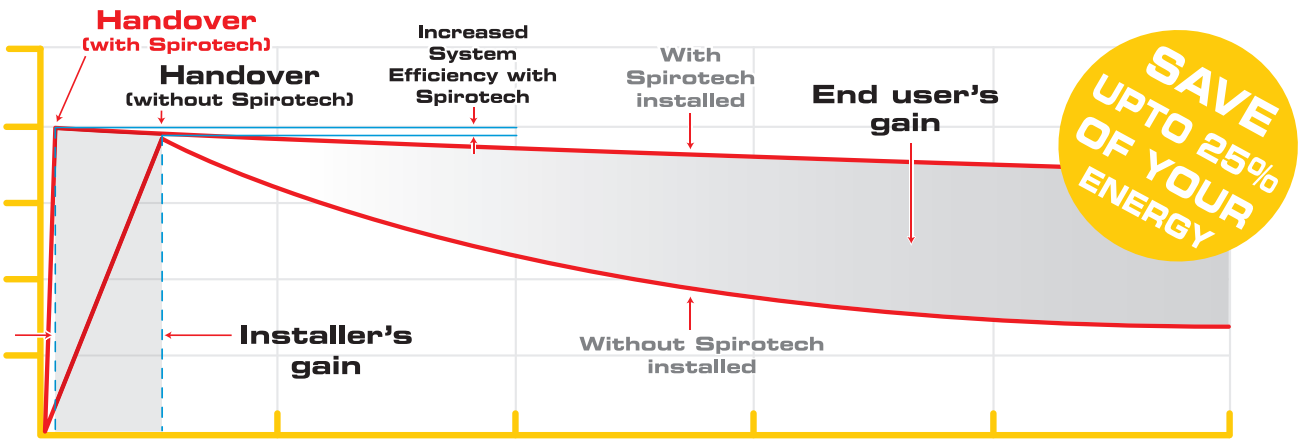

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> was raised to E from F. This was solely as a result of focusing on improvements in the air conditioning systems. Further capital investments would improve the energy load further.

So, even in these hard times, we can see there is real value in assessing the air conditioning and making low-cost improvements. The value of an energy performance certificate lies in taking expert advice on developing the recommendations associated with the certificate, and then implementing them to achieve cost, energy and carbon savings in practice. ●

Darren Bryant is managing director of Efficient Air. www.efficientair.co.uk

See this month's Schools & Education Supplement for another CIBSE award-winning case study – the City Academy, Hackney

Figure 3: Detailed inspection findings and recommendations

1. Air-handling unit (AHU) supply temperatures are not consistent. Temperature ranges being supplied at the time of inspection ranged from 15.1C to 28.4C a temperature differential of 13.3C. Excessive supply temperatures provided by office AHU's will not only result in increased heating costs during the winter season but will also result in the chilled beam circuits having to work harder to overcome higher internal temperatures. Specific consideration should therefore be given to:

- Adopting a heating schedule policy to ensure optimum temperatures are maintained. This should take into consideration the various solar elevations of the building;
- Ensuring a dead band of at least 3C (+/- 1.5C) is factored into BMS strategies to prevent simultaneous heating and cooling between the Air Handling Units, perimeter heating circuits and the chilled beam units; and,
- More frequent temperature and pressure sensor calibration, for optimum control efficiency.

2. At present chilled beam circuits are operational from 7am to 5.30pm Monday to Friday all year round. It is considered however, that during winter months when ambient air temperatures are below 15C and solar heat gains are minimal that conditioned air supplied by AHU systems should be adequate to overcome the internal temperature gains of the building without the need to run the chilled beam systems. Consideration should therefore be given to controlling the 'on floor' secondary chilled water pumps on demand only, either based on an outside air temperature set point (ambient hold-off) or controlled on an internal upper temperature limit which could be set as high as 26C in any given zone. Predicted savings are based on the circulating pump being held off for just two months of the year. These savings have been calculated on the audited running frequency of 27.9Hz.

3. AHU 2 – Both the pre-heat coil and the heating coil control valves appear to be letting by on this unit. The BMS was calling for cooling only, however both heating coils were on. This would indicate that there is a fault with both control valves. Replacing or repairing these valves will prevent losses in the system from over-heating and re-cooling.

4. AHU 2 – The control actuator for the fresh air dampers on this unit has been disconnected. This means that this damper is always fully open. This air during winter months will require significant heating to achieve the desired temperature set point. This will therefore increase heating costs and reduce the control of heat recovery from the unit. Replacing the control actuator and regulating the amount of fresh air will provide the following estimated savings.

5. AHU's 1, 3, 6, & 104 – The cooling coil control valve was letting by on these units. The BMS was calling for heating only, however both coils were on. This would indicate a fault with the cooling valves. Replacing or repairing the valve/actuators will prevent losses in the systems from over cooling and reheating.

6. AHU 4 – This is a fixed speed system controlled by a VSD at 43.5Hz. However the unit was providing almost 10 air changes per hour to a basement plant-room. It is not considered necessary to condition plant areas unless these areas are subjected to temperatures in excess of 30C. Therefore consideration should be given to permanently isolating the heating battery on this unit and controlling the fan speed to provide a minimum amount of fresh air free-cooling (say at 20Hz), when plant-room temperatures exceed 30C. This would reduce both heating loads as well as power consumed by the motor.

7. AHU 6 – It would appear that there is a problem with the actuator on the fresh air dampers on this unit. The BMS was saying that there was no fresh air into this unit and that it was in full recirculation mode. However, on inspection, it was found that the fresh air dampers were fully open. This will be causing problems with the control of the unit, which will then mean that more mechanical conditioning will be required to condition the space.

8. AHUs 1, 101 & 104 – There appears to be a problem with the control strategies of these units. The recirculation dampers were fully closed, suggesting that the units at the time of inspection were in full fresh air mode. This air therefore requires significant heating to achieve the desired condition temperature. By adjusting the control of the dampers, so as to use heat recovery from re-circulated air and free cooling from fresh air, the amount of mechanical conditioning can be reduced.

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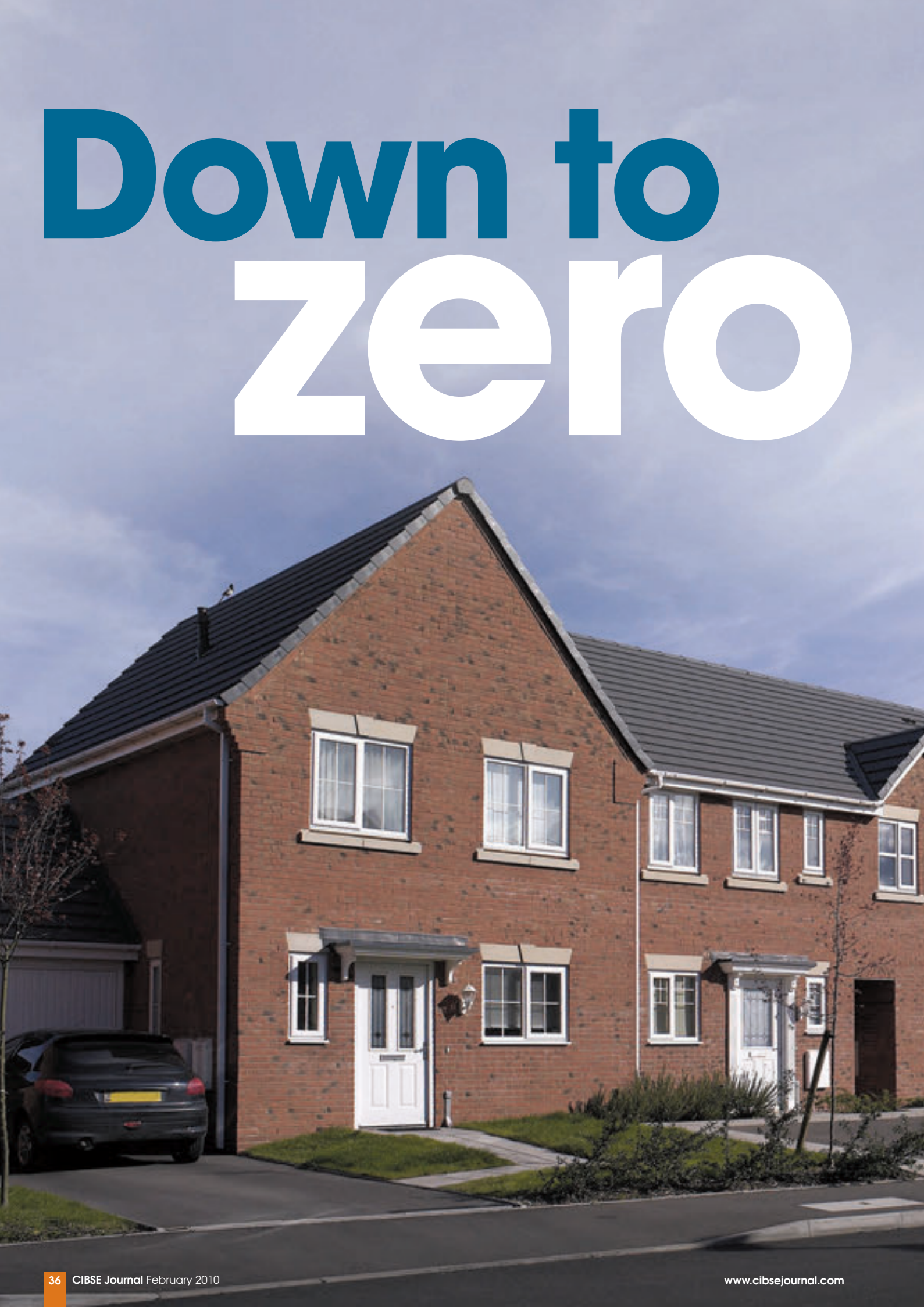

What are the prospects of Britain shifting to zero-carbon new homes in the coming decade? **Mark Jansen** asks the experts and, on page 40, takes a look at prospects for the country's biggest low-carbon residential development

Three years ago, the chief executive of a leading house builder said privately that he thought the UK government's aim to make all new homes zero carbon from 2016 was impossible. All that insulation and renewable energy equipment would add so much to the cost of building a home that perhaps half the development sites across the UK would end up with a negative value. Those landowners would have to pay him to take the land away before he could make a profit. Although he sympathised with the aims of the policy, he couldn't see how it would stack up.

Fast-forward to 2010, and the government and housebuilding industry are still wrestling with the problem of making zero carbon financially viable. However, there has been some progress. 'There are still some big issues to be resolved, but we are not giving up on this,' promises John Slaughter, policy director at the Home Builders Federation. The key change since 2007 has been in the way the government defines 'zero carbon'.

The current version of the Code for Sustainable Homes insists that zero-carbon homes must take all their energy from renewable sources built on-site. This can work on some sites, such as Hanham Hall, a suburban development of almost 200 zero-carbon homes by Barratt, where a single combined heat and power (CHP) plant, running on locally-grown biomass will provide all of the residents' heating and electricity needs, including appliances (see the case study on page 40). The land was obtained at a discount, from the regeneration agency English Partnerships.

But most housing developments do not enjoy such happy circumstances. For example, biomass may be unsuitable for many urban environments, where supplies are too far away and the sites too small to make the installation of a CHP plant viable. There are also concerns about air quality if every home moved to biomass CHP. Wind turbines are generally considered ineffective in cities and there are limits to solar power in the British climate. >

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Zero carbon

Countdown to cuts

2007: Code for Sustainable Homes launched – government announces all homes to be zero carbon from 2016

2008: Consultation on definition of zero carbon homes follows industry concern over viability

July 2009: Housing minister John Healey announces that zero carbon homes must achieve a 70 per cent cut in carbon emissions and remainder may be tackled through investments in low-carbon energy off-site

Nov 2009: Healey announces fabric energy efficiency standard for zero carbon homes

Dec 2009: Consultation to update the Code for Sustainable Homes launched

Oct 2010: Building Regulations due to be amended to reduce emissions by 25 per cent against 2006 standard, and revised Code to be introduced

2013: Building Regulations to be updated to cut emissions by 44 per cent against 2006 standard

2016: Building Regulations to be updated again to cut emissions by 70 per cent against 2006 standard, with all new homes to be zero carbon

2019: All new non-domestic buildings to be zero carbon

In May 2008 the UK Green Building Council told the government straight: 80 per cent of housing developments would never reach zero carbon from on-site renewables – just from a technical perspective, never mind the cost. Something had to give.

In July 2009, following a consultation, housing minister John Healey announced a new definition of zero carbon. From 2016, a zero carbon home would need to emit at least 70% less carbon than is allowed under current Building Regulations (2006). Housebuilders could mitigate the rest by choosing from a list of 'allowable solutions' that includes investment in low- and zero-carbon energy projects off-site.

The full list of 'allowable solutions' and details of how they work are still being negotiated, and further announcements are expected later this year. However, housebuilders are not expecting an easy ride. Their mitigation efforts will have to cover emissions caused by residents' use of cooking, TV and other appliances over a period of 30 years, as well as emissions from heating, lighting and ventilation.

The consultation on zero carbon suggested that housebuilders may be allowed to invest in 'low and zero carbon energy infrastructure' anywhere within the UK and its waters. This could mean contributions to wind farms in the North Sea or district heat networks built by local authorities. Alternatively, housebuilders could receive credits for retrofitting existing buildings near the new development.

> **"Publication of the new version of zero carbon and the energy efficiency standard six years before the deadline gives the industry time to respond"** – David Adam

The UK Green Building Council and the Home Builders Federation are keen on the idea of a national investment fund for low and zero-carbon energy projects, which housebuilders would pay into as part of receiving zero carbon accreditation for their new developments. 'A fund is surely the simplest way of achieving the twin aims of delivering more housing and delivering zero carbon homes,' says Slaughter.

Proposals to update the Code for Sustainable Homes with the new definition of zero carbon were launched in December last year. A new fabric energy efficiency standard for zero carbon of 46 kWh/sqm/yr for detached and semi-detached homes, and 39 kWh/sqm/yr for all others, announced by Healey in November, will also be added. The government also wants feedback on how to make the Code more accessible to consumers and less bureaucratic for housebuilders.

Slaughter welcomes these developments, even though the issue of how the industry will pay for zero carbon remains unresolved. 'Although we have increased understanding about how to achieve the policy technically, the overall cost is still an area of concern,' he says.

Barratt

A Code level 6 home built by Barratt

Slaughter points out that achieving a 70 per cent improvement on today's standards for carbon emissions is likely to require 'a lot of solar thermal and photovoltaics, which are still fairly expensive', even before the cost of the allowable solutions is added on top. Yet, he says, the Federation remains committed to the 2016 goal.

David Adams, a director of the Zero Carbon Hub, an industry body that works on ways to meet the 2016 target and acts as a bridge between housebuilders, the wider industry and the government, says publication of the new version of zero carbon and the fabric energy efficiency standard six years before the deadline gives the industry time to respond.

'These are big steps across a complex industry. Housebuilders need to understand the target they are aiming for, so they can decrease the costs and the risks,' he says. Yet the cost of achieving zero carbon remains a problem. 'The assumption that this can just be absorbed into the land price is not valid in many cases,' he says.

Chris Twinn, director of building sustainability at Arup, believes the industry may just have to accept that avoiding climate change comes at a price, along with everyone else. 'All of us are going to have to spend more,' he says, pointing out that energy regulator Ofgem has already predicted UK electricity prices could rise 60 per cent to help pay for decarbonisation.

The Department for Communities and Local Government claims the cost of building a home to Level 3 of the Code has fallen six per cent since 2007 as builders have gained experience and supply chains have become established. Twinn argues that just as double-glazed windows have become cheaper >

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New homes in Staffordshire, UK, which were among projects used by the Good Homes Alliance to assess the application of the Code.

> than single-glazed ones, the price of materials and equipment needed to reach zero carbon will continue to fall. Builders that we work with, like Barratt, are looking at how to work with their supply chains to reduce the costs,' he says. Options include buying photovoltaics in bulk from China rather than more expensive sources.

Rory Bergin, head of sustainability at architects HTA, the lead consultant on the Hanham Hall development, is convinced costs will fall sharply. 'Technology that was unusual will become normal,' he says.

'For example the price of photovoltaics is falling and mechanical ventilation and heat recovery systems

"Housebuilders will develop a template and use that to roll their products out – they will use their scale and their supply chain to drive costs down" – Roy Bergin

are much cheaper now than two or three years ago.' He adds: 'Housebuilders will develop a template and use that to roll their products out – they will use their scale and their supply chain to drive costs down.'

Twinn and Bergin believe it would be wrong to settle for anything less than zero carbon from 2016. Twinn points to the figures: a quarter of the UK's carbon emissions come from our homes and the UK is committed to an 80 per cent cut in emissions by 2050. A third of the homes that exist in 2050 will be built between now and then. The UK simply can't afford to have new homes that add to our carbon output, he says, especially as the existing stock of housing is proving so difficult to upgrade.

Bergin points to people around the world that face mass displacement and loss of livelihood because of climate change and says: 'We've got it easy. OK, zero carbon homes are difficult, but anything you do for the first time is difficult. Our problems are nothing compared to those people's.' Bergin has a good point, but if housebuilders can't make a profit building to zero carbon, they won't build. It's clearly imperative that those cost challenges can be resolved. ●

Case study Showcase for Britain's zero-carbon ambitions takes shape

Hanham Hall is by far the largest zero-carbon housing development yet to be built in Britain, comprising almost 200 homes ranging from one-bedroom flats to five-bedroom family houses. Designed by HTA Architects and built by Barratt, Hanham Hall will meet Level 6 of the Code for Sustainable Homes. From 2016 all new homes will have to meet this standard, so the project is a crucial learning exercise for the development team.

The suburban site, located between Bristol and Bath, was awarded to Barratt in the Carbon Challenge competition, organised by regeneration agency English Partnerships to encourage housebuilders to develop the techniques needed to build zero-carbon homes. Three years have passed since then, but planning permission has now been secured, the designs are almost finalised and demolition work started on-site in November, with completion due in 2013.

All the heating and power needs of the estate will be met by a combined heat and power plant that runs on wood chips, so there is no need to equip the homes with individual boilers, ground source heat pumps or solar panels. The biomass will be sourced locally. The team has two pages' worth of names of potential suppliers of feedstock grown in Avon or Wales and a weekly lorry delivery should be enough to meet the estate's energy needs, thanks partly to the very high level of insulation in the homes.

The power plant will be managed by an energy services company, set up and supported by E.ON, to which the residents will pay a service charge. The homes will take space heating from an underground hot water pipe that loops around the estate. Each home will be fitted with a mechanical ventilation system, which will be used to transfer the heat inside.

Air is warmed by passing it over a coil of hot water taken from the loop and spread around the home using the ducts that are part of the mechanical ventilation >

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Checklist

Hanham Hall, Gloucestershire

Location: Suburban site in south Gloucestershire, between Bristol and Bath.

Development type: Up to 200 homes, built to Level 6 of the Code for Sustainable Homes. Around 30 per cent two-bedroom flats and houses, 30% three-bedroom houses, 10% 1-bedroom flats, 30 per cent four and five-bedroom houses. One-third to be affordable rented, the rest privately owned.

Schedule: Demolition work began November 2009, completion due 2013.

Build system: Structural insulated panel system (SIPS).

Key sustainability features:
- Building U-values: Walls 0.11, Roof 0.11, Floor 0.16, windows vary from 0.8 to 1.4, doors 1.4
- Envelope air tightness aimed for: 1cu m/h/m2@50Paschals
- Mechanical ventilation and heat recovery systems
- Heat and electricity for the whole development comes from a wood chip-fuelled, combined heat and power plant
- Rainwater harvesting, low-flow water appliances
- Triple-glazed windows
- Sliding external shutters to prevent over-heating

Post-occupancy evaluation: 10 homes will be monitored by Oxford Brookes University for temperature, humidity, CO2 emissions

Build cost per square metre: not disclosed

Lead consultant: HTA

Engineer: Arup

Housebuilder: Barratt

Barratt

Hanham Hall in Gloucestershire, Britain's largest zero-carbon development, is due to be completed in 2013.

system. The ventilation systems are also fitted with heat recovery, whereby heat is extracted from the stale air taken out of the homes and sent back inside with the fresh air, which further reduces space heating needs.

The team is negotiating to sell excess heat from the plant to buildings next to the estate, including a doctors' surgery and another NHS building. Although Hanham Hall will be self-sufficient in energy, the plant will be connected to the national gas and electricity grids. Excess electricity will be sold back into the grid during winters when production is at its peak. In summer the CHP plant may be shut down, with gas and electricity taken from the grid. 'The point is that on an annual basis, you import the same as you export,' says Rory Bergin, head of sustainability at HTA.

Rainwater harvesting units are configured in clusters of 10 or 15, feeding a shared tank. Bergin says around 30 litres will be collected per person per day, while dual-flush toilets and low-flow taps and showers will reduce daily consumption by 40 litres. These measures are expected to cut the demand on conventional water supplies from 150 to 80 litres per person per day. The homes will be fitted with A-rated white goods for maximum energy efficiency.

Bricks and mortar have been eschewed for a structural insulated panel system (SIPS) from Kingspan, which comprises 112mm of rigid insulation sandwiched between two layers of oriented strand board. An extra 80mm of rigid insulation will be installed on the internal face. Bergin says this will help to achieve U-values as low as 0.11 in walls no thicker than the current standard of about 300mm. The roofs will also be made from SIPS panels clad with metal sheets. The overall air tightness of the envelope is expected to be 1cu m/h/m2@50Paschals.Triple-glazed, inward-opening windows developed by Jeldwen will be used extensively alongside double-glazed windows.

The use of SIPS panels, which are manufactured off-site, has affected the shape of the houses: 'They're quite simple in shape, there aren't lots of bits that jut out and cross each other at funny angles. It's designed to make it possible to construct them all in a fairly easy way,' says Bergin. He stresses that residents will still be free to open their windows as they wish, although naturally this will affect space heating needs.

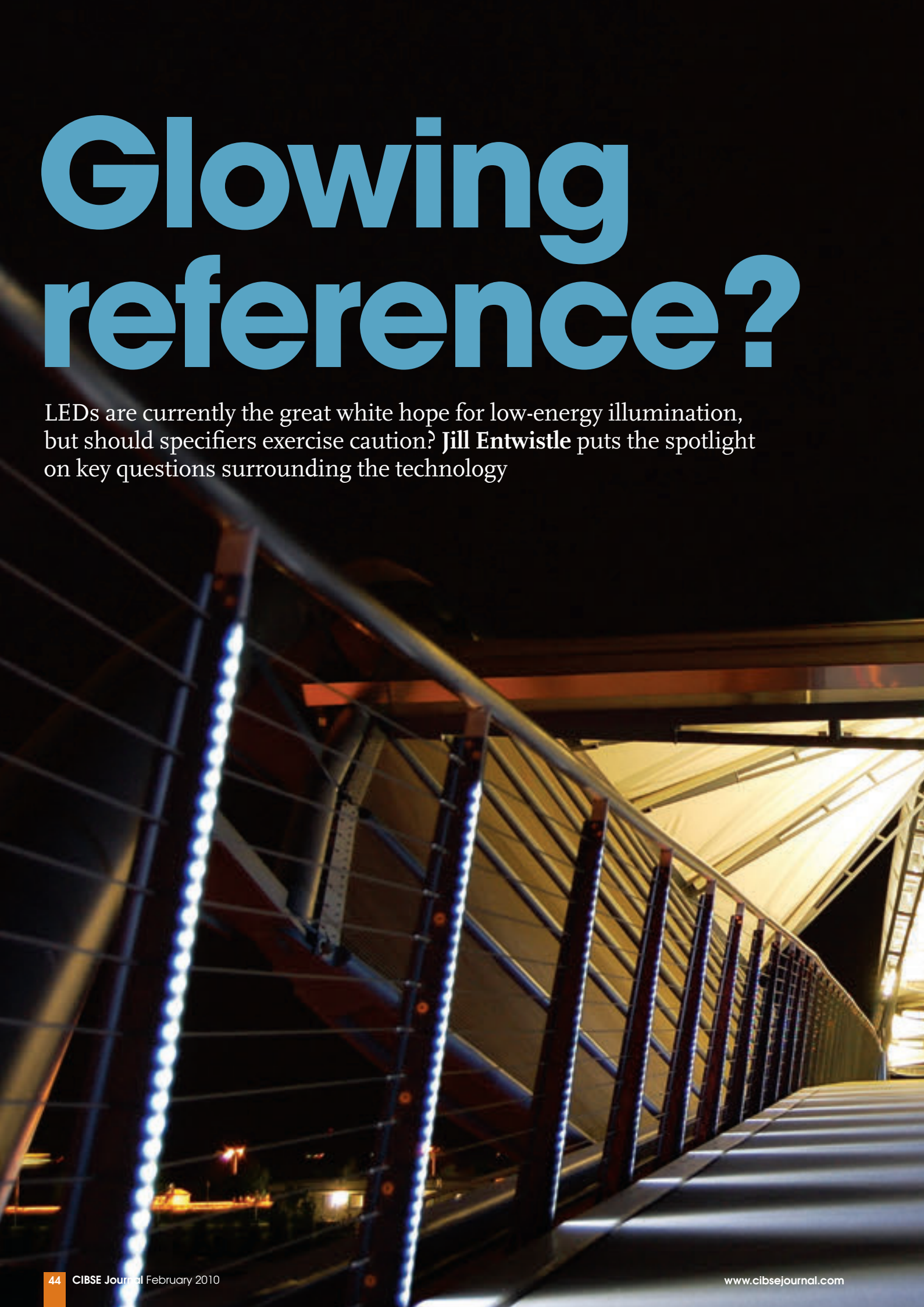
The mechanical ventilation system will keep humidity down and prevent excessive condensation, he adds. Some of the homes will be fitted with sliding external shutters to prevent them from overheating in the sun; all will meet CIBSE standards on overheating.

> "We simply cannot afford to build new homes that add to our carbon footprint, with existing stock so difficult to upgrade" – Chris Twinn

Bergin declines to comment on how much building to Level 6 will add to the construction costs of Hanham Hall. It has previously been estimated that Level 6 will add 40 per cent to building costs. Conversely, the land in the Carbon Challenge programme is provided at a discount to help get exemplar developments up and running. Bergin thinks it unlikely that the Level 6 homes at Hanham Hall will fetch higher prices than other homes in the area, pointing out that the Council of Mortgage Lenders does not factor the lower running costs of energy-efficient homes into its valuations. ●

Glowing reference?

LEDs are currently the great white hope for low-energy illumination, but should specifiers exercise caution? **Jill Entwistle** puts the spotlight on key questions surrounding the technology



Talk to anyone involved in UK government energy policy and you will get an unequivocal endorsement of LEDs as the efficient light source of the future. After a long haul with consumers who have been stubbornly resistent to compact fluorescent lamps, policymakers have fallen on the white LED as the panacea for the thorny problem of a decent quality light at a low-energy price.

In the US, this technology has been hailed as some sort of lighting saviour. 'No other lighting technology offers the department and our nation so much potential to save energy and enhance the quality of our building environments,' declares the US Department of Energy.

Manufacturers, including all the major lamp companies, have invested billions in the development and perfection of the white LED. Philips has bought up companies representing every stage of the LED production process and market, and has withdrawn from the traditional-source interior lighting sector to concentrate solely on LED luminaires.

And so the pressure is on for the widespread take-up of the technology. And yet, we are dealing with a product which at present is not only an expensive option compared with conventional low-energy sources such as ceramic metal halide or fluorescent, but which still has unresolved problems.

There are still difficulties with white colour quality, stability and consistency. Beefing up the light output to match conventional sources still involves a consequential increase in heat and the issue of how to dissipate it. There is still the matter with some companies of wildly optimistic and often unsubstantiated claims about longevity - though the original estimates of a 100,000-hour lifetime have been quietly modified to 50,000 hours.

In addition, quantification of light output is often based on the LEDs themselves rather than the output of the fitting, which itself can be affected by the optics, electronic driver losses and thermal losses: the temperature of the p-n junction of the raw LED is measured at an ambient temperature in the vicinity of the LED of 25 deg C, whereas in a luminaire it will be operating at a higher temperature.

LEDs still have no standards or an agreed method of measurement. Apparently, no fewer than five technical >

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> committees of CIE, the international lighting body, are working on methods for the measurement of LED performance.

There is little doubt that white LEDs are an extremely important source and, as with most new technologies, those technical and quality issues will be largely ironed out and the price will come down with increased introduction. But is it wise to specify them now? Does it make more sense to stick with the tried and trusted sources for the time being?

'The use of LEDs for white light is rapidly growing, but it needs to be the right application, and they have to offer advantages compared to other technology,' says LEDs consultant Gordon Routledge. 'For general lighting, T5 fluorescent and CMH are still tough competition to beat on cost of ownership.'

Independent lighting designer Kevan Shaw of Kevan Shaw Lighting Design agrees: 'It depends why you are specifying LEDs. If you are trying to achieve the ultimate in energy efficiency then you are likely to be disappointed. There are too many people prepared to accept the marketing hype that LEDs are the "ultra efficient light source". There are an increasing number of applications where LEDs are the right choice – emergency lighting, coloured effect lighting, signage, to name a few. It is likely that other applications will become appropriate territory for LEDs in time.'

But actual efficiency is not an issue, argues Peter Barton, managing director of LED designer and manufacturer Forge Europa. It's more a matter of cost effectiveness in comparison with other sources,' he says. 'They are two to three times more efficient >

"The use of LEDs for white light needs to be the right application, and offer advantages over other technologies" – Gordon Routledge

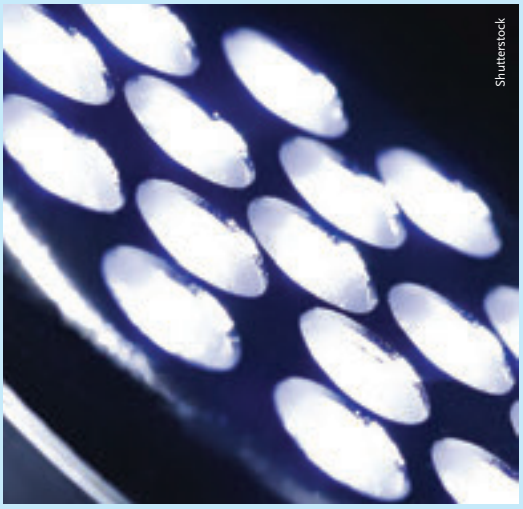
Key questions to ask about LEDs

What is the hot and cold junction or board temperature of the LED?
The temperature will have a direct bearing on the life of the LED. The cooler the board/junction temperature the longer life the product will probably have. The supplier should advise what the temperature is when tested in the lab (cold) and when tested live (hot). It is usual for laboratories to test LEDs at an ambient temperature of 25 deg C.

What forward current are the LEDs being driven at?
Life expectancy is usually given in terms of the percentage of the flux compared to a new LED. L80 – the life to 80 per cent flux – is typical. Long quoted life may be simply the life to a lower flux output (for example, L50). A standard test method for the measurement of lumen maintenance of LEDs is IESNA LM80 and is commonly used by the major LED manufacturers. Fixture manufacturers should be able to substantiate lifetime claims through determining the LED junction temperature at the highest design ambient temperature that the fixture is suitable for. The operating current for the LED relating to its operating temperature will provide information on the light output and projected life.

What test conditions is the photometry based on?
The output of LEDs is dependent on temperature and therefore it is important to know the conditions on which the output is based. Unrealistically low test temperatures in the laboratory will yield a higher output than is achievable in practice and the fixture may therefore not deliver what is expected.

Average life expectancy of installed driver?
The driver life should be rated and tested in a similar manner to HID ballasts. The life of a driver may have an impact on the life of the luminaire. In other words it may be the part with the shortest life. As a general rule the cooler the driver and its components are running, the longer and more trouble free it is likely to be.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What is the total circuit/system wattage?
It is important to understand the real electrical load.

What colour temperatures are the LEDs working at?
The most efficient LEDs are cooler in appearance (5000–6000K) but may not be perceived as warm enough in the UK and other northern European counties.

Do they maintain a stable colour over the entire rated lifetime? How do you know?
Colour stability is a common problem in lower quality LED fixtures. It can be a result of poor LED selection, poor thermal management, or both. LEDs should be appropriate for the application (lighting-class LEDs, not 5mm lamps designed for toys and novelties, for example), and the luminaire should have a good thermal management capacity for the worst-case expected operating environment. Colour shift is measured through Macadam Ellipses and the fewer steps the LED is rated at (for example, two Macadam Ellipses), the less variation is likely through life.
Source: Understanding LEDs, *published by the Institution of Lighting Engineers, www.ile.org.uk*

> than CFLs, they are 10 times more efficient than incandescent, they are five times more efficient than halogen. The technology continues to develop and they will become even more efficient. It's not a matter of whether they are more efficient, it's that they still cost considerably more.'

While the white LED is effectively a substitute for traditional lamps, there is also a drawback when that is interpreted too literally. As a solid state source its photometric distribution is different to other lamps and it therefore requires appropriate optics. A classic case has been the LED fluorescent tube replacement. Lighting designer Mary Rushton-Beales of Lighting Design House originally raised objections to it in the lighting press. 'The differences are obvious: the distribution, the appearance, the quality and the colour of light. This will change the appearance of the space completely...' she wrote in a recent letter to a lighting magazine.

Shaw agrees with her: 'These are the spawn of the devil and the most stupid application for LEDs. Fluorescent lamps are a distributive light source, LEDs are directional. These things instantly destroy the optical design of any fitting they are installed in and so make a nonsense of any design that has been done for the original installation. LEDs are their own thing and need fittings that suit their characteristics.'

They 'hold promise' in directional lighting, he adds, and predicts the same kind of revolution as the MR16 caused when it rapidly displaced the PAR 38 and crown silvered spotlights of the 1970s. 'For some reason the current generation of lamp marketeers don't think we can handle a revolution in lamp type any more and keep trying to force LEDs into existing lamp form factors. I really think this is a very dumb thing to do.'

LEDs are used to light up Buckingham Palace

Edmund Sumner/Philips

The housing also affects efficacy and lifetime. 'The best quality product could fail if produced in the wrong way,' says Barton. 'The fundamental issue is heat dissipation. If they run too hot, and you don't thermally manage them properly, they will fail.'

So how will specifiers sort the wheat from the chaff in terms of quality? Barton is among those reputable manufacturers which are pushing for the introduction of standards so that buyers can believe what's said on the tin and have some sort of redress if it's misleading.

"We need an independent body that can look at claims on the label and decide whether or not it's a load of twaddle" – Peter Barton

'What we are pushing for is getting some kind of kitemark system to indicate the product's passed some sort of standard. We need an independent body that can go along and look at the claims made on the label and and decide whether or not it's a load of twaddle.'

Roger Beckett, director of Light Projects Group, is among those who are exercised by the current claims made for LEDs. 'LED drivers are, in the most part, built to such a price that they will fail before 10 years, so forget what the LEDs are meant to be doing. 50,000 hours? For a client if their light is out, it's out. If the driver manufacturers would only spend an extra £2 on the build of their drivers, some good quality capacitors, for instance, it would help. And even when manufacturers conform to the "recommended junction temperature, or below", the chips still decide to go slightly green to pink to blue.'

'We have to get a grip on this issue,' says Shaw. 'LEDs will never be the same as other light sources. The nature of the manufacturing process results in a range of characteristics in every batch so there will always be issues with specification until there are standards that all manufacturers follow.' In the meantime how does the specifier know what they're getting?

'We don't,' says Shaw. 'We have to rely on developing trust relationships with manufacturers and suppliers. Traceability is entirely down to paper trails as you cannot identify specific LED types and specifications by inspecting the LEDs themselves.'

Routledge advocates a common sense mix: ask the right questions, demand guarantees and go for well-known, established names: 'Specifiers should demand the same information as for any other fixture – photometrics, quality approvals and, dare I say it, longer warranties. Manufacturers should stand behind their products – it's well proven that LEDs can last the distance. Ultimately, work with trusted brands.' ●

***LED Guidelines*, jointly produced by professional lighting bodies, is available from the SLL. Visit www.sll.org.uk**

Back to basics

Higher energy efficiency in heating systems and improved building insulation can have major implications for flow rates and heat emissions. **Ian Vallely** reports

"My advice to consultants is to get back to basics and really establish at the front of the project what the heat and hot water demand will be"
– Pete Mills

Two major changes in the industrial/commercial heating sector have influenced the way heating systems are designed and specified. The first is a move to heat sources such as condensing boilers and heat pumps that work most efficiently at reduced temperatures and lower flow rates. The second is construction or refurbishment of buildings with lower heat demand because of their higher insulation standards.

The requirement to use condensing boilers at peak efficiency has led to typical flow and return temperatures of 55/35 deg C, as this arrangement will maximise energy savings. Similarly, many more projects are making use of ground-source or air-source heat pumps as a heat source, necessitating flow and return temperatures of around 50/45 deg C to improve the coefficient of performance.

The lower flow rates used with heat generators such as condensing boilers and heat pumps have potential implications for the heat emitters (typically radiators) which, in older buildings, may have been designed to operate with higher flow rates.

However, for historical reasons, this does not generally present a problem, according to Pete Mills, technical service support manager at Buderus.

He says: 'Lower flow rates mean that terminal units – radiators etc – will have to be sized to the higher delta T (the differential between the flow and return temperatures). However, what we find in older systems is that radiators were typically oversized anyway. If you are designing the system from new you will, of course, size the terminal units accordingly, but even in a refurbishment, the radiators tend to be oversized so the issue of whether they will be able to handle lower flow rates does not arise.'

Ron Barker, group product manager of Ideal Boilers, agrees. Referring to refurbishment projects, he says: 'Even in a large building which might contain several wings that are zoned off, possibly needing different flow rates, provided you have pumps that are correctly sized, and – if the system demands it – there are reasonable quality adjustable flow valves, then it isn't going to be too problematic to set things up.'

Flow rates are normally only a problem in heating systems after the low loss header, so they have little impact on the running of a boiler, according to John Bailey, commercial heating and systems director at Vaillant. He adds: 'The flow rate from the boiler(s) is actually governed by the controls sensor in the low loss header; this would then modulate the boilers and pump to suit the required flow rate.

'It's true that the traditional UK design delta T of 82/71 deg C is becoming irrelevant when designs of 60/40 or even 50/30 are used. These designs ensure that condensing boilers operate in condensing mode longer; this can sometimes make them difficult to control due to the low temperature range, but they certainly aren't problematic as far as I'm aware.

'The problem actually lies in ensuring that the chosen heat emitters, either radiators or underfloor heating, are sized correctly. Underfloor systems are easier to control because they never require temperatures above 50C, >


Buderus

Changes to buildings can affect system performance.

"The problem lies in ensuring that the chosen heat emitters are sized correctly"
– John Bailey

> making them the first choice for new build. However, retrofitted and refurbishment products will still favour radiators.'

Barker doesn't see an issue with radiator sizes, even in older properties: 'All sorts of things may have changed from when the heating system was initially installed – for example, double glazing, new insulation within the building, and so on. You may think that the heat emitters may not therefore be adequate. Equally though, the consultant may find that the system is an older one that was sized by "rule of thumb" where an estimate was made and another, say, 20 per cent was added on for good measure, so they were oversized in the first place. Therefore, they might well be adequate for a heating system operating at lower temperatures.'

In fact, low flow rates offer distinct advantages in terms of economy and energy saving – after all, less heat needed to be generated means less energy expended and therefore more energy saved.

And there are other benefits, as Mills points out: 'Lower flow rates mean you can use smaller-sized pumps and the energy used by these is a prime focus in respect of energy saving at the moment. Also, if the pipes are sized correctly, you get lower velocities and therefore less noise in the system.'

Better-insulated buildings have also had a marked impact on the design of heating systems because a tightly-insulated and airtight space will reach its set point faster than a poorly insulated space for the same heat input. According to some, this also has significant implications for the specification of heat generation and emitting equipment.

Dave Shuttleworth, technical director of fan convector supplier Dunham-Bush, explains: ''Heat input is traditionally calculated to match the steady state heat loss at a prescribed external minimum condition. Because of improved insulation and air tightness, these values are now significantly lower. But, the thermal mass of the space and contents are relatively unchanged and this will lead to inefficient protracted warm-up periods, unless additional allowance is made to the heat input.'

Shuttleworth believes that, if the heat input to the space is increased, then it is essential to prevent overshoot and this can only be achieved by good control of heat emitters. 'At the same time,' he adds, 'other factors such as variable occupancy and changing solar heat gains through the day will have a more profound impact on space temperatures in well-insulated space – this requires good local control of the heat emitters.

'The heat emitters, therefore, need to provide rapid warm-up of the space when initially switched on, and then be highly responsive to fluctuating internal heat gains and heat losses once the design temperature has been reached – with as little overshoot, or undershoot, as possible.'

Consequently, he says, the best solution for many >

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> projects is to use highly controllable heat emitters with a low internal thermal mass, but capable of using low grade heat.

Although he acknowledges that some specifiers have an aversion to using fan-assisted heating because of the perceived increase in energy consumption to run the fans, Shuttleworth believes fan convectors or low water content convectors to be a particularly efficient and responsive heating solution.

'These products offer a fast response on warm-up and to changing internal temperatures, taking advantage of internal and solar heat gains to reduce energy consumption. In fact, recent tests carried out by an education authority on two similar schools with similar condensing boiler plant suggested that low grade heat fan convectors used 30 per cent less energy than under floor heating to maintain the same design conditions.'

Graham Rodd, managing director of MHG Heating, believes that condensing boilers and radiators also offer a highly responsive heating system provided they are controlled properly. He says: 'The application of good controls with good feedback to the boiler gives a heightened level of control and economy and makes ecological sense because the boiler will reduce its output according to the conditions. A boiler is a boiler to a degree, but it is how that is controlled that really matters.'

He believes that control is the key to energy efficient heating system design and that "intelligent" controls are the best way to guarantee the right temperatures at the right time.

For Mills, the building application determines the heating requirement: 'The design of the heating system depends not only on the fabric of the building and how well it is insulated, but also on the way the building is used. If, for example, you take a nursing home that is occupied 24 hours a day, it does not need so much responsiveness. On the other hand an office building, say, needs a quick heat up in the morning.

"The application of good controls with good feedback to the boiler gives a heightened level of control and economy" – Graham Rodd

Sector changes have influenced heater design.

'My advice to consultants is to get back to basics and really establish at the front of the project what the heat and hot water demand will be for this particular project, how it's going to be used, how it will be controlled, and to establish whether improvements have been made to the building.

'All this will equip you to decide on the most cost-effective and energy-saving way to heat the building. It is important to consider the number of heat generating units needed for security of supply, too.' ●

Mixing heat-generating technology can bring benefits

There is, of course, no reason why the designer shouldn't specify more than one heating system for an industrial/commercial application. Indeed, many in the industry advocate this approach.

MHG Heating's Graham Rodd puts it this way: 'MHG believes the future to be integrated systems with renewable and conventional heating sources under a coherent controls strategy.'

To that end, the company has developed the ThermiPro hybrid heat station which combines a 7.3kW air/water heat pump and a 7.7 – 26.8kW gas-condensing boiler in a single unit. The ThermiPro also comes with a standard solar link-up to supply hot water and supplement the heating system.

Buderus's Pete Mills is more cautious about combined systems. He agrees that a combination of renewable sources such as heat pumps or solar thermal systems and conventional heat generation can work well together. However, he adds this caveat: 'Obviously, the cost benefit has to be weighed up because often the energy saving you are going to get from adding the heat pump to the boilers may not be economic in certain situations. Each heating system has to be taken on its own merit and it is very difficult to use a broad brush with these things.

'It can be beneficial, but there are several factors to consider. For example, if it is a new build project underfloor heating can be a good option for modern condensing boilers or heat pumps or using heat back up from solar systems. Because UFH is designed to use lower temperatures you can get greater benefit out of all these other options.'

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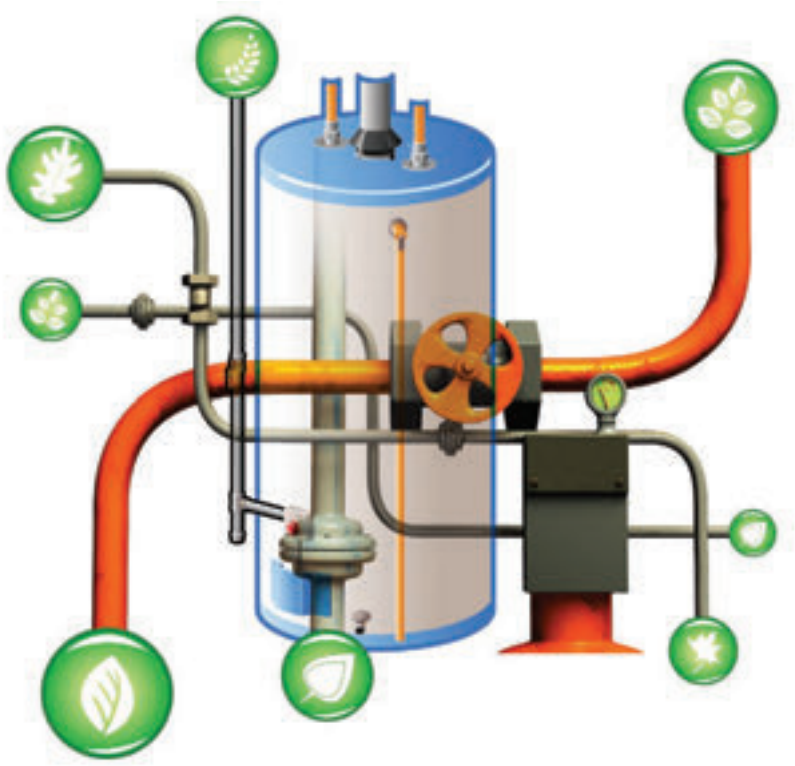
TA

Hot topic

Pressure for greater boiler efficiency underpins CIBSE's new guide to non-domestic hot water systems, writes **Ian Vallely**



The last CIBSE guide to non-domestic hot water heating systems was published more than 20 years ago, so the sector has been due for new guidance on this subject for a while now. The new AM14: *Non-domestic hot water heating systems* is a comprehensive application manual that describes a logical sequence of processes for engineers to help them to design efficient heating systems. It covers water-based heating systems for buildings other than dwellings with a total installed capacity from 45kW up to 2MW. (Domestic hot water generation is outside the scope of the publication.)

Arnold Teekaram of research body BSRIA is principal author of AM14. He says: 'The guide is intended for designers and engineers who install and commission non-domestic heating systems or components. It addresses both the design of heating systems for new buildings and the specific requirements relating to the design of replacement systems and refurbishment of existing systems.

The process of producing AM14 included researching new and emerging technologies, and Teekaram began by consulting manufacturers, building owners and operators. The main focus of the research was to look at existing knowledge in both new and emerging technologies.

The guide also makes reference to existing technical publications such as the CIBSE guides, the Building Regulations, British Standards and manufacturers' published literature (updated where necessary).

AM14 is wider-ranging in its scope than its predecessor, AM3 (no longer in print), as well as being more comprehensive. In fact, as Teekaram explains, the project began with the objective of updating AM3 but, as its development proceeded, the scope was widened, largely because of advances in technology including modular boilers and renewable heating sources.

'AM3, which was first published in 1989, dealt specifically with the application of condensing boilers. At that time, these high efficiency boilers were used in very small numbers in the UK and their use was not encouraged by legislation so there was little incentive to use them.

'Since the publication of AM3, however, there have been many significant changes in technology and that is one of the main reasons it was felt there needed to be a more comprehensive and updated heating guide.

'There have also been other changes that were not envisioned in 1989, such as low-carbon technologies including heat pumps, biomass, solar thermal and CHP, and these are covered comprehensively in the new guide. Guidance is also given on controllability, an important design issue.'

AM14 has also evolved as a result of the pending withdrawal of parts of *British Standard BS 6880: Code of Practice for Low Temperature Hot Water Heating Systems of Output Greater than 45kW*, as well as a response to changes to the Building Regulations introduced in 2006 and the requirements of the Energy Performance of Buildings Directive.

Legislation is now in place that prohibits the use of inefficient boilers for many domestic and commercial space heating and hot water production/applications. BS 6880 was, for many years, a comprehensive guide for engineers involved in the design, installation and commissioning of non-domestic heating systems. Its nominal replacement, BS EN 12828 (published in 2003), only covers system design and in far less detail than the earlier standard. Matters covered in BS 6880: Part 2: *Selection of equipment* and Part 3: *Installation,* >

"Knowledge of the types and designs of existing systems will help the engineer to make the correct decisions"

> *commissioning and maintenance* are not addressed in BS EN 12828.

The changes to the Building Regulations in 2006 imposed more stringent requirements for energy efficiency and carbon emission reduction, which apply to both new and existing buildings. This imposes additional requirements for designers and installers who are upgrading existing systems.

What was once a simple boiler replacement now needs more thought and detailed knowledge of the building, the system and its controls to enable the engineer not only to comply with the Regulations, but also to implement an efficient and effective system. In addition, to ensure that boilers comply with the regulations, extra measures may need to be taken, such as improvement in operating temperature controls and zoning. Existing heating systems are highly diverse in design and this can mean that some are relatively simple to upgrade whilst others present much more of a challenge.

Knowledge of the types and designs of existing systems, their initial design criteria and their limits will help the engineer to make the correct decisions, Teekaram says.

AM14 contains two major sections which deal with design decisions and criteria for new buildings and refurbishment. The rest of the guide is built around these two sections. For example, it examines the major components of heating systems which would be applicable to both new build projects and refurbishments. The same applies to specific guidance on controls, installation, testing and commissioning and troubleshooting. The operating strategy of heating plant is covered with specific reference to the use of controls. Various strands of legislation that affect the design of the heating system are explained, such as Part L of the Building Regulations.

Drivers for refurbishment are also looked at – for example, failure of existing heating plant; the need to improve plant performance, reduce carbon emissions, improve reliability or maintainability or reduce fuel costs; the need to provide for changes to the heating load due to an extension, or in order to take advantage of energy efficiency measures. Teekaram adds: 'We suggest within the guide that refurbishment could either be minor, major or complete – essentially, ripping out and replacing the entire heating system.'

The refurbishment section covers a wide range of activities including redesign/replacement of the entire heating system; replacement of heat emitters, controls, burners, boilers or pumps, drives or valves; conversion of constant volume circuits to variable volume; replacement/rerouting of boiler flues; installation of metering devices, and the provision of boiler house/plant room ventilation and combustion air openings.

Says Teekaram: 'The reason we have made this section so comprehensive is that a lot of work is done on the refurbishment of boilers and there is no detailed guidance to assist the designer in what to look for when deciding on refurbishing.' ●

AM14 is priced at £35 for CIBSE members and £70 for non-members. For more information, or to order, call 020 8772 3618 or visit www.cibse.org/publications

CIBSE AM14: design, installation and more

Design decisions and criteria: new buildings
- Strategic design decisions
- Design criteria for boilers in new buildings

Design decisions and criteria: refurbishment
- Drivers for refurbishment
- Scope for refurbishment
- Constraints
- Statutory regulations and guidance
- Identification of existing heating types
- Evaluation of existing heating systems
- Evaluation of heating loads
- Reducing energy consumption
- Options for refurbishment using low carbon technologies
- Whole life costs and payback
- Performance criteria for replacement boiler plant

Controls
- Circuit design
- Boiler controls
- Avoiding excessive boiler cycling
- Demand-based boiler control and system inhibit
- Boiler sequence control
- Burner controls
- Time controls
- Temperature controls
- Hot water controls

Major components of heating systems
- Heat sources (boilers)
- Distribution network
- Heat emitters
- Flue and chimney design
- Air supply and ventilation
- Fuel storage

Installation
- Legislation and guidance
- Site facilities
- On-site storage and protection of equipment

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● **For details visit: www.mhsradiators.com**

Elesta in new Leamington Spa Sikh temple

Worcestershire-based Clarkson Controls has recently completed the installation of an Elesta composite BMS control system for the brand new Gurdwara Sahib Sikh temple at Leamington Spa. Temperature and CO_2 levels in the Langar Hall, main prayer hall and two smaller prayer halls are constantly monitored and controlled for a building occupancy varying from less than 10 to several thousand people.

● **For more information visit: www.elesta.co.uk**

Highbury reaches its goal with Grundfos

Arsenal FC's former stadium, Highbury, has been transformed into tastefully developed apartment buildings retaining many of the original features – including those in Art Deco style. The former pitch has now been transformed into a garden area.

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A new website dedicated to R22 refrigerant legislation has just been launched by air conditioning manufacturer, Mitsubishi Heavy Industries Europe (MHIE). By logging on to www.mitsubishiR22.co.uk, companies affected by the new regulations can check out key deadlines in the run-up to the ban on R22 and access advice on the options available, whether they are an end-user, a specifier, an installer or service engineer.

● **For more information visit: www.mitsubishiaircon.co.uk or tel: 020 7842 8100.**

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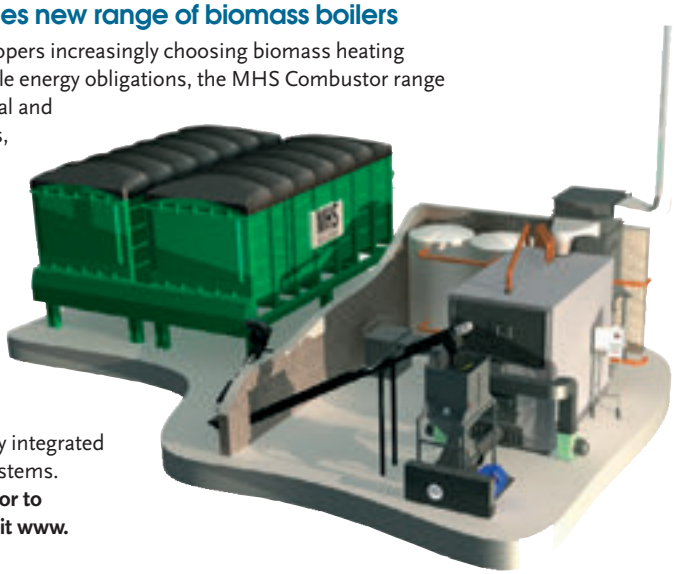


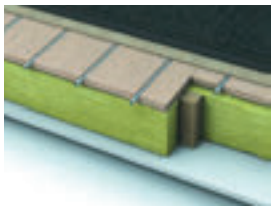
HCP tested to European radiant panel standard

Radiant Heating Panels from HCP, the specialist heating division of SAS International, have been tested to BS EN 14037, the dedicated British and European standard for ceiling-mounted radiant panels supplied with water at temperatures below 120°C.

Radiant heater output was formerly based on a large number of pan-European test methods for wall mounted radiators – resulting in output figures that varied significantly, depending on the country, test institute or certification scheme used.

● **For more information visit: ww.hcp-sasint.co.uk/radiant-heating.htm**

Timoleon's combined heating and flooring passes tough tests



Underfloor heating specialist Timoleon has launched the Toron flooring system, combining a floor deck with an underfloor heating system in a single, structurally loaded entity.

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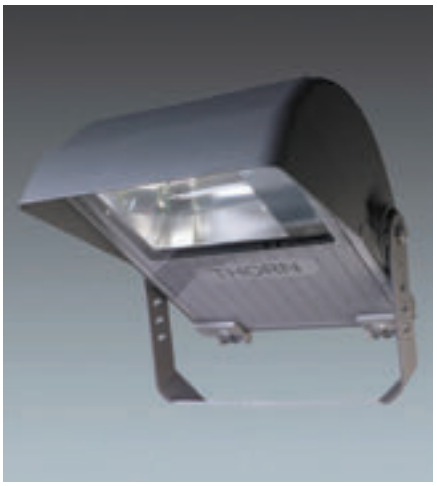

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Design of air source heat pump systems for heating and hot water

The UK has a challenging and legally binding target of generating 15 per cent of its energy from renewables by 2020. The government's Renewable Energy Strategy has recognised the potential of commercial buildings to contribute to this shift, and the potential for air source heat pumps is starting to be recognised. In December 2008, the European parliament adopted an EU directive on the Promotion of Renewable Energy Sources, which expanded its definition of renewable energy sources to include air and water source heat pumps, in addition to ground source heat pumps. Now all three technologies are being promoted as part of EU policy to get member states to increase their use of renewable energies and this ruling will make its way into UK legislation in 2010.

This CPD article examines some practical issues in selecting and applying air to water heat pumps. For an introduction it would be useful to refer back to the May 2009 CPD article, where the basic operating principles of a heat pump are described, with its related performance characteristics. Note that efficiency of a heat pump is defined using the Coefficient of Performance(COPh) (heating) or Energy Efficiency Ratio(EER) (cooling).

COP_h = *Useful Heating Capacity (kW)/ Power Input to drive the system (kW)*

Values between 2 and 5 are attainable for air source heat pumps producing hot water. The efficiency is principally a function of the heat pump's operating temperatures, the evaporating and condensing temperatures and these will be a function of the air intake temperature and the hot water temperature required. As far as wanting to improve efficiency is concerned, if the evaporating temperature could be raised by 1K and the condensing temperature reduced by 1K, performance of the system will increase quite considerably, by between 4 and 8 per cent. Figure 1 shows the variation in COP_h for a typical air-to-water heat pump in the capacity range 3 to 15kW. Once the air and water temperatures are fixed, improvement in efficiency is achieved by heat exchanger >

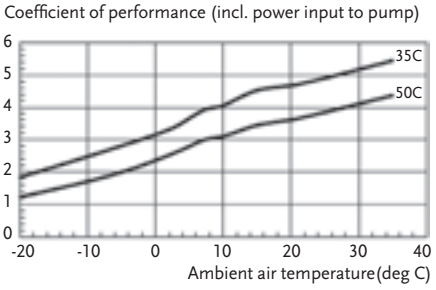

Figure 1 Performance of Air-Water heat pump for hot water temperatures of 35C and 50C

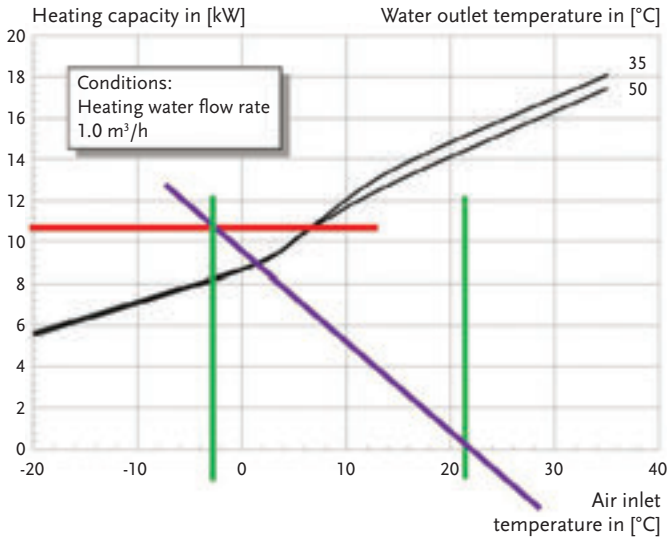

Figure 2 Selection procedure, step 1

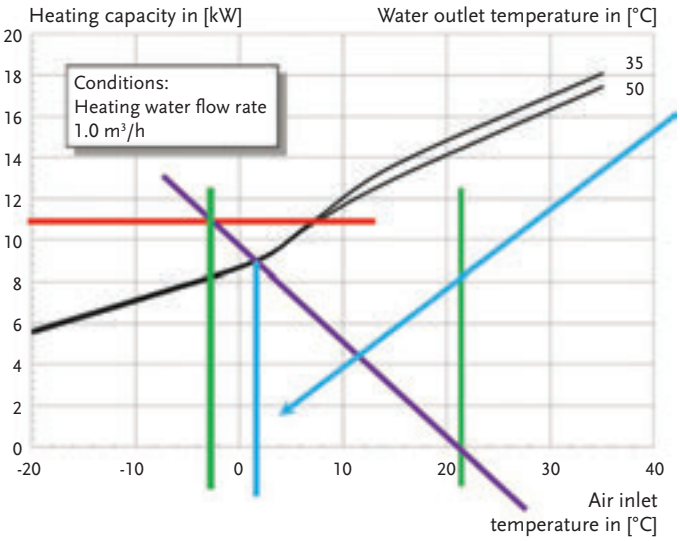

Figure 3 Selection procedure, step 2

> design and selection, plus developments in compressors and controls.

Heat pumps are most typically applied for space heating, space cooling and also for the production of stored sanitary hot water.

For heating operation, heat pumps will always optimise their efficiency at low water temperatures and are most effectively installed in conjunction with low temperature heat distribution systems, typically underfloor heating or fan convectors. If conventional radiators are used, these need to be suitably oversized in order to allow effective operation at lower water flow temperatures. Radiator manufacturers provide tables to calculate the radiator output across a range of mean water flow temperatures.

In the case of underfloor heating, designers should ensure that the underfloor pipe matrix is designed with low temperature operation in mind (ideally 35C – 40C); this is largely a function simply of pipe spacing.

A widely held misconception about heat pumps is that they are only suitable for space heating and even then, only at low water temperatures. However, heat pumps also have the ability to provide plentiful hot water, either as the sole water heating appliance or, if preferred, in conjunction with another heat source such as solar or a fossil fuelled boiler.

As hot water flow temperatures increase, heat pump efficiency (Coefficient of Performance) does drop, but even at a relatively low COP_h of 2, this is still equivalent in terms of CO_2 emissions to a gas powered system. A well-designed and sized heat pump will normally be operating above this value, even for hot water production. New generations of air source technology available from some manufacturers now offer performance that is comparable to ground source, with high COPs at low ambient temperatures. In addition, the incorporation of renewables brings other benefits. For example, a recent installation at a Travelodge used three 28kW air source heat pumps to pre-heat domestic hot water for the hotel, helping it to achieve the percentage of renewable energy required to meet the Merton Rule, as well as achieving compliance with Building Regulations Part L.

Defrosting

Specifiers must also consider the energy impact of an air source heat pump's requirement to defrost its evaporator to remove ice build up at low ambient temperatures. This is most commonly achieved by the heat pump switching into reverse cycle operation. When this happens the outdoor heat exchanger (evaporator) becomes the condenser, with hot refrigerant used to remove the ice. When operating in this mode, electricity continues to be used by the compressor and heat is removed from the heat sink (that is the condenser temporarily becomes the evaporator). This is a fundamental reason why air source heat pumps should always be installed in conjunction with a buffer tank as this prevents heat being extracted from the buildings heating system when operating in the defrost cycle.

Typically the defrosting cycle takes place between ambient temperatures of approximately 10C and 0C. In the UK maritime climate where these reflect typical winter temperatures, it is therefore crucial that the efficiency of the defrost cycle is taken into consideration and that manufacturers quoted performance includes energy consumption of the defrost cycle.

Selecting a heat pump

For a new build the situation is straightforward. The design heating load is determined for a particular winter design ambient temperature. The type of heat emitter is decided (radiators, underfloor heating, fan coil, etc.), which determines the water temperature required. Underfloor heating and fan coils can operate at water temperatures of 35C, but radiators will need water at least at to 55C.

If a heat pump system is retrofitted into an existing building that had a gas/oil boiler system, the following factors have to be considered:-

- The correct actual flow and return water temperatures have to be determined for each heat emitter (most likely to be a radiator) at design conditions.
- If the flow temperature required is less than 55C for all emitters, no additional measures are needed for the refit.
- If the flow temperature is higher than 55C in some of the emitters, those emitters must be replaced by larger surface heat exchangers.
- If the flow temperature is greater than 65C for all emitters and it is not possible or not desired to carry out replacement, a high temperature heat pump will need to be used.

Benefits will be made if the heating capacity can be reduced by ensuring that air infiltration losses are reduced, insulation to the building is improved and glazing is upgraded, all of this in line with the latest Building Regulations. The result of this is not only to reduce the heating requirement, but also to lower the water temperature needed for heating.

Accurate selection of an air source heat pump (ASHP) to meet the demand at a range of outdoor air temperatures is absolutely vital. Remember that ASHP output is a function of heat source temperature and water flow temperature, so both efficiency and kW

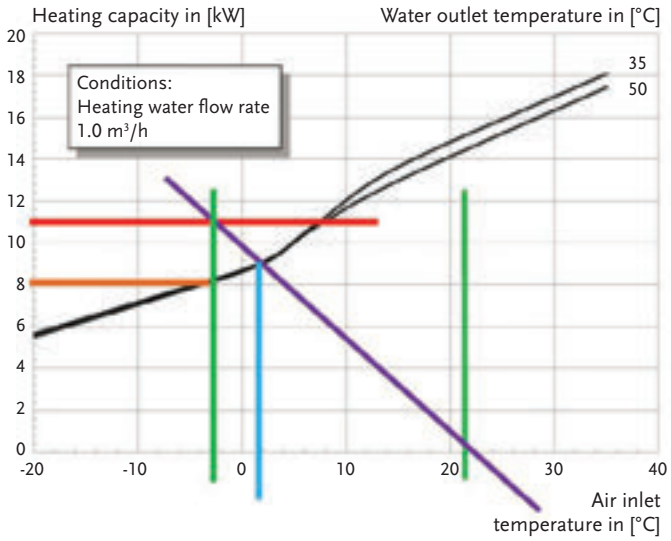

Figure 4 Selection procedure, step 3

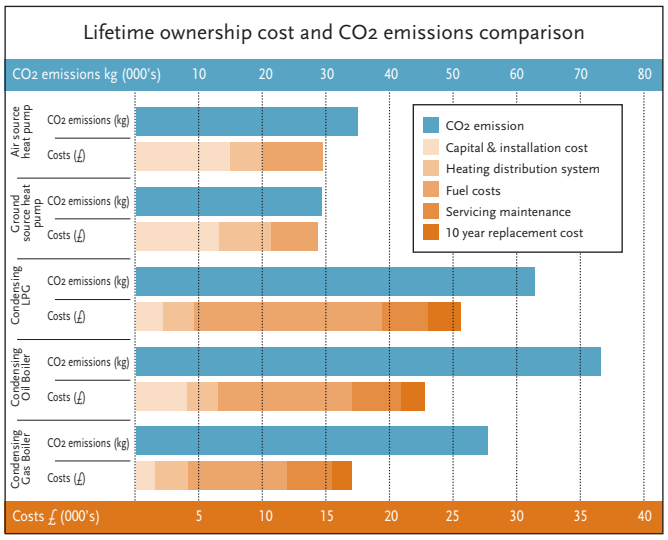

Figure 5 CO_2 Emissions and lifetime costs for various fuels

rating will decrease at colder times of the year. The capacity of the heat pump needs to be matched to the energy demand during cold periods. The following example illustrates the factors that need to be considered. Figure 2 shows the heating demand as 11 kW with the red line, the room design temperature is 21C and the ambient air design temperature is -3C (green). The diagonal purple line intersects the heat pump output curve to give the bivalent or balance point (1C ambient). From Figure 3, the heat pump contributes 100 per cent of the heating demand at this balance point.

When the ambient temperature falls below the balance point, Figure 4 shows how the heat demand increases, while the heat pump output falls, such that about 3 kW of supplementary heating has to be provided. Other factors that may affect the heat pump output are:

- Wind speed affecting fan on outdoor unit
- Positioning in relation to the building (dead areas)
- Orientation and shading
- Geographical height and area
- Defrost requirements

Hot water storage

The ability to provide sufficiently high water temperatures for stored hot water is also important, both from an efficiency point of view and also to meet Health and Safety legislation aimed at preventing legionella. For heat pumps specified primarily for hot water production, high temperature models are able to achieve stored hot water temperatures of up to 65C without the need for supplementary heating. These typically use refrigerants such as R290 (Propane) or R134a to achieve higher temperatures within the vapour compression cycle. Lower temperature heat pumps will require support from a supplementary heat source to reach the maximum temperature – this might be from another heat source, such as a fossil fuel boiler, or from a boost electric immersion heater.

Correct selection of the hot water cylinder with an appropriately sized heat exchanger to ensure maximum heat transfer is important as heat pump systems usually require a larger heat exchanger surface area. This is particularly important for air source heat pumps to ensure that stored hot water temperatures can be maximised in the summer months when the heat pump output will increase due to higher ambient air temperatures. Cylinder specification for air source heat pumps therefore needs to be carefully considered in line with performance characteristics of the heat pump.

> **"In the current economic climate, many businesses will find the costs of a new renewable heating system off-putting"**

Commercial cylinders compatible with heat pumps are available in sizes up to 4,000 litres, with coil size bespoke designed to exact specification. Hybrid systems of solar thermal and heat pumps are also possible and becoming increasingly popular. Intelligent heat pump controls can optimise use of the solar energy before bringing on the heat pump compressor. The use of waste heat is also an interesting application for heat pumps. Heat pumps installed at the first supermarket in Ireland built to Passivhaus standards use the waste heat from the chiller cabinets at around 30C, which is circulated directly through the system and used to provide hot water at 60C for the staff canteen and washrooms, and customer toilets.

In the current economic climate, many businesses will find the costs of a new renewable heating system off-putting. But building managers should bear in mind that the Renewable Heat Incentive(RHI) comes into effect in 2011, which will provide a direct financial return for every kWh of renewable heat generated. And to minimise the impact of the initial capital costs of installation, leasing schemes can cover the complete project outlay and spread the costs over up to 15 years. Repayments can very often be met by the savings made on fuel bills, and payments from the RHI will also make a useful contribution.

Figure 5 measures total lifetime costs against different fuels and also total CO_2 emissions (electricity based on 0.422kgCO_2/kWh) for a three-bedroomed new-build semi-detached house over a 20-year period. Heat pumps are a viable option in commercial buildings, for hot water as well as space heating, offering great flexibility over installation and system design. It is a question of specifying the right heat pump for the specific task in mind, and siting it to gain the optimum performance.

References

Heat Pump Benefits: http://www.dimplex.co.uk/products/renewable_solutions/heat_pump_Benefits.htm

The CIBSE Journal CPD Programme: May 2009, Heat Pump Technology

Heat Pump Design, http://www.dimplex.de/en/downloads/planning-manuals/heat-pumps/heat-pumps-project-planning-manual.html

Module 13

February 2010

1. If a heat pump's evaporating temperature is raised by 1K and its condensing temperature lowered by 1K, efficiency increases by:

- ☐ A 2%
- ☐ B 6%
- ☐ C 1.5%
- ☐ D 10%
- ☐ E 15%

2. The most common defrosting method used for air source heat pumps is:

- ☐ A warm air heating
- ☐ B antifreeze solution
- ☐ C electric heaters
- ☐ D reverse cycle operation
- ☐ E solar heating

3. The following factor will not affect heat pump performance:

- ☐ A ambient air temperature
- ☐ B wind speed affecting outdoor unit fan
- ☐ C building heat load profile
- ☐ D hot water temperature
- ☐ E defrosting

4. Which refrigerant is most likely be used in a heat pump producing hot water at 65C?

- ☐ A R290
- ☐ B Ammonia
- ☐ C R407C
- ☐ D R410A
- ☐ E R123

5. What would be typical lifetime CO_2 emissions from an air source heat pump used in a three-bedroom semi-detached house?

- ☐ A 55,000kg
- ☐ B 73,000kg
- ☐ C 29,000kg
- ☐ D 63,000kg
- ☐ E 35,000kg

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Events & Training

NATIONAL EVENTS/ CONFERENCES

● **09 Feb 2010 Developing the Grid for a Renewable Future** Belfast
The electricity network challenge. Randal Gilbert: rgilbert@theiet.org

● **10 Feb 2010 Lifts Group AGM and evening seminar** London
AGM and group talk. Steve Hobson 01732 458222 steve.hobson@geraldhoney.co.uk

● **10 Feb 2010 CIBSE ASHRAE Group AGM** London
ASHRAE's AGM. Tim Dwyer 020 7815 7638, timdwyer@lsbu.ac.uk

● **10 Feb 2010 How engineers can reduce a building's carbon emissions in reality, not virtual reality** London
Tools for reducing carbon. timdwyer@lsbu.ac.uk

● **10-11 Feb 2010 Manchester HEVAR 2010** Lancashire
Exhibition and seminars on the latest topics and technologies.

● **17 Feb 2010 Daylight Group Visit** (all details to be confirmed)
Graham Phillips 01306 885787 graham.phillips220@ntlworld.com

● **18 Feb 2010 Remote sensing and flooding** Bristol
Latest technological advances in sensor technology. www.ice.org.uk

● **24 Feb 2010 Beyond design basis analysis of buildings: future trends in the nuclear industry** London
ICE event/speakers to be announced. James.Mitchell@ice.org.uk, www.ice.org.uk

● **26 Feb 2010 Energy and Environmental Targets in Hospitals** London
Ambitions/targets for healthcare. Richard Knight tel 07794 914211

● **09 Mar 2010 41st Cooling Prize Competition** Dundee
Awards for geotechnical engineers. James.Mitchell@ice.org.uk

SOCIETY OF LIGHT AND LIGHTING

Visit the SLL pages via www.cibse.org

● **16 Feb 2010 Residential Lighting** London
Speakers: Benedict Cadbury and Rececca Weir. lpeck@cibse.org

● **17 Feb 2010 The new Part L: will it really reduce carbon emissions?** London
Part of the joined Up Lighting series. www.ile.org.uk

● **25 Feb 2010 SLL Masterclass – Lighting for the Future** Portsmouth
Southern region event. Tel: 020 8772 3614 email: jrussell@cibse.org

● **17 Mar 2010 Ready Steady Light** Sidcup
SLL lighting event. Register at www.cibse.org/rsl2010

CIBSE REGIONS

● **08 Feb 2010 GSHP delivery of expected performance** Belfast
A Northern Ireland region event. admin@cibseNI.org

● **09 Feb 2010 BS 9999: Fire engineering** Northampton
A two-session meeting for M&E and FM. Mark Lowe 01629 580000

● **11 Feb 2010 Design for indoor environment quality in schools** London
Internal school environments. Tel: 020 8621 2100.

● **17 Feb 2010 NHS roadmap to zero-carbon hospitals** Manchester
Speaker: David Pencheon (NHS Sustainable Design Unit). r.gordon@tace.co.uk

● **17 Feb 2010 Building simulation in practice – quick and dirty modelling** London
A Home Counties South East region event. jzhang;2005@yahoo.co.uk

● **23 Feb 2010 A review of the design principles associated with siphonic cast iron above ground drainage systems** London
chris.northey@bdsp.com

● **25 Feb 2010 Resilient Electrical Services** Bristol
The reliability of electrical supply. Louise.Payne@Hays.com

CIBSE/OTHER TRAINING

● **09 Feb 2010 Delivering Nuclear Projects** Birmingham
Delivering successful nuclear projects. events.imeche.org

● **10 Feb 2010 Choosing the right environmental assessment: BREEAM vs LEED** London
Comparing the two assessment methodologies. www.cibsetraining.co.uk

● **15-19 Feb 2010 Low Carbon Consultants Energy Management System Register for BSEN 16001** London
The technical skills and management systems knowledge to meet BSEN 16001. www.cibsetraining.co.uk

● **22 Feb 2010 Green specification and new technologies** London
Issues and regulations affecting green specifications. www.cibsetraining.co.uk

Last year's event attracted large seminar audiences.

Ecobuild 2010

Dubbed the world's biggest event for sustainable design, construction and the built environment, Ecobuild 2010 will be coming to London again in March.

Staged at Earl's Court, this year's event should see about 850 exhibitors showcasing products and more than 100 free conference and seminar sessions given by expert speakers, as well as a series of live demonstrations and attractions.

This year seminars are expected to be held on a wide range of topics, including the future of energy, getting water wise, energy performance, regulations, building refurbishments and sustainable design. Speakers will include experts from the built environment, engineering consultants including Arup, Mott MacDonalds Fulcrum, and AECOM, as well as Nottingham Trent University and real estate company, Hammerson.

The event will be held from 2 to 4 March. Almost 35,000 visitors attended Ecobuild 2009. Visit **www.ecobuild.co.uk** for more information.

CPD TRAINING

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

MECHANICAL SERVICES

● **10 Feb 2010 Understanding and application of psychrometric charts** London

● **18 Feb 2010 Fans in the 21st century, Parts L, F and all that** London

FIRE SAFETY

● **09-11 Feb 2010 Fire safety engineering design: principles and practice – three-day course** London

● **16 Feb 2010 Examination of the new BS9999 on fire safety in buildings** Birmingham

● **17 Feb 2010 Emergency lighting to comply with fire safety requirements** London

● **23 Feb 2010 Smoke control: matching the method to the building** London

● **25 Feb 2010 Fire detection and alarm systems for buildings – BS 5839 Part 1: 2002** London

WATER, PUBLIC HEALTH AND SUSTAINABILITY

● **18 Feb 2010 Legionnaires disease prevention: implementing the guidelines** London

● **24 Feb 2010 Rainwater harvesting in the sustainable environment** London

BUILDING REGULATIONS

New courses

● **23 Mar 2010 Building Regs Part L2 2010** London

● **16 Apr 2010 Building Regs Part L2 2010** Manchester

● **27 Apr 2010 Building Regs Part L2 2010** Birmingham

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Rhona Cloherty, rcloherty@macdonaldandcompany.com **Ref: 75091**

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Alison Sharples, asharples@macdonaldandcompany.com **Ref: 74653**

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Gavin Grubb, ggrubb@macdonaldandcompany.com **Ref: 74966**

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Belinda Miller, bmiller@macdonaldandcompany.com **Ref: 75141**

BID MANAGER

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Rhona Cloherty, rcloherty@macdonaldandcompany.com **Ref: 72737**

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Claire Marchant, cmarchant@macdonaldandcompany.com **Ref: 72825**

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Charlotte Murdoch, cmurdoch@macdonaldandcompany.com **Ref: 74971**

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Belinda Miller, bmiller@macdonaldandcompany.com **Ref: 75129**

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Our client, a leading expert in the fields of Energy & Environmental Services, Building Services Design, Property Appraisal Services and People Solutions are recruiting for a HV/LV Electrical Design Engineer to join their Building Services Design Team.
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An established Property Management company requires a Senior Mechanical Design engineer to provide survey and design solutions. Managing existing commercial properties you will be tasked with creating new cost efficient replacement HVAC designs and monitoring their installation. Contact Darren for further information.

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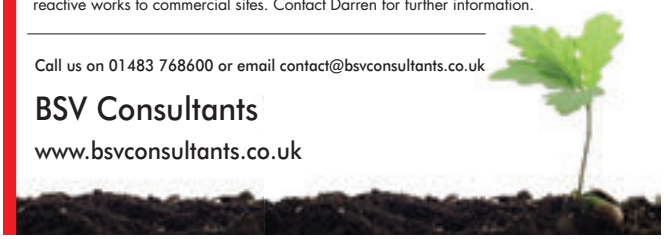

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Calgary Studio

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Certifying excellence

CIBSE's new certification manager, **Phil Clare**, reveals what it is he does to help members

Phil Clare may have only been in the job for four months, but he has yet to find an aspect of being a certification manager for CIBSE that he doesn't like.

In charge of a team of nine staff, he manages financial performance and authorises certificates for Low Carbon Energy Assessors for DEC (Display Energy Certificates), EPC (Energy Performance Certificates) and ACIs (Air Conditioning Inspectors).

He was hired in September 2009 and, since that time, has attended both internal and external technical and commercial meetings; suggested and (if approved) implemented new certification schemes; and ensured that CIBSE's schemes continue to comply with the relevant authorities, such as the Department for Communities and Local Government (CLG) and the United Kingdom Accreditation Service (UKAS). This is on top of managing his team, which deals with the day-to-day activities of the schemes, quality assuring approved assessors/inspectors work, issuing certificates and advising prospective applicants. The 46-year-old normally starts work at 8.30am and leaves about 5.30pm, but with the 90-minute journey each way, it's a long old day.

Clare enthuses: 'Every day introduces a new challenge. At the moment there isn't anything I don't like, although this could have changed by the time this article is published!'

One of the projects he is currently working on is implementing the automated systems for registration applications and recording and updating CPD records: 'The systems have both gone live and I have been working with the software provider to resolve issues as and when they occur.

> "As with all new systems, until it is implemented, not all of the issues can be foreseen"

As with all new systems, until it is implemented, not all of the issues can be foreseen.'

All new documentation that is created is reviewed and approved by a director and, where required, the low carbon consultant steering committee. Depending on the size of the project, it can take up to three months to create, approve and implement a scheme, which then needs to be assessed by UKAS.

Other projects he has been involved with include reviewing all of CIBSE's current processes and procedures, enabling him to identify improvements and ensure compliance with the relevant bodies' requirements. 'This is a continual improvement process involving review and audit of our processes and procedures,' he added.

Clare, an ACQI (associate member – Chartered Quality Institute) ISO 9001 lead assessor, has been in the industry for nine years, having previously worked at BRE Global.

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

Movers & Shakers

The European Building Automation Controls Association (eu.bac) has announced that **Scott Petersen** has replaced Stephane Le Gentil as chairman. Petersen is marketing director – energy solutions at Honeywell EMEAI.

Rob Gardiner has secured a four-year apprenticeship with building services consultant NG Bailey. The 16-year-old fought off competition from thousands of others to obtain the position. The former CTC Kingshurst Academy pupil recently completed his Level One NVQ in engineering.

Andy Walsh has been appointed UK sales specialist for PV (Photo Voltaic) Inverters by Fronius GMbH of Austria, following the opening of their new UK subsidiary. Andy is responsible for all sales in the United Kingdom. Andy has 18 years' experience in the energy management industry, and was formerly with Perpetual Energy Ltd.

Multidisciplinary engineering consultancy Buro Happold has appointed **Chris Sparrow** as group director and regional discipline leader (structures) to its Hong Kong office. Sparrow is a structural engineer with more than 35 years' experience. He previously worked at Meinhardt.

Southern Bear plc, a holding company for support services, industrial and engineering sectors, has appointed **Nigel William Wray** as non-executive chairman. He has previous board member experience on many AIM listed companies. Fenhams, which designs, installs and maintains domestic heating systems, is a trading subsidiary of Bear.

AECOM graduate **Jonathan Farrance** has become the world's youngest ICE Chartered Engineer, aged just 23. A structural engineer, Farrance was one of 1,206 candidates across the world that sat the ICE exams last year. He is now studying for the Institution of Structural Engineers Professional examination in April.

Three key figures in the built environment field have been recognised in the 2010 New Year Honours List.

Anne King, director of the Building Services Research and Information Association (BSRIA) received an MBE in recognition of her services to the construction industry, while **William Rickett**, retired director-general of energy at the Department for Energy and Climate Change, (pictured) was awarded an Order of the Bath. **George Ferguson**, past president at the Royal Institute of British Architects (RIBA), was honoured with an OBE for his services to architecture and to the community in the south-west.

Design, engineering and management consultant WSP has appointed **Jason Richards** as an associate director in its Leeds office. Richards, an chartered mechanical engineer and accredited BREEAM assessor, joins from OPERON.

David Stanley, CEng MCIBSE MIET, has been appointed as senior project manager at Birmingham City University. He will now be responsible for the MEP and ICT engineering of the new city centre campus. Stanley previously worked for Hoare Lea as an associate and has recently become a regional CIBSE committee member.

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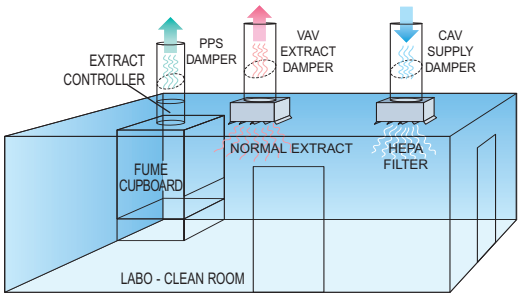

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