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The official magazine of the Chartered Institution of Building Services Engineers

May 2012

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Green fakery has its consequences

Another month, another government shambles on green policy. This column was happy, last month, to laud the minister in charge of the Building Regulations, Andrew Stunell, for his directness and honesty over the scale of the challenge Britain faces in trying to make its housing stock more energy efficient. But now we have the spectre of the Prime Minister, David Cameron, apparently overturning what is considered by many in the construction sector to be a main plank of this approach – the introduction of 'consequential improvements' for dwellings.

The inclusion of this proposal in the current consultation on changes to the Building Regulations next year was in itself a major concession by the Tory leadership in the coalition. Some ministers had previously been firmly opposed to consequential improvements – which would require people carrying out extensions or conversions on their homes to introduce some energy efficiency measures. On the face of it (particularly if you are the *Daily Mail*) this proposal, dubbed by critics a 'conservatory tax', could seem to be too draconian and burdensome on homeowners. But the whole point of this approach is that it would form part of the government's Green Deal, with people able to more than recoup the costs through energy savings.

> It's time the PM and Chancellor stopped faking their green credentials and showed some bravery on eco policies

Unless Downing Street is persuaded to row back on this apparent veto of consequential improvements, we will lose an important new carrot for persuading householders to become more energy efficient – and the Green Deal will be undermined in advance of its autumn launch. The scrapping of the alleged 'tax' is also another example of bad and dishonest government. Like the fiasco over the so-called 'consultation' on feed-in tariff cuts (the courts ruled ministers' action unlawful because they tried to introduce changes while the consulation was unfinished), we now have an attempt to rule out consequential improvements prior to any full consideration of responses to the Building Regulations consultation.

We have said it before in this column and we will say it again. Every time a minister like Mr Stunell proclaims that the coalition will indeed be the 'greenest ever' administration, the evidence from those at the top of government directly contradicts this claim. It's time the Chancellor and the Prime Minister stopped faking their green credentials and showed some bravery on implementing eco policies.

Bob Cervi, Editor
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NEWS

All the latest news from around the building industry

Policy change 'would be self-defeating'

Homeowners would carry out fewer improvement works if the 'consequential improvements' proposal was introduced, according to a survey of its members by the Federation of Master Builders (FMB).

The FMB said that requiring home owners to carry out energy efficiency improvements as part of house conversions would be 'self-defeating'. The survey found that '70% of respondents did not believe that consequential improvements were technically, functionally or economically feasible to implement for most domestic extension projects'.

'Our research also shows that 73% of builders think that home owners would carry out less work as a result of the proposals, with a further 69% expecting home owners to turn to cowboy builders instead to get around the proposed legislation,' the FMB said.

FMB chief executive Brian Berry said: 'There is an urgent need to improve the energy efficiency of our existing homes but people should be encouraged and not forced to take action as the current proposals will only backfire on the government.'

Consequential improvements proposal may be scrapped

Prime Minister is reported as calling for the proposed change to Part L to be dropped

Plans to include 'consequential improvements' in the Building Regulations could be scrapped, after the Prime Minister was reported as being unhappy with them.

The consultation document on changes to Part L of the regulations includes plans for 'consequential improvements', which would require home conversions to be accompanied by some energy efficiency measures. But Downing Street sources told the BBC that such additional measures, dubbed a 'conservatory tax' by some MPs, should not be compulsory.

The government also stressed that the Green Deal – a voluntary home-efficiency scheme that is separate from the Building Regulations – would not be scrapped, as some newspapers had suggested.

CIBSE president Andy Ford said: 'If the government decides not to implement consequential improvements, it significantly undermines their efforts to cut emissions from buildings.

'The savings from these measures are estimated to be almost 10 times what we will save from the proposed changes for new buildings. It is hard to see how the government can either meet the requirements of the Energy Performance Directive for major renovations, or be "the greenest government ever" if it drops consequential improvements for existing homes.'

Paul King, chief executive of the UK Green Buildings Council, described Downing Street's suggestions as 'bewildering'. He told the BBC that, under consequential improvements, homeowners would not be required to introduce energy efficiency measures unless these were cost effective. 'If they're not cost effective, the homeowner can refuse,' he said.

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The consequential improvements policy has been dubbed a 'conservatory tax' by some MPs opposed to it

Separately, several organisations have signed up to become Green Deal providers, offering energy efficiency packages to consumers when the scheme launches later this year.

The government said it would be working with the 22 signatories to ensure the move from testing into a managed launch in October works 'seamlessly' and provides a good customer experience from day one. The 22 include several big energy companies, but there are also some smaller firms and community groups.

Analysis of Building Regulations proposals, page 32

New heat strategy seeks views of industry

Consultation document seeks the industry's view on future plans

The government has set out its vision of how it can cut emissions from heating homes, businesses and industry in future decades, and has called for the views of industry.

It has published its heat strategy, which 'sets out the long-term challenges and opportunities on the pathway to decarbonisation', says the Department of Energy and Climate Change (DECC).

Almost half of the energy consumed in the UK is used to generate heat for buildings and water, in cooking food and manufacturing goods or to keep offices and homes cool in hot weather, according to DECC.

The strategy asks specific questions on future policy options and includes a range of different low carbon heat case studies, including major district heating networks in the UK.

Climate Change and Energy Secretary Edward Davey said of the proposals: 'Many towns, cities and communities across the UK are already switching from fossil fuels to low carbon forms of heating like biomass, heat pumps and solar thermal.

'I want to give the opportunity to others to follow the pioneers so that, in time, our buildings are no longer dependent on burning fossil fuels for heat but using affordable and reliable alternatives to help create a flourishing, competitive low carbon manufacturing industry.'

DECC has also launched a new interactive National Heat Map, an online website aimed at helping planners to identify potential areas for district heating networks.

The new map, developed for DECC by the Centre for Sustainable Energy, will allow planners to visualise the potential for heat networks in their area.

Separately, DECC has issued provisional 2011 estimates of UK greenhouse gas emissions.

The figures show that in 2011, UK net emissions of carbon dioxide are estimated to be 456.3 million tonnes, 8% down on 2010.

The fall in CO_2 emissions from the residential sector was 22%, while the business sector saw an 8% drop and the energy supply sector a 6.1% fall.

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A new UK heat strategy has been launched

CRC reforms outlined by government

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Proposals for simplifying the Carbon Reduction Commitment (CRC) energy efficiency scheme have been published.

The CRC, which requires larger energy users to report their levels of carbon emissions, had come under attack for being too complex.

In its original form, the scheme recycled payments from participants purchasing emission allowances to reward those which improved their energy efficiency most.

But the scheme was revised to generate revenue for the Treasury, prompting concern within the UK business sector.

The government is asking for comments on a range of simplifications to the scheme aimed at retaining the potential benefits while reducing bureaucracy.

The proposals include shortening the qualification process for the scheme, reducing the number of fuels covered by the scheme from 29 to four, and cutting the amount of reporting required, as well as the length of time for which records have to be kept.

The government says that the new procedures would also align CRC reporting with the greenhouse gas reporting process, to make it simpler for businesses and other organisations.

The proposed changes would come into force next April as the second phase of the scheme begins.

In Brief

SMART ENERGY INITIATIVE
The first Smart Energy System demonstration of its kind in the UK is to be developed by the Energy Technology Insititute (ETI). The £100m, five-year programme aims to expand the UK's capability in low carbon technologies.

LEED AND BREEAM PLAN
The US Green Building Council has announced that the LEED programme for sustainable buildings will in future recognise BREEAM energy credits. The aim was to make the two systems more 'interoperable'.

PLANNING MOVE 'RAISES BAR'
The government has published its National Planning Policy Framework, which it says contains provisions to make planning simpler and more accessible. The framework also 'raises the bar on design standards', according to Planning Minister Greg Clark.

SUPPORT FOR SHALE GAS
The extraction of gas from shale, known as fracking, should continue but with more safeguards, a government-appointed panel of experts has reported. The report is being consulted on by DECC.

IMTECH AQUA
The CIBSE award winner, Imtech Aqua Building Services Ltd, was misspelt in our report on the awards in the March *Journal* (page 17). We apologise to the company for the error.

Energy certificates revamped in move to 'aid' home buyers

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Communities Department pledges more training for energy assessors

Prospective home owners will be given better and clearer advice on making their new homes more eco-friendly, according to the government

A new-look Energy Performance Certificate (EPC) will provide recommendations for improvements and will indicate to the consumer whether they can be funded through the Green Deal.

Energy assessors who compile EPCs will also receive further training to ensure the documents are produced to a 'consistently high standard and assured advice is given to prospective homeowners', the Department for Communities and Local Government (DCLG) in a statement.

Prospective buyers and tenants will also be given this energy information much earlier in the buying process, to give them time to plan how they will implement some of the recommendations included. From April this year, house buyers have been able to compare the energy performance of the new home with that of similar properties, as the National Energy Performance Certificate Register is opened up to public use for the first time, DCLG said.

But to ensure the data is as secure as possible, companies wanting to use the register will be required to sign a licensing agreement – which will include strict rules over how the data is used.

Communities Minister Andrew Stunell said: 'The Energy Performance Certificate has proved useful in putting the efficiency of our homes at the forefront of our minds, but homeowners can often struggle to know how to act on the advice it gives.

'That's why we're giving it a complete redesign, making it clearer and easier to understand and putting the recommendations for improvements into matters of pounds and pence by showing how much consumers could potentially save on their energy bills.'

See Regulations, page 22

Architects body attacks minister's 'unambitious' climate target plans

The Royal Institute of British Architects (RIBA) has expressed concern over the government's 'inconsistent' and 'unambitious' position on the draft European Energy Efficiency Directive (EED).

The directive is designed to ensure the European Union meets its 20% energy savings target by 2020.

The coalition is currently opposing both a 20% binding target and nearly all the other significant measures in the EED, said RIBA, which has written to Energy Secretary Ed Davey.

Anna Scott-Marshall, RIBA head of external affairs, said: 'The coalition government's current position on the EED is confusing and causing us some concern.

'In particular, the coalition appears to be pushing for an unambitious target on public buildings renovations.

'This does not help lead the market for energy efficiency renovations, and leaves a large energy bill for the taxpayer.

'This position... stands contrary to the coalition's claims to be the greenest government ever. We need a sensible road map to improving the efficiency of our building stock.'

The letter was signed by 18 other organisations including the UK Green Building Council, the Association for the Conservation of Energy, and WWF-UK.

GREEN CHALLENGE

Will all new homes really be zero carbon from 2016? Can the existing building stock become significantly more efficient? These and other key issues were debated at this year's Ecobuild event in London. Reports by **Bob Cervi**, **Carina Bailey** and **Katie Silvester**

CIBSE/IET debate: Forging collaboration

How can professional institutions in the built environment share knowledge for the benefit of the whole sector? In a discussion panel organised by CIBSE and the Institution of Engineering and Technology (IET), representatives from several bodies came together to look at how more sharing could be brought about.

CIBSE president Andy Ford, who chaired the panel, opened the discussion with the question: 'What is the knowledge that we should be sharing.'

Architect Alan Shingler, who chairs RIBA's sustainable futures group, said: 'For us to collaborate, we need to align our targets. We're having to produce low carbon buildings at lower cost – and so sharing needs to be put in this context. And this means involving contractors in the project as early as possible.'

Ford raised his concerns that in general engineers are not terribly good at talking to architects, and 'contractors I meet don't seem to have the knowledge of how to interact with early stage design'. This was partly due to ideas instilled a university level which failed to teach design as an interactive team effort and reinforced existing prejudices.

'It begins earlier than that, at school,' said Anne King of research body BSRIA. 'Let's have integrated design courses in schools.

David Warriner, who chairs the construction and building services division at mechanical engineering body ImechE, added: 'But all of us here represent a different professional body – we have already parcelled it all up. So we need people who can work across the professional disciplines.'

'People are aligned with their company and have commercial secrets to protect,' said Bruce McLelland from the IET. 'But when they come into an institution they are keen to talk about what they are doing. Achieving this sharing of knowledge is about getting professionals in a place where they can network and share best practice.'

But what about taking that sharing to the level of contracts and procurement, an audience member asked. Johnny Dunford of surveyors' body RICS agreed: 'Yes, procurement needs to change before collaboration can improve.'

Shingler added: 'I have worked on projects that have worked very badly, even with integration at Stage B. The problem is that quantity surveyors, contractors, and so on, have different goals. For a successful integrated team we need an "intelligent

Andy Ford, CIBSE president, chaired a panel discussion on institutional collaboration. The event was jointly organised by CIBSE and the Institution of Engineering & Technology

client" to be involved – that is, a "client" who is fully integrated into the team.

'But so much procurement is about the lowest possible price,' said Martin Burton, former president of contractors' body the HVCA (now renamed the B&ES). 'However, BIM [building information modelling] does allow us to deliver an integrated process. Our challenge is to make sure that BIM works in getting design and contracting teams together at an early stage.'

Burton added: 'One of the biggest challenges is to bring the two different worlds of large companies and SMEs [small and medium enterprises] together through professional institutions – and we need the government to buy into this.'

'I was at the beginning of the UK Green Building Council – this showed it was possible for competitors to come together and agree solutions to real problems,' said Ford. 'We could look at that taskforce model more, for the whole industry.' Now we have the 'green construction board'

Asked by the audience who the institutions could offer as a single leadership voice, Shingler said he felt that an architect would be well placed for this role 'because we have training in leadership'. Ford responded: 'I don't mind if it's an architect, or any experienced individual, so long as they consult first and genuinely can and will speak for all in language all can understand.'

He pointed out that Paul Morrell, the government's Chief Construction Adviser, was interested in the idea of a new Existing Buildings Hub to mirror the work of the Zero Carbon Hub, which has been involved in developing policy on low carbon new homes. Dunford added: 'We need to work together to come with such a new hub'. Ford agreed, adding: 'It has to be set up in the right way'.

'Knowledge sharing and breaking down barriers between institutions are key (to our success)'

Summing up his view of the discussion, Ford concluded: 'Clearly, knowledge sharing and breaking down barriers between institutions are key. An Existing Buildings Hub could provide a group of people whom we trust to speak for us all and potentially give us a credible trusted focus . We should also not be focusing on zero carbon – The DEC [Display Energy Certificate] defines what we are about.'

Left to right: Paul Morrell, Andy Ford, BBC broadcaster Sarah Montague (panel chair), and Noel Morrin

Industry still lacks leadership, insists Morrell

The construction industry still lacks leadership and a 'route map' for implementing the green agenda, the government's Chief Construction Adviser told the conference.

Paul Morrell said that what was needed above all was a plan. 'But there really isn't one for getting from the high-level Climate Change Act – and this massive promise that we've made that we'll take 80% of our emissions out by 2050 – and everything that's going to happen if that's going to have to happen.'

He added: 'It's very hard to find collective leadership in the industry for this agenda. We need to stand up and say, we're not going to wait for the government; we are going to do this thing.'

CIBSE president Andy Ford said he'd spent 25 years trying to make buildings low carbon and 'didn't expect to be getting into an institution'.

He said: 'I spent a lot of time thinking about how to get rid of the need for heating and cooling building services from buildings. The knowledge for doing this lies with the engineers – and they need to get this across via knowledge sharing [with other professions], hence the need for institutional collaboration.'

Ford added: 'Professionals also need to know how to work together within a design team. The client also needs to be there – and to listen and stick to the green ambition.'

Noel Morrin of Scandinavian construction group Skanska said the UK was lagging behind on the green agenda: 'In the UK I see a country trying to lead on policy but too often the money disappears too soon.'

The biggest challenge for the green agenda is refurbishment, said Morrin: 'The issue here [for us] is the business case; it's there for commercial offices but we haven't got it cracked for other sectors.'

CIBSE/IET debate: Loss of old skills, lack of new skills

The loss of 'old' skills as experienced workers retire, and a shortage of 'new' skills as young people turn their backs on the industry, are creating a serious long-term legacy for the building engineering sector.

Senior industry figures told a debate hosted by CIBSE and the Institution of Engineering and Technology (IET), that the length and depth of the recession was creating a legacy of skills shortage that would have far-reaching effects.

'Young people are finding it hard to get into the industry because of lack of opportunity,' said Mike McNally, client development director at recruitment firm Hays. 'Since 2008 we have seen an increase in candidate numbers of 37%, but a fall in vacancies of 46%. This means the sector is not picking up the new skills it needs to deal with the challenges of a changing market.'

At the other end of the career ladder, experienced engineers are deciding to retire because they don't think their pensions will increase in value if they stay and the tough trading conditions are driving them away.

'There's just too much grief involved at the moment, so many are bailing out,' said Martin Burton, former president of contractors' body the HVCA (now renamed the B&ES). 'Many run small consultancies and these are being closed down. The problem will become more apparent when work picks up again and these specialists are missing.'

The panellists suggested that the loss of skills could have a significant impact on the country's ability to meet targets for improving building performance. 'Some specialist skills are almost impossible to replace,' said Huw Blackwell from Hoare Lea. 'No one is doing much training so when the elder statesmen leave they take their knowledge with them.'

The panel, which was chaired by WSP technical director Simon Robinson, agreed that the industry needed to embark on a PR campaign to improve its public perception among young people. It also should encourage the development of international networks of engineers so that skilled people could migrate to areas of greatest need.

Existing buildings 'becoming more efficient'

Moira Wallace, permanent secretary at the Department for Energy and Climate Change (DECC), said the inefficiency of the existing building stock was improving at a rate faster than the 'one a minute' refurbishment of homes that experts say is needed to meet the carbon reduction target for 2050.

'In the last three years this country has insulated two million cavity walls – that's more than 10% of the nation's stock of cavity walls – and in the same three years nearly four million lofts have been insulated.

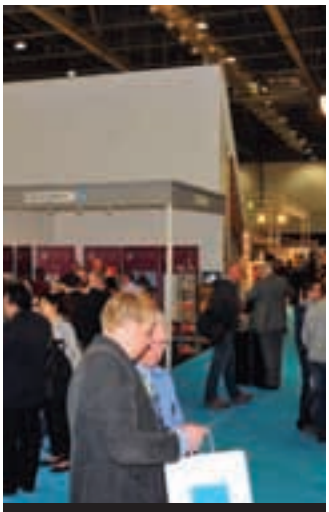
'My people have been working out the numbers and these programmes have been running at more than one a minute – in fact, 3.67.'

Jack Pringle, deputy chair of the Construction Industry Council, called for a review of VAT charges on renovations.

'The ball is in the government's court. The Green Deal is a government initiative and it needs to work properly, but there are other issues too.

'VAT on renovations to existing buildings is absolutely crackers. In France it's the other way around, you pay VAT on new buildings and it's zero rated, or about 5% rated, on innovation. The French have got it right, we've got it wrong.'

Construction Minister Mark Prisk responded: 'If we were to say, right we'll get rid of it on refurb and get the balance back on new build, you push the price of new homes even higher, so we've got to strike that balance. It's a difficult dilemma. We already have a problem not having enough new build out there anyway.'



Delegates at Ecobuild in London

The conference audience listens to a discussion on the government's flagship Green Deal policy for encouraging home improvements. The panel included Paul King of the UK Green Building Council and was chaired by the BBC's Sarah Montague

Industry collaboration 'needs to improve'

Insulation still needs to be made more 'sexy', an energy firm chief warns

The need for collaboration between professionals was a running theme during a conference session entitled 'From megawatts to negawatts: taking the energy out of buildings in use'.

Ian Marchant, chief executive of utility company Scottish and Southern Energy, told delegates that collaboration throughout industry needs to be improved, as well as creating trust in organisations that are involved in energy. He said this could be achieved by collaborating across organisations and building a shared purpose around improving 'our estate'.

He added that 'we still need to make insulation sexy' and described how the public still had a long way to go in taking notice and acting, with just two million lofts insulated across the UK last year.

Keith Bugden, programme director of Better Buildings Partnerships, agreed that collaboration was key to reducing carbon and improving the sustainability of the existing building stock.

He said: 'Penalties, incentives and other drivers should be sufficient to drive real change. But unfortunately it's also clear to me, from my work with leading organisations, that barriers to such change are also significant.' Drivers currently include the Carbon Reduction Commitment Energy Efficiency scheme, Feed-in Tariffs, the Renewable Heat Incentive, and the Green Deal. But despite these, said Bugden, there seemed to be a lack of activity within industry to improve energy efficiency.

David Fisk, president-elect of CIBSE, said that industry needed to collaborate on benchmarks to drive performance.

He described benchmarking as effective, incremental and able to be done through cost effective steps, with each one opening up opportunities for doing others.

But, he added: 'As soon as someone sets one up in Britain, someone else sets up another [different] one.'

He drew on research by the University of Cambridge, which studied Display Energy Certificates for all schools, and found that new academy schools consumed slightly more electricity, which in effect offset the slightly better heating performance.

'Because none of them were properly commissioned, they're actually just as bad as they were before,' added Fisk.

He concluded that industry needed to collaborate on benchmarking, because 'we are not going to get anywhere if we have 27 benchmarks'.

Costs an obstacle to zero carbon new homes

The Communities Minister admits that the policy still needs to be delivered

In a session titled 'The road to zero carbon', the Communities Minister, Andrew Stunell, spoke frankly about the challenges facing both government and industry. He said the idea of zero carbon homes still had to be delivered in practice, and this involved a range of people – from developers to designers to users.

But he stressed that costs for low carbon homes were coming down, with developer Barratts 'looking to deliver Code 4 housing without extra cost'.

However, Stunell also lambasted the industry for failing to produce low carbon homes that, in practice, performed well. He said that tests on such homes had shown them to be performing below their low carbon specification, which meant that delivery was not matching expectation.

Stunell threw down the gauntlet to the industry by declaring: 'I want to see the highest standards for sustainability.'

Professor Malcolm Bell of Leeds Metropolitan University, which has carried out tests on heat loss from low carbon new homes, outlined ways in which their 'performance gap' could be bridged.

This involved 'three pillars of performance'. The first, 'tolerance-based design', was aimed at 'knowing just how close we can get' to achieving performance.

The second, 'process control', meant 'constructing technology so that it performs'. The third pillar was 'performance measurement and feedback'. 'Without feedback we'll never learn how to do it,' stressed Bell.

One leading developer mentioned by Stunell, Barratts, was represented by its chief executive, Mark Clare. Clare insisted that housebuilders were now focusing on making the fabric of new homes 'as efficient as possible' – known as the 'fabric first' approach to construction.

Builders were also exploring new technologies, he said, adding: 'We have to ensure they can actually be used'.

However, echoing Stunell, he said the real challenge was the cost of low carbon homes, which is 'still too high'. He called for a 'transformation' in renewables to make them far less costly, and said the government needed to ensure there was 'clarity of targets' for implementing policy on zero carbon homes.

Andrew Stunell: Frank discussion

Consumers still reluctant to insulate, say energy firms

Consumers are reluctant to insulate their homes, even if the service is offered for free, said Don Leiper from utilty group E.ON.

He told a session titled 'Don't generate, insulate': 'We've actually offered money to customers to encourage to insulate their homes, but in the future that model isn't really going to work.

'We need to work together with the government regulator and other partners. As energy suppliers, we need to step up to the plate.'

Eric Salomon, from EDF Energy, said: 'Most people think their house is very or fairly efficient, but the UK's housing stock is among the least energy efficient in Europe.'

Phil Wynn Owen, director general of climate change and consumer support at the Department for Energy and Climate Change, confirmed that secondary legislation on the Green Deal would soon follow to reflect feedback in response to the consultation on the policy.

He predicted that a second phase of the Renewable Heat Incentive – which sees consumers receive payments for producing heat from renewable sources – would get the go ahead.

Europe is hugely behind on targets

Europe is massively behind its target to reduce energy consumption by 20% in 2020, an expert on European legislation told delegates at Ecobuild.

Zsolt Toth, EU public affairs officer of the Royal Institution of Chartered Surveyors, said: 'There is a huge gap between policy and what's happening on the ground. Clearly, we are not doing enough.'

Creating a more energy efficient economy is important to Europe, said Toth, because it is the most effective way to meet the climate change challenge, to reduce fuel poverty, to create 2-3 million jobs across the EU, and to 'put Europe back on a growing economic track'.

Construction processes used in the Olympic Park will leave a legacy for the UK's building industry

ODA www.london2012.com

Olympics 'will be defining moment for our sector'

'Greenest Games' have produced key design success as part of their legacy

The session titled 'Greenest Games and the greenest learning' heard how processes used in the construction of the Olympic Park in east London will benefit the UK's construction industry in the future, as well as impressing potential customers overseas.

Construction Minister Mark Prisk said: 'The Olympics is a defining moment for the construction sector. When can you think of a time that an Olympic park has been finished on time, if not earlier?'

'An extraordinary number of people from overseas think we are leading, so let's lead'

Mike Peasland of Balfour Beatty spoke of some of the design successes from the Olympics building work. The aquatic centre has temporary 'wings' on either side of the building to seat 17,500 during the Games; these will be removed afterwards when the swimming pools revert to community use.

'In the original design mechanical ventilation was going to be required for the temporary stands,' he explained.

'Humidity and the design of the environment is hugely important within a swimming pool environment because of the aggressive nature of the air. With our sister company and the designers, we devised a way of removing the mechanical ventilation from the design just by changing the pitch of the roof. So in Games mode, this is going to save something like 56 tonnes of CO_2. We achieved 15% better energy efficiency than required by Part L.

Andy Haynes of Network Rail outlined some of the green options that had been taken up in its programme to upgrade major stations and infrastructure ahead of the Games, in order to cope with the numbers of visitors that will need to be transported to the Olympic Park.

King's Cross station, built in 1851, uses 2,500 square metres of PV tiles on its roof, installed during an ongoing £550m refurbishment project.

Paul Morrell, the government's Chief Construction Adviser, was enthusiastic about opportunities that British companies will have overseas as a result of work that will be showcased by the Olympics.

'An extraordinary number of people from overseas I've met over the last few years think that we are leading, so let's lead and let's not follow,' he said.

Media stories are undermining the push for more renewables, says green campaigner

Former Labour minister says there is a reliance by Whitehall on fossil fuels

The recent media reporting on the fallibility of renewables was described in one conference session as 'quite an active and organised assault against renewable energy technologies'.

Tony Juniper, chairman of Action for Renewables, said he feared the reports were 'pushing back against renewables' following stories about certain technologies' ability to function correctly, intermittency issues and scale.

He added that the wind energy industry was in serious danger of being killed off in the UK, or being caused serious harm, with investors potentially put off investing because of the coverage.

And, if renewables are to be taken off the agenda, the default position is to use nuclear power, he said.

Michael Meacher MP, a former Labour minister, said he was concerned about a 'lack of financial muscle and industrial power' and a reliance by Whitehall on fossil fuels and nuclear power generation.

If the government did decide to go down the nuclear route, Meacher claimed that it would need a £75bn subsidy – which would more than likely have to go to a foreign company because Britain lacked the expertise.

Under threat... the UK's wind energy industry

Final fees reminder

Members are reminded that payment of subscriptions was due on 1 January. Those who have not yet paid risk being lapsed, and so will no longer receive the benefits of membership.

Anyone who has not renewed their membership by 18 May will not receive the June edition of the *CIBSE Journal*, or any future issues, until payment is received.

Visit **www.cibse.org/membersservices/finance** or contact the subscriptions department on 020 8772 3655.

AGM date set

The CIBSE annual general meeting will be held on 10 May 2012 at Imperial College London in the Skempton Building. It will be followed by the incoming president David Fisk's presidential address.

His theme is 'Reality-check time' and will ask why professional institutions have found it so hard to provide a much-needed reality check in recent public debate.

Members should now have received the calling notice, which contains further details. This is also available online at **www.cibse.org/agm**

LinkedIn

Visit the CIBSE LinkedIn page at **www.linkedin.org/company/cibse** to engage in technical discussions with more than 4,000 fellow professionals, and keep up to date with the latest information from the Institution and the wider sector. You can also follow us on Twitter: **@CIBSE**

Celebrating 10 years of Ready Steady Light

Teams battle it out to be crowned RSL champion

The Society of Light and Lighting (SLL) recently held its 10th annual outdoor lighting competition, Ready Steady Light (RSL), widely regarded as the best event in the lighting calendar.

The brainchild of Mark Ayers and Martin Lupton, RSL was created as a way of generating more excitement within the industry and getting people involved. The event essentially follows the format of television cookery show *Ready Steady Cook* – but with light instead of a bag of groceries!

For those not familiar with the television show, contestants compete to create a culinary masterpiece in 20 minutes from a random selection of ingredients. With RSL, things are done on a slightly larger scale: teams are randomly allocated an external site in the grounds of Rose Bruford College, given nine pieces of lighting equipment and are then given three hours to create a lighting masterpiece.

Staging the event at the end of March – in a bid for the best possible weather while ensuring an hour of complete darkness to reveal the lighting in all its glory – makes for some great entertainment as the teams rush around in the last hour, realising they've over-lit their site or that it now looks different in the dark from what they expected.

RSL has grown a lot in the past 10 years, not only in terms of the numbers of people taking part, but it has also become increasingly competitive as independent design practices go head-to-head with teams of students and manufacturers.

Importantly though, the ideals of its founders are still realised, year on year, as computer calculations are thrown away, no one cares about the Light Output Ratio (LOR) and it's a hands-on, real-life, lighting experience.

Of course, the March weather isn't always kind, but fortunately lighters are a hardy bunch; this outdoor event happens rain or shine – in some cases, snow and freezing conditions – but every year the consensus from everyone involved is what brilliant fun that was.

Bring on the next 10 years!

Liz Peck

Foreign membership grows

CIBSE pushes its international boundaries

CIBSE has recently been working to better serve its membership based outside the UK. The international membership is an ever-growing area for CIBSE and there are now 5,310 members in 105 countries, representing 28% of the Institution's total membership.

Aside from well-established links with Australia, New Zealand, Republic of Ireland and Hong Kong, CIBSE is growing its wider international presence, with active groups in 15 countries across the globe, and is in the process of creating a group in Malaysia.

The level of CIBSE activity in a country is dependent on the number of members, and the availability of willing members to act as representatives. Recent international activities have included: hosting talks from eminent industry professionals in Singapore; holding membership interviews in Dubai; and contributing to a conference in Chongqing, China.

Recognising the wealth of expertise in our international contingent, and the fact that many of the challenges faced by building services engineers are location-specific, CIBSE has produced two special publications: *Buildings in Extreme Climates* and *Building for Extreme Events*.

Members outside the UK also benefit from the CIBSE Knowledge Portal (**www.cibseknowledgeportal.co.uk**), which enables instant access to all CIBSE publications, including all the guides, commissioning codes, applications manuals, technical memoranda, lighting guides and more.

For more information or to volunteer as a country representative, contact Marie Dignan at **m.dignan@CIBSE.org**

Ireland Conference a success

The annual CIBSE Ireland Conference took place on 6 March at the Croke Park Conference Centre, Dublin, and was attended by more than 100 delegates.

CIBSE president Andy Ford opened the conference and attended the full-day's programme, contributing to the various discussions when opened to the floor.

The theme of this year's conference was 'Engineering opportunities – an integrated approach', reflecting the industry road map for the future.

The distinguished panel of speakers tackled topics including: public-sector procurement; international opportunities; building information modelling; commissioning; passive building design; and post-occupancy evaluations.

CIBSE chairman Derek Mowlds of PM Group, said he was 'delighted with the turnout and calibre of speakers'.

Water efficiency tops the agenda

The Water Regulations Advisory Scheme (WRAS) held a special conference on 'Shaping the Future' at the National Motorcycle Museum in Solihull on 14 March.

The purpose of the conference was to reflect on what WRAS is doing and to work with all industry stakeholders – including designers, manufacturers, installers and water company regulators – to ensure the scheme is moving forward and providing the high-level quality services that the industry needs.

Eight speakers, with a wealth of knowledge and experience in their chosen fields, gave presentations, setting out what they believed their sector thinks WRAS should be doing in the next few years.

Chris Northey, chairman of the Society of Public Health Engineers, gave a presentation entitled, 'Water efficiency inside buildings and the role of WRAS', which highlighted the main issues facing the water industry, such as the under- and over-supply of rainfall.

The importance of water use within buildings was also on the agenda, detailing water-efficient design, which is driven by changes in legislation. Water consumption issues were also discussed, particularly water stress areas such as the south east of England.

The second part of Northey's presentation focused on the opportunities for WRAS and suggested WRAS' remit should be broadened to further engage with the design community.

The conference was a great success with 120 delegates attending, representing all of the major stakeholders. It is hoped that this will be the start of many other events that WRAS and the stakeholders can participate in.

Register now for yacht challenge

The Southern Region Low Carbon Yacht Rally will take place on Saturday 14 July. The event is open to all connected with building services and will take place in the Solent and Southampton Water. Participants are challenged to round a series of buoys, using only renewable energy. In the evening, RAF Yacht Club in Hamble will host a dinner and prize-giving.

This is a great social event for both sailors and non-sailors. Numbers are limited, so express your interest by contacting: **d.pope@popeconsulting.co.uk**

Moorings are available at £20 per boat; dinner is £26 per person; and entry to the rally is £30 per boat.

SLL awards to honour lighters

The Society of Light and Lighting's (SLL) 2012 presidential address and annual awards will take place at the Zoological Society of London, Regents Park, on 29 May. The evening will incorporate the Society's annual general meeting and will feature specially laid-on 'gorilla lighting', in conjunction with Rose Bruford College.

The SLL's awards will recognise individuals who have made an outstanding contribution to the society or lighting industry over the past year, and incoming president, Iain Macrae, will deliver his presidential address. The evening will be rounded off with a drinks reception held in the Reptile House.

The event is free to attend but registration is essential as numbers are limited. Register at **www.sll.org.uk**

Diary date

Building Future Education

9-10 May 2012, Business Design Centre, London
www.buildingschools.co.uk/cibse

New edition of *TM44* published

CIBSE has published a new edition of *TM44: Inspection of Air Conditioning Systems – a guide to EPBD compliance*, to coincide with the start of statutory lodgement of air conditioning inspection reports, which began on 6 April 2012.

TM44 is primarily intended to support inspections that are carried out for compliance with the Energy Performance of Buildings Directive, but it will also be useful to anyone who wishes to assess the energy efficiency of an air conditioning system.

This edition clarifies some key questions on air conditioning inspections, considers the requirements for the production of reports in England and Wales, as well as in Northern Ireland and Scotland.

The revised edition covers: inspection of packaged cooling systems; inspection of centralised cooling systems; assessing equipment sizing in relation to the cooling load; assessment of ventilation performance; advice on alternative ways of delivering cooling; and explanatory notes for building owners and managers.

This edition supersedes *TM44 2007*, and is available free to CIBSE members from **www.cibseknowledgeportal.co.uk**

The future of heating

The Department of Energy and Climate Change (DECC) has issued a strategic framework on future provision of heat in the UK. It explains how heat is supplied and used in the UK today and describes how DECC believes it will need to evolve over time. In doing so, it identifies substantial changes that it believes will be required across our economy and the role for government in delivering them.

It estimates that the UK will spend some £33bn on heat for buildings and industrial processes this year. Almost all of it is generated from fossil fuels and it accounts for a third of UK carbon dioxide emissions. As we seek to reduce our emissions, we will need to reduce those from heat generation. This will create new markets and opportunities; for example, three-quarters of a million heat pumps were sold in the EU last year. DECC identifies an opportunity for the UK to capture more of this market.

The strategy does not make new policy proposals at this stage, but provides the strategic framework within which these will be developed, and invites stakeholders to give their views.

DECC is inviting responses to a number of questions in the strategy, which are to be submitted by 24 May. Members with comments who wish to contribute to the CIBSE response are invited to send them to **technical@cibse.org** Once the deadline for responses has passed, the department will publish a summary of comments received. DECC intends to develop specific policy proposals within the next 12 months.

For some further discussion of the strategy, see the article on the role of CHP in cutting emissions on page 38 of this issue of the *Journal*.

Visit **www.decc.gov.uk/en/content/cms/meeting_energy/heat_strategy/heat_strategy.aspx**

Call for members to register their training

CIBSE is encouraging all new trainees who are following an approved-employer training scheme to register their training with the Institution.

Trainees must also hold a grade of CIBSE membership, such as 'graduate' for those progressing towards ACIBSE/IEng or MCIBSE/CEng; or 'student' for LCIBSE/EngTech, and if you have not already applied, you are invited to do so as soon as possible.

School leavers who are on an appropriate academic course of study are eligible to apply for student membership.

Information and application forms for all grades of CIBSE membership are available on the CIBSE website under the Membership section, by following the link to the relevant membership grade.

The training and development (T&D) plan registration form is included in the current T&D manual. Trainees can email their T&D plan registration form direct to Olwen Williams at **owilliams@cibse.org**, or call 020 8772 3605. Acknowledgement will be sent via email.

More information on the T&D form is available from **www.cibse.org**, listed under Employer Training Schemes.

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Your letters

No more tribalism

Terry Wyatt's call for the creation of an integrated buildings engineering industry (April *Journal* cover feature) is a vital step forward and long overdue. As an industry we have made progress, but in recent hard-pressed economic times the worst aspects of the lack of joined-up thinking and bad practices are starting to emerge again.

Construction can be tribal, and this can produce a tendency to blame other people where things go wrong. If a shared understanding is not fostered, then we, as an industry, have a tendency not to fully appreciate the contribution of others, creating unnecessary industry divisions.

I have the privilege of chairing the Sustainable Built Environment East Group. This is a unique group in the East of England that has brought together architects, surveyors, town and transport planners, civil engineers, building services engineers, main contractors, mechanical and electrical subcontractors, NGOs and local government. Everyone involved has a shared interest in agreeing the way forward to achieve a sustainable built environment.

This is a small example of what I believe should be a way forward in looking at ways of providing more integration for all parties involved in building engineering. I certainly agree that building information modelling will help this whole process, and placing more emphasis on the shared understanding of tasks and roles across the industry will create and foster a much more positive way of working.

We don't have time to mess around and we certainly can't wait another decade or more after the Egan and Latham reports of the 1990s. The time is right and we have the catalyst and mechanisms to provide the incentives for more collaborative and integrated working. This will be good for business, the economy and will be a vital component in providing the low carbon future. I certainly support the call for an 'integrated buildings engineering industry' – the sooner we do this the better.

Mike Malina

> If a shared under-standing is not fostered, then we, as an industry, have a tendency not to fully appreciate the contribution of others, creating unnecessary industry divisions

Architects and Building Physics

I was very interested to read (March *Journal*, page 60) about the Passive Design Assistant (PDA), which sounds like an ideal tool at sketch-

design stage for testing different configurations and materials, especially if it makes 'Building Physics more accessible to non-specialists'. But I do hope that this 'non-specialist' term is not intended to include architects, because Building Physics has actually been taught in Schools of Architecture for at least 50 years.

The subject matter of what has been described recently as 'the new discipline of Building Engineering Physics' was wholly covered by the syllabus of the RIBA B2 and B3 examinations from as early as the 1960s. In particular, I had architecture students doing Peak Environmental Temperature calculations at least 35 years ago, but they were also made well aware of the fact that Environmental Temperature was never intended to be a comfort index, which the writer seems to have ignored by then talking about operative temperature. A key aspect of Environmental Temperature, which should not be forgotten, is the fact that the original formula is based on rooms being roughly cubical in shape. Using it as a calculation basis for offices with large floor and ceiling areas but comparatively low walls will not necessarily give accurate results. Also, since Environmental Temperature and Operative Temperature are dependent on Mean Radiant Temperature, they will both vary considerably across a large office with windows.

Neil Sturrock

Let's tax non-renewables

I totally agree with all of the Editor's commentary (February *Journal*, page 5). A technically simple fix would be to stop subsidising everything, but instead put significant taxes on all non-renewable resources.

Why? First, we would better appreciate that by consuming non-renewable resources we are using something up which we'll never, ever be able to replace. Second, if for example fuel would cost five or 10 times as much as it does now, then nobody would need further incentives to drive efficiency. We services engineers would thrive, since it would be economical for building owners to pay us to help drive their buildings better. Labour is currently far too expensive compared to resources. Imagine a world where we don't have to worry as much about treading lightly on our planet, because we would live more in line with our planet by default. Can we make our politicians like the thought as well?

> Services engineers would thrive as it would be economical for building owners to pay us to help drive their buildings better

Stefan Waldhauser, New Zealand

Btus/hr are back

Rereading the Brookwood Farm case study on page 38 of the June 2011 *Journal*, I was pleased to see the small gas-fired boiler rated as 40.3k Btu/hr. Too much to hope it comprises a simple cast iron heat exchanger, and no electronic gizmos.

The article explains that the pitched roof supports a PV array, with roof insulation at ceiling level to keep the roof void cool and so dissipate heat from the inverters. This begs the question, what about summer when these inverters are going full bore?

John Shankster

MANUFACTURER'S VIEWPOINT

The industry needs to have its voice heard by policymakers. Sharing professionals' opinions on websites is important, but so too is responding to consultations, writes **Martin Fahey** of Mitsubishi Electric

The Department of Energy and Climate Change (DECC) has launched a strategy document called *The future of heating – a strategic framework for low carbon heat in the UK*, and if the responses to my recent post on the LinkedIn CIBSE Group are anything to go by, then it is clear that this is a hot topic (forgive the pun!).

Sharing opinion on websites is a valid way to debate an issue, but more important is making sure that everyone's views in this industry are also heard by the policymakers.

As engineers, you will be critical to achieving the low carbon future we aspire to and DECC is asking for comments by Thursday 24 May. I would urge everyone to take the time and send a response comment to the strategy document (send an email to **heatstrategy@decc.gsi.gov.uk**).

> Are we just waiting for a renewable silver bullet, when a combination of what is currently available could provide the answer?

The DECC document details that around 80% of our heat demands are currently served by gas. This is something that simply cannot continue as prices continue to rise, the UK continues to be more reliant on imports, and as we head towards our legally-binding carbon reduction commitments.

As an industry, we therefore need to work together, to decide what technologies and combined solutions can help move us towards low carbon. However, looking at the response to my blog, it is clear that if there are lots of questions – there may be even more answers!

Do we think that renewables are still too unsophisticated or expensive? Or is there technology out there that is usable now but not widely known about?

Are there better ways to integrate the heating into the architecture and fabric of the building? And should we be seeking ways to incorporate more passive heat recovery systems so that we minimise the need for energy consuming equipment?

How do we force architecture and engineering to work more closely together? Or is this happening anyway?

Are we all just sitting, waiting for a renewable silver bullet, when a combination of what is currently available off the shelf could provide an answer that will work?

What about the Green Deal? Shouldn't we all find ways to encourage better use of existing resources and minimise energy consumption?

And finally, what about operation? When the Carbon Trust states that 90% of heating systems are not controlled effectively, how much is the operation of a heating system left to chance? And why aren't we making more use of advanced, intelligent controls?

Lots of questions. Now is the time to come forward with your opinion on the answers.

The Future of Heating can be found at: **www.decc.gov.uk/assets/decc/11/meeting-energy-demand/heat/4805-future-heating-strategic-framework.pdf**

Martin Fahey is sustainable solutions manager for Mitsubishi Electric's Living Environmental Systems Division

VISIBLE PERFORMANCE

Further changes to the Energy Performance of Buildings regulations came into force recently. **Hywel Davies** considers their implications

The Energy Performance of Buildings Directive (EPBD) was first adopted in 2003, and implemented in stages throughout the UK through both the Building Regulations and, in Scotland, Building Standards, and the Energy Performance of Building (EPB) Regulations. The latest changes to take effect in England and Wales were adopted last year, and came into force on 6 April.

These changes require Energy Performance Certificates (EPCs) to be available within seven days of a property being marketed, and remove the wording that required them to be available before entering into a contract. They also extend the duty to provide an EPC so that both the agent and the seller are liable if there is no certificate. The fine for not providing a certificate is £5,000.

There is a provision that where the 'responsible person' (agent or seller) can show that 'despite using all reasonable efforts' they have failed to secure an EPC within the seven days, then they have a further 21 days in which to obtain the EPC. The wording of the legislation suggests that just having ordered an EPC is not enough, but that will depend on the view of trading standards officers and, if it is challenged, the courts.

But waiting until the parties come to sign the contracts is clearly no longer within the requirements of the EPB regulations. It is reported that there has been a significant upturn in the number of EPCs being commissioned, but time will tell whether these changes have the desired effect of improving compliance with the Directive.

The Directive also requires EU member states across Europe to put in place 'measures to establish a regular inspection of air conditioning systems of an effective rated output of more than 12 kW'. Legislation has been introduced across the UK requiring building owners or managers to undertake regular inspections of air conditioning systems. These regulations have now been in place for some two or three years, and the principal guidance for the inspections has been contained in CIBSE TM44: 2007.

However, the second major change in the EPB regulations relates to air conditioning inspections. The original regulations created a duty to carry out an inspection and to hold a report. Unfortunately, compliance with this requirement has been so patchy that it is estimated that as few as one in 20 systems have compliant reports in place, when they should all have been inspected by the start of 2011. Since the original light touch approach has clearly not been effective, the Regulations now require that, as of April 6, the reports are to be lodged using an approved report template on the national register operated by Landmark.

To coincide with the introduction of statutory lodgement, to incorporate the experience gained over the past three years, and to clarify some of the questions that have arisen around aircon inspections, CIBSE TM44 has been revised. The revision also takes into account the requirements for reporting using an approved report template. The revision has also provided the opportunity to incorporate the separate legislative requirements for Northern Ireland and Scotland in the main text of the TM, rather than as separate addenda as they have previously been.

The revised TM44 provides guidance on conducting an air conditioning inspection to satisfy the requirements of the Directive as expressed in the various regulations in the UK. The focus is on systems that use refrigerants to produce cooling.

> It is reported that there has been a significant upturn in the number of EPCs being commissioned, but time will tell whether these changes have the desired effect of improving compliance with the Directive

Some of the guidance may also be applicable to elements of other forms of cooling systems, such as those that use pipes or ducts built into the fabric of the building (eg, cooled deck or ceiling slabs), or those which use aquifers or local water sources to provide cooling.

The guidance is primarily intended to support inspections that are carried out for compliance with the EPBD, but it is also relevant and useful to anyone who wishes to assess the energy efficiency of an air conditioning system. However, it does not address other statutory inspection requirements, such as those required in relation to preventing legionella, or those covering any health and safety requirements. Nor does it cover inspection under the F-Gas Regulation and associated requirements, as all these are outside the scope of the EPBD.

CIBSE TM44 is available online for free to CIBSE members through the Knowledge Portal, where printed copies can also be purchased (with discounts for members): **www.cibseknowledgeportal.co.uk**

HYWEL DAVIES is technical director of CIBSE **www.cibse.org**

THE EPB REGULATIONS

The EPBD was first adopted in 2003. The recast adopted in 2011 came into force on 1st February 2012, with implementation in phases until 2015. The EPB Regulations 2011 were made in October 2011 and came into force on 6 April 2012, amending the original 2008 regulations. For the full text of the Directive, go to http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:153:0013:0035:EN:PDF. For the regulations go to http://www.legislation.gov.uk/uksi/2011/2452/contents/made

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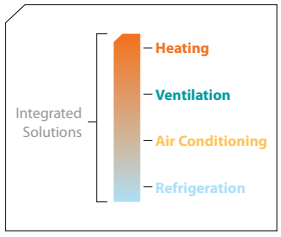

Email **skyair@daikin.co.uk** quoting reference 0016/ni/042012 or visit **www.daikin.co.uk/seasonalefficiency**

Angelic DESIGN

Energy reduction was at the heart of the transformation of a drab central London office block into a CIBSE award-winning refurbishment. **Andy Pearson** reports

All images courtesy of Norman Disney & Young

The rejuvenated Angel building in north London is the Refurbishment Project of the Year in the CIBSE Building Performance Awards 2012

As part of the renovation, a new fifth floor has been added to the roof, along with two spacious roof terraces giving views over north London

'The key to the success of this project was to involve the design team to develop the building to reduce energy consumption in conjunction with the building services solution,' says Danny Hall, associate director at consulting engineers Norman Disney & Young (NDY). Hall is talking about the £70m reinvention of the Angel Building – a transformation from an ugly, inefficient 1980s commercial property into a swanky, modern office that is also a showcase for sustainable refurbishment.

The scheme's recent triumph at the CIBSE Building Performance Awards 2012 – where it was the Refurbishment Project of the Year – and its shortlisting for architecture's 2011 Stirling Prize, are a testament to the success of this transformation.

Situated on a busy crossroads in Islington, north London, the revamped building has a sleek, curved slate-coloured façade. Inside the building, the street's hubbub gives way to a cool, restrained interior centred on an impressive atrium that affords glimpses of five floors of modern offices.

Fundamental to the building's reincarnation has been the retention of its concrete structure. NDY has been involved in the makeover from the outset, both as environmental engineers and sustainability consultants. It was the firm's analysis – demonstrating how much carbon could be saved by retaining the structure – that convinced the design team this was an option worth pursuing. 'It saved about 7,400 tonnes of CO_2, so it made a lot of sense to keep the structure,' says Hall.

To tease every inch of extra space out of the site, the architect discarded the original cladding and sympathetically extended the structure to maximise the floor areas. At the front of the building this extension takes the form of a curved, steel-framed addition that follows the bend of one of merging roads, St John Street. A smaller, rectilinear extension has also been added to the southern elevation, while a new fifth floor has been added to the

CIBSE BUILDING PERFORMANCE AWARDS 2012 WINNER

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The CIBSE Building Performance Awards recognise, reward and celebrate the best performance, innovation and practice in design, commissioning, construction, installation and operation of sustainable buildings and the manufacturers whose technologies enable energy efficiency.

For further information on this year's winners, as well as details of how to enter the 2013 awards, please visit **www.cibseawards.org**

roof along with two spacious roof terraces giving views over north London.

In addition to the perimeter extensions, the floor plates have also expanded into the large central courtyard. The remainder of this opening is now covered by a transparent polymer roof of ETFE pillows to form the central atrium. In all, the addition of a new floor and extensions to the existing office floors has added over 60% more lettable space for the developers, Derwent London.

The scheme now totals more than 24,000 sq m of high-specification office space, along with an atrium, retail outlets and new roof terraces. 'We've been able to generate a significant amount of new space,' Hall explains.

Energy reduction was at the heart of this transformation. The re-used structure saved a significant amount of embodied carbon; the challenge for the building services design was to build on this achievement and come up with an energy efficient, environmental solution to complement the structural solution.

The engineers were helped in their task by the existing structure, which was based on a significant floor-to-ceiling height of 3.5m. 'We inherited a building with fairly generous floor slab to ceiling slab heights, which opened up a lot of options for the type of cooling and heating systems we could install,' says Hall.

Cooling

The designers looked at a number of options to provide cooling to the office floors – including fan coil units, chilled beams and chilled ceilings – before settling on an air displacement system. 'In the end we decided to exploit the exposed soffits by opting for a displacement ventilation system concealed within a new 450 mm raised floor,' says Hall.

Displacement air is introduced to the offices through grilles set in the floor. This arrangement restricts the minimum temperature at which air can be introduced to 19C which, in turn, limits the amount of cooling the system can achieve. 'Because we're introducing air close to people it cannot be too cold or they will feel a draught,' Hall explains.

The upside of supplying air at this temperature is that it allows the building to run in 'free cooling' mode for 80% of the time. 'At 19C we don't have to cool the outside air for most of the year, we don't have to use the water-cooled chillers, so we save loads of energy,' says Hall. Another big advantage of this approach is that using mostly outside air helps keep the office environment feeling fresh. The downside is that the fans still have to run to push all this air through of the offices.

Another potential drawback of the system is that NDY was concerned that the displacement air would heat up in contact with the floor slab. The problem arises because air temperatures can reach 27C close to the ceiling soffit, heating the floor slab of the offices above. NDY had data from tests carried out in Germany showing that, depending on the temperature difference and the distance air travels in contact with the slab, the supply air temperature could increase by

> The key to the success of this project was to involve the design team to develop the building to reduce energy consumption in conjunction with the building services solution

PROJECT TEAM

Client: Derwent London

Environmental and fire engineer: Norman Disney & Young

Architect: Allford Hall Monaghan Morris

Structural engineers: Adams Kara Taylor

Main contractor: BAM

Project managers: Buro Four

Cost consultants: Davis Langdon

Lighting consultants: Equation Lighting Design

The design of the building's façade was crucial to the performance of an internal air displacement system

up to 2.5C. A temperature increase of this magnitude would significantly reduce the amount of cooling available, particularly at the perimeter of the floor plates, where the system has to cope with solar gains in addition to occupancy gains.

Hall's solution is to deliver the air from the service cores to the floor perimeters in insulated ducts concealed within the raised floors. Each of the building's floors is divided into quarters to allow the building to be subdivided for letting. Each of those quarters is served by a riser. Hall's solution allows the temperature and quantity of air reaching a specific floor area to be targeted precisely. It also allows air to be ducted to cellular offices, where these have been installed by tenants. Air is extracted from the offices at high level through grilles set into the cores, and then ducted back to the roof-mounted air handling units.

Façade

Design of the building's façade was critical for the displacement system to perform effectively. 'We knew the maximum cooling capacity of the system, which was about 75W/sq m tops, so once we'd taken off the cooling needed to deal with the loads of a modern office, we were left with the maximum cooling load we could handle at the façade,' says Hall.

To keep the cooling load within this limit the engineers worked closely with the project architect, Allford Hall Monaghan and Morris (AHMM), to develop a façade

Lighting was carefully designed to avoid impacting on the cooling load limit

solution that balanced high performance glazing with solid elements. In the end the designers opted for high performance neutral-coloured glazing with a G-value of about 0.3 and low level solid elements on each floor. However, even with this type of glazing, to keep the solar gain within manageable limits a 500 mm band of fritting had to be added to the top of the glazing to provide additional shading.

The windows are fitted with internal blinds for glare control. To prevent heat build-up close to the glazing, NDY and AHMM developed a neat return air detail. According to Hall, when the sun hits the blind, the blind heats up and the heat form changes from radiant to convective. Their solution has been to incorporate a return air slot detail in the box housing the blind to remove this convective element as it rises upwards.

Careful detailing has also been used to extract air from beneath the soffit in areas where the floor plates have been extended. An existing downstand beam marks the outer limit of the original floor plate; this protrudes into the offices from the soffit. The intrusion impacted the flow of warm air along the soffit back to the return air grille at the cores. Tests by NDY in Germany had shown that without intervention, returning warm air at high level would dislodge from the soffit at the obstruction and fall into the occupied zone.

In another neat solution, to overcome this particular challenge the engineers designed an extension to the extract system to draw air through a shadow-gap created between the plasterboard ceiling panels of the new floor plate extensions and the downstand beam. The extract air is carried from high level to the floor void through ducts concealed within the webs of the steel columns that support the new structure. Once in the floor void, the warmed air is routed back to the main return air ducts in the cores.

The scheme also includes openable windows controlled by the occupants at will. About half of the windows can be opened. Hall says that because the displacement ventilation system is designed to use outside air for much of

Carbon footprint: Recycling the structure

Re-use of the existing structure helps limit the carbon footprint of the development and significantly reduces the transport and disposal of demolition and construction waste, which reduces emissions and minimises dust creation.

The omission of unnecessary finishes and fixtures such as suspended ceilings helps expose the thermal mass and also reduces the amount of energy embodied in the finishes and their maintenance.

Using the concrete carbon calculator and data from the University of Bath, NDY estimated that the retained structure accounts for 39,500 tonnes of concrete, or about 30,000 cu m, which is equivalent to about 7,400 tonnes of CO_2 or running the operational elements of the building for 13 years.

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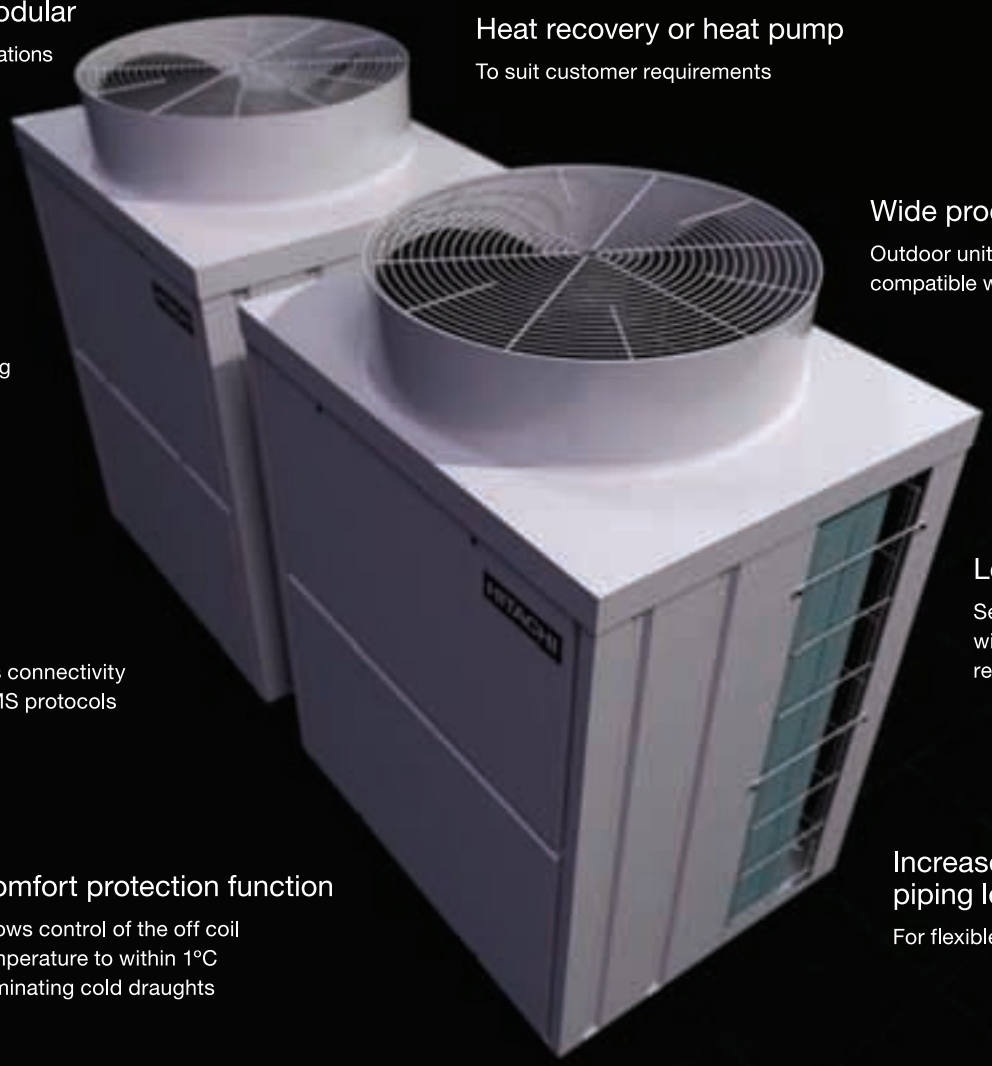

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> We inherited a building with fairly generous floor slab to ceiling slab heights, which opened up a lot of options for the type of cooling and heating systems we could install

the year, the system is able to cope with additional air 'better than most other systems'. The windows do not form part of the night time ventilation strategy; instead the air handling units run at night, with the cooling system off, to purge the structure of the day's residual heat.

The lighting scheme, too, was influenced by the cooling system. NDY restricted the heat output from the lighting to a maximum of 12W/sq m. 'It was quite a challenge to maintain the design at that level but if we'd gone over, the lighting would have impacted on the cooling available for the space,' explains Hall. The solution developed uses suspended high efficiency fluorescent fittings with daylight and PIR controls as part of a DALI system.

The lighting solution has been enhanced around the atrium, where the new infill has created deeper floor plates. The number of fittings has been increased in this area to give the impression of higher levels of light entering from the atrium than is actually the case. 'The light in this area has been enhanced to make the offices feel light and open,' says Hall.

Heating

In winter the return air from the offices, which can be at temperatures as high as 27C, is mixed with the outside air to achieve the 19C supply air temperature without having to use additional heat. The solution can recover up to 65% of the heat that would otherwise be thrown away. 'It's a really efficient system,' says Hall.

When heating is needed, it is provided by a combination of three gas and two biomass boilers. The biomass was installed because, at the time the scheme achieved planning approval, the rules required a 10% reduction in the building's carbon emissions from renewable technologies.

'We tried to minimise energy use by making the building as lean as possible through the improved façade performance, our system selection and the plant efficiencies,' says Hall. As a result, the biomass boilers are the scheme's only renewables.

The two biomass boilers, located in the main ground floor plant room, provide 15% of the overall heat demand. In summer, a 550 kW boiler is sufficient to meet the hot water demand. Hot water is delivered to each toilet block via a hydraulic interface unit complete with a heat exchanger. In winter, a larger 900 kW boiler will supply additional heat for the ventilation system heater batteries, office perimeter trench heating and the below-floor fan coil unit for the main entrance door. The gas boilers provide supplementary heating when necessary. Variable speed pumps on both the heating and chilled water systems help match the circuit flow rate to demand.

Unlike gas boilers, which can be turned on and off instantly, biomass boilers are less responsive. 'If the biomass boilers are servicing a big demand and that demand suddenly drops you cannot turn them off instantly,' says Hall. To allow the boilers to consume any remaining fuel, Hall has included a giant 20,000 litre hot water storage vessel in the heating/hot water primary circuit to act as a thermal buffer, ensuring biomass boilers can run efficiently.

The hot water store also helps prevent corrosion in the boilers by keeping the water circuit warm. 'Biomass boilers don't like being fed cold water, so the hot water store helps provide back-end protection by maintaining a minimum return temperature,' explains Hall.

Proof of the effectiveness of the building services solution is in the scheme being awarded a BREEAM Excellent rating. It has also achieved a B rating Energy Performance Certificate. 'It's an impressive performance from a 1980s building,' says Hall. 'But then it was a pretty heavy refurbishment,' he adds. **CJ**

Windows are fitted with internal blinds for glare control

Basic building loads	kWhr/sq m/yr	kg/CO/sq m/yr
Heating (gas and biomass)	6.43	0.25
Hot water (gas and biomass)	5.32	0.15
Electricity – lighting	26.40	11.14
Electrical building services	8.92	3.76
Electrical cooling	4.44	1.87
Subtotal	**51.5**	**17.7**

Projected, estimated energy loads of the services, based on Energy Performance Certificate data. (Source: Norman Disney & Young)

GREATER THAN THE PARTS

The Building Regulations are to be revised next year. **Hywel Davies** takes an in-depth look at the thinking behind the changes, and what they might mean for professionals across the supply chain

There is much talk about legacy today. One legacy of the previous government is that, to give greater certainty to the construction sector and its supply chain, the Building Regulations only change every three years. The latest round of proposals appeared at the end of January. But what do they contain, and what significance does the package have for services engineers?

The government argues that the proposals will deliver on their deregulatory agenda, to the tune of £63m pounds, and will also simplify the Regulations, with two Approved Documents being combined and all of them restyled as they are revised, with more user friendly layout and language. In addition, there are proposals to introduce 'non-regulatory approaches', for security, and for public toilets for those with special needs.

So the current package of proposals stretches to an 'easy-to-read summary', four separate sections and nine impact assessments, which assess the likely costs and benefits of the proposed measures. There is also an example of what the new style Approved Documents will look like, and a table of the principle changes to the Approved Documents and the Domestic and Non-domestic Services Guides

Section one outlines the scope of the consultation, its structure and contents *and describes how the consultation fits with current government policies to reduce the burden of regulation on business*. It then presents proposals to change various technical aspects of the regulations, including Part A (Structure), to take account of the introduction of the Eurocodes, Parts B (Fire Safety), C (resistance to contaminants and moisture), in particular updating the guidance on radon protection, and consolidating Parts K (Protection from Falling), M (Access) and N (Glazing Safety).

Approved Documents (ADs) K and N will be combined, removing several areas of conflict and confusion, and guidance on stairs, ramps and manifestation will move into the new AD K from AD M. There are also deregulatory proposals to amend the guidance on Access Statements to promote their use where they add value, rather than as a matter of course. Security and provision of 'Changing Places' toilets for those with special needs are the subject of non-regulatory (voluntary) proposals, and there is also an amendment of Regulation

Section 2 of the consultation document includes proposed changes to the standards for new buildings

7 on workmanship, to address the CE marking requirements in the new EU Construction Products Regulation.

Section two outlines proposals to Part L to increase the energy efficiency of buildings, covering changes to the standards for new buildings and the introduction of consequential improvements to dwellings when certain work is carried out on them. There is also a proposal to simplify the Approved Documents, to make them easier to understand and comply with, and a fully worked example of how Approved Document L1A might look under the new approach is also provided in the package.

Section three contains proposals in relation to Part P for electrical safety in homes, and Section four outlines changes to the building control system.

Section one also explains the government commitments to reducing regulatory burdens on business and how the package fits with the government's 'one-in, one-out' policy on regulation. It sets out the commitment to reduce the total regulatory burden on the house building industry during the current Spending Review period, and it explains how all the

> The big issue in the Part L consultation document is the acknowledgement that the great savings to be made are in the existing building stock

proposals in the consultation will impact on business as a whole, and specifically house builders. One of the significant regulatory cuts, an 'out', is in the proposed technical amendments to AD B for wall linings and light diffusers.

Energy efficiency

The primary interest for most readers is likely to be Section 2, which deals with energy efficiency. This is mainly related to Part L, but also addresses aspects of the Regulations that relate to the forthcoming Green Deal to upgrade the energy efficiency of existing buildings.

The proposals for new buildings are to require a further reduction in the carbon emissions from new homes of 8%, and of new non-domestic buildings of 20%. These proposals will save 15 $MtCO_2$ over the life of the policy (to 2022). However, the costs and benefits do no not fall uniformly across these sectors. The 8% improvement in carbon performance, which is stated to be the 'preferred option' for new homes, represents an additional cost to housebuilders, or an 'in', of **£103m** per year, while for non-domestic buildings there is a net benefit.

Treasury rules for calculating 'ins' and 'outs' need careful reading. Any regulatory cost to business is an 'in'. Any benefit which accrues to business is an 'out'. But a benefit to a homeowner does not accrue to a business, and so does not count as an 'out'. So the saving made by the owners of the more energy efficient homes built under any revised Part L 2013 is **not** an 'out', whereas savings from non-domestic buildings are. And the target is to **reduce** the net regulatory burden on housebuilders by 2015. So the changes for new homes, whilst 'preferred', must be balanced by DCLG finding compensating 'outs', or else they will have to change the package accordingly.

For calculating compliance of new non-domestic buildings there will be four new concurrent notional buildings. These will be side-lit heated only (similar to an office or hotel for example), side-lit including cooling (a prestige office), top-lit (a retail shed) and un-lit (a data centre, or warehouse). The proposed building will have to perform at least as well as the concurrent notional building.

The notional building has assumed values for the fabric and services, and these have stimulated some debate. While some argue that these values provide useful guidance to designers on the levels of performance required, there are some concerns about some of the values being proposed, in particular for some aspects of metal clad buildings and for specific fan power of mechanical ventilation systems.

A consultation version of the SBEM compliance calculation tool, cSBEM, has been provided to help consultees assess the impact of the changes and to inform consultation responses. There are also proposals to formalise the incorporation of innovative technologies into SBEM through an equivalent process to SAP Appendix Q.

Finally, there is a proposal to create an 'Integrity Group' for SBEM, made up of industry and stakeholder interests, to provide advice and guidance on development of the compliance tool.

Consequential improvements

The big issue for energy efficiency is the acknowledgement that the great savings to be made are in the existing building stock. And so the proposals for consequential improvements for the existing stock make very interesting reading. For larger non-domestic buildings (over 1,000 sq m) there is already a requirement that when they undergo controlled work to the fabric or services, then consequential improvements to the energy performance must also be made. The proposal is that from 2013 these requirements will apply to all non-domestic buildings and also to the residential stock as well. However, at time of writing this policy is in doubt as there are reports that the Prime Minister may also veto these

The proposals on Part L of the Regulations also address aspects of the forthcoming Green Deal, aimed at encouraging homeowners to make their properties more energy efficient

What is the Coalition approach to regulations?

Government priorities for the 2013 changes are to:

- Deregulate and streamline wherever possible;
- Regulate only when essential and after all other approaches rejected;
- Deliver policies which support the desire to be greenest government ever; and
- Further improve compliance.

Controlling regulation:

- A one-in, one-out approach to all domestic regulations;
- Spending Review commits to cut regulatory burden on housebuilders by April 2015;
- Greater scrutiny of analysis and policy by the Regulatory Policy Committee and Regulatory Reform Committee;
- A moratorium on regulation affecting micro-businesses and start-ups until April 2014; and
- Challenging all regulation through the Red Tape Challenge.

What is not in the consultation:

DCLG reported at the CIBSE Consultation Seminar on 6 March that the following proposals were **not** brought forward to consultation:

- Revoking Part D (Toxic substances) – this is not being considered further as evidence suggests urea formaldehyde is still used;
- Reviewing Part H6 (Solid waste storage) – decisions on this issue are pending, subject to work on the Waste Review and local authorities' waste collection approaches; and
- Reviewing Part E4 (Acoustics in schools) – has not been taken forward as DfE will be consulting on changes to their guidance on this issue later this year.

requirements (see News on page 6 of this edition).

Under the consultation proposal, when the habitable area of a house is increased, by extending the building or by converting a loft space or integral or adjoining garage, then there will also be a requirement to consider upgrading the energy efficiency of the whole dwelling. And when replacing windows there will also be a requirement for consequential improvements.

Given that these are generally premeditated and planned activities, both in terms of the works involved and associated disruption, and the financial aspects, the case for these is easy to understand. They are not a cost on housebuilders, and where they are imposed on businesses in the non-residential buildings sector, business derives the benefits. The impact assessments indicate that these measures could potentially deliver savings of 130 MtCO2 over the life of the policy. Compared with the 15 MtCO2 to be gained from the measures for all new buildings, this is a significant saving, if it can be achieved.

Electrical works

Section three outlines proposed changes to Part P, which was introduced in 2005 for domestic electrical works, to improve the competence of domestic electrical installers and the quality of electrical installation work in dwellings, and to reduce the number of accidents due to electric shocks and electrical fires in homes.

Major electrical jobs in homes are notifiable and must be overseen by a building control body or carried out by an electrician registered with a Part P Competent Person Scheme. Since 2005 the number of registered electricians has increased from 11,000 to nearly 40,000, and registered electricians now undertake nearly all 'notifiable jobs' that are notified (there is no robust data to indicate how many notifiable jobs are just carried out without being notified.

DCLG is proposing changes to AD P to reduce regulatory burdens by extending the range of simpler, non-notifiable jobs that do not require inspection, including those in kitchens and gardens, and by allowing householders and unregistered installers to employ a qualified electrician to inspect and test notifiable work as an alternative to using the local authority, (should electricians wish to undertake such work and responsibility). These changes would deliver a deregulatory 'out' of £9.7m per year. It is also proposed to update the reference to the wiring regulations in AD P to the current version of BS 7671.

The consultation includes proposals to apply 'consequential improvements' requirements to dwellings in 2013 – although at the time of writing this is in doubt (see News on page 6 of this edition)

Building control

Finally, section four addresses Building Control, and aims to 'reduce burdens, improve compliance, encourage industry to take greater responsibility for their actions and to level the playing field between building control bodies'. It proposes to extend the time allowed for prosecutions under the Building Regulations to two years, introduce civil sanctions and improve the building control process. Issue of completion certificates within a specified time will be mandatory where building work is completed and considered compliant, and the wording on completion certificates and their equivalents will be amended. It is also proposed to reduce the number of statutory notifications and introduce a requirement for 'service plans' based on an assessment of the risk for a particular project.

There are proposals to increase the alternatives to supervision by Building Control by extending the competent person self-certification schemes, introducing specialist third party certification schemes and considering the introduction of the 'Appointed Persons' created by the Sustainable and Secure Buildings Act. These are all potentially relevant to CIBSE members, as they will either change the relationships with Building Control, or, possibly, provide new opportunities to provide elements of the building control process for clients. **CJ**

HYWEL DAVIES is technical director of CIBSE

TIMETABLE FOR CHANGE

DCLG is proposing that the changes should come into force as follows:

- Domestic consequential improvements for extensions (including loft and garage conversions which increase the habitable area) coming into force in October 2012
- Deregulatory changes – April 2013
- Regulatory changes, including Part L coming into force in October 2013 (with the aim being to publish revised Regulations and Guidance documents in April 2013)
- Remaining consequential improvements to come into force in April 2014

Finding the consultation documents:

- These are still available on the DCLG website along with the impact assessments and supporting research. Visit: **www.communities.gov.uk/planningandbuilding/buildingregulations/buildingregulationschanges**

POWER DEBATE

Are engineers overstating the benefits of district heating systems, as was claimed in a *Journal* article? No, say **Peter Hamnett** and **Phil Jones**, who argue the case for such energy networks

The Department of Energy and Climate Change's recently released document, *Strategic Framework for Low Carbon Heat*, notes in its Executive Summary that 'we use more energy for heating than for transport or the generation of electricity'. In that context, it is clear that the UK's £33bn per annum demand for heat needs low carbon solutions to be implemented sooner rather than later. No single solution exists in isolation and the combination of reducing demands in tandem with improving the efficiency of heat supply has to be our goal.

The article on combined heat and power (CHP) and district heating in the March edition of the *Journal* (page 55) made much of the EU Cogeneration Directive's methodology for calculating primary energy savings and its contrast with most emissions savings calculations. It is worth remembering, of course, that the Directive is intended to provide a perspective about the use of fuels by EU member states and is therefore quite removed in purpose from the well-established calculations for emissions savings (such as SAP and SBEM for Building Regulations or those undertaken as part of BREEAM assessments).

It is therefore potentially unhelpful to suggest that building services professionals are somehow in the wrong for utilising the valid and well-understood calculation methodologies that are provided to them by law and which may be required of them by their clients. The aim in the current climate

A combined heat and power installation

Phil Jones

is not to argue national fuel strategy on a building-by-building basis but to deliver real projects on the ground that are focused on reducing running costs, achieving a return on investment and striving to go beyond the minimum emissions performance required by Building Regulations.

Emission factors

The emissions savings attributed to the cogeneration of heat and power can be a source of confusion for some. The simplest interpretation is to consider that the generated electricity offsets carbon emissions at the grid average factor. Put simply, if the CHP unit were not generating, then the electricity would instead be supplied from the existing electricity grid at the average emission factor.

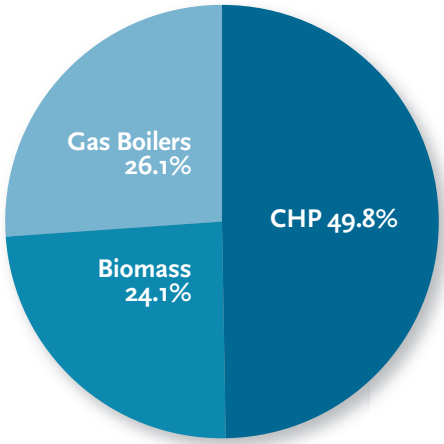
In practice, a higher emissions factor than the grid average is justified, on the basis that the CHP generation is not offsetting the nation's relatively low-carbon baseload generation (eg nuclear) but is instead affecting the output of the UK's higher carbon marginal generation, such as from coal-fired plants. By virtue of the way the grid operates, nuclear or wind energy will not be displaced so the use of an average emissions factor is not as appropriate. This does not mean that coal-fired generation is used as the sole offset; it simply means that it is justifiably taken into account.

The letter by Paul Woods, in April's *Journal*, clears up the confusion between the *actual* CO_2 savings that CHP can deliver and the *relative* savings of gas-fired CHP compared with new gas-fired power stations. Using realistic performance figures, Woods proved in his paper presented to the 2011 CIBSE Technical Symposium that the CO_2 content of heat from a gas-fired CHP district heating system clearly provides a saving when compared to heat from gas-fired boilers (visit http://cibse.org/symposium2011). The analysis took account of a range of electricity emission factors and considered typical district heating boiler use (20% of total), heat losses (at 15%) and pumping energy (1% of heat supplied).

As Woods reminded us in his April 2012 comment, the analysis showed that a significant carbon saving is still achieved when compared with individual gas boilers, even when assuming CHP generation displaces a highly efficient combined cycle gas power station producing electricity at an emission factor of 400g CO_2/kWh. Since research at Imperial College has established that the likely figure for displaced electricity (operating marginal) will be around 600g/kWh in 2016 and 511g/kWh in 2020-2025[1], it can be seen that appropriate use of CHP will provide significant carbon savings for years to come.

Considering the use of primary fuels to the exclusion of any other analysis (by only allowing comparison between identical fuel types) can result in absurd conclusions when carbon emissions savings are the actual goal. For example, if this approach were correct, then operation of a biomass-fuelled boiler plant could not be responsible for any carbon savings because it could only be compared to the operation of other biomass boilers.

The March article was correct to state that



Relative contributions of plant to the projected heat loads of the Olympic Park's legacy developments in the year 2020 (Source: District Heating Concessionaire for the Olympic Park)

WHAT THE GOVERNMENT SAYS...

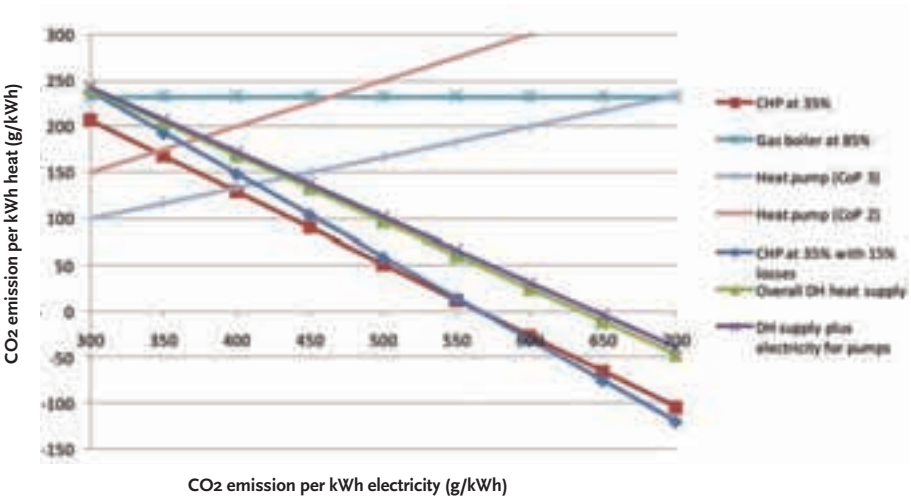
'Heating networks are currently estimated to provide less than 2% of total heat in the UK. The Government believes that heat networks have an increasingly key role to play in the UK energy system and this decade will be crucial in removing the barriers and beginning deployment.'

'[Heat networks] can be upgraded over time according to local and national priorities, without impacting on consumers. For example, it may be economic in the short term to power a network with gas CHP, and to replace this with a lower carbon alternative such as biomass CHP in the medium to long term. In-building heat sources can also be replaced over time, but in many cases it may be easier to replace in-building heat sources once, to switch to district heating, and then replace the central heat source when appropriate, than to frequently replace the in-building heat source.'

'Heat networks are best suited to areas with high heat demand density. They can be an excellent choice in urban areas, providing individually controlled and metered heat as reliably as gas boilers. Heat networks can also serve buildings like blocks of flats where individual gas boilers may not be an option.'

Source: *The future of heating: A strategic framework for low carbon heat in the UK*, DECC, March 2012. The quotations can be found respectively on pages 95, 63 and 59

Variation of heat emissions factor for various heat sources



Comparative carbon savings achieved by CHP-led district heating
(Source: Paul Woods paper to the CIBSE Technical Symposium 2011. Visit http://cibse.org/symposium2011)

> It makes sense to use CHP to decarbonise now, rather than taking a wait-and-see approach that fails to reduce emissions at all

as grid electricity supplies decarbonise in the future, the emissions savings achieved by fossil fuel CHP will diminish. However, significant savings are achievable today and will continue to be achievable for far longer than the lifetime of a single CHP unit, based on current forecasts. It makes sense, therefore, to use CHP to decarbonise now, rather than take a wait-and-see approach that completely fails to reduce emissions at all.

Energy sources

CHP and district heating are not inextricably linked and gas-fired CHP is not the only viable technology used in a modern district energy system. For example, two of the UK's largest and most successful district energy schemes, in Sheffield and Nottingham, already supply heat from their *energy from waste* plants, each delivering thousands of tonnes of emissions savings to their heat consumers.

In addition to gas-fired CHP, local waste to energy and biomass plant with good-practice emissions control systems can all operate at the centre of a district energy scheme today. Once the original low-carbon energy plant has reached the end of its lifetime, the district energy scheme can utilise new *best available technologies* to continue providing the lowest carbon heat that is feasible. In this way, every one of an energy scheme's consumers can be collectively and progressively decarbonised without relying on piecemeal action by individual parties.

This future-proofing approach will be central to the success of the district energy scheme on the Olympic Park site in east London (see the *Journal*, August 2011, page 16). Developers are already bidding to build on the land that will be freed up after the event, and their developments will be utilising the low carbon heat supplies available from the district energy system. The Kings Yard energy centre has substantial space provision for an increase in energy plant to meet future loads.

Low carbon technologies that are technically feasible to use with district energy networks are not limited to the few mentioned in the March *Journal* article, and we can expect that there may be more developments in the approach to 2050, potentially including financially viable fuel cells or small-scale carbon capture and storage. Additionally, the potential future role of CHP plus heat storage acting as operating reserve for the grid should not be ignored.

Whereas an individual building might have its own low carbon plant (such as a biomass boiler or heat pump) that has to modulate against its individual heat demand profile, a district energy scheme brings multiple consumers into a diversified load profile, providing a significant *baseload* against which a larger item of low-carbon plant can operate at peak design output for a far higher proportion of the year.

Consequently, efficiency savings are achieved not only from substantial economies of scale but also from the far more efficient operation of low carbon plant. The low carbon plant in a well-designed district heating scheme can provide the majority of the annual energy needs, with fossil-fuel boilers merely providing top-up heat at times of peak demand (or at heat demands too low for the turndown ratio of the low carbon plant) and also acting as back-up plant to ensure system resilience.

Assessment of a district energy scheme's feasibility is essential on a case-by-case basis.-The implications of thermal distribution losses and pumping energy requirements should always be considered as part of the feasibility. It is important to note that installation of a district energy network can be very expensive, and a system's operational efficiencies will need to be good enough to make the network installation feasible, in both financial and carbon terms.

When it comes to heat loss, the 1C loss per km figure mentioned in the August

DEFINITIONS

Though the terms **district energy** and **CHP** (see below) are often confused, it is worth noting for clarity that district energy (both district heating and cooling) refers to the insulated pipe networks that carry thermal energy from a source to consumers, in conjunction with the plant used to produce that thermal energy.

Combined heat and power (CHP) is the simultaneous generation of useful thermal and electrical energy. CHP is frequently used to generate the low carbon heat used in district energy networks, though it is by no means the only technology that is used.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A district heating network installation

> When district energy and CHP are implemented appropriately, they can be the most cost-effective means of significantly reducing carbon emissions

2011 *Journal* article is generally considered to be a worst-case heat loss rather than a typical loss factor – and is certainly not a best-case loss factor, as the March *Journal* article assumed. The actual temperature losses on a given network will fluctuate from moment to moment, depending on the constantly varying demands on the different sections of the network.

Therefore, heat-loss calculations are more accurately performed using W/m figures and over a whole year of operation. In high energy density situations, the losses are much smaller than estimated in the March article – around 5% and a maximum of 10% of annual heat consumption. Heat losses at the Olympic Park's district energy scheme – in 'legacy phase' for example – are calculated to be 6.9%.

Conclusion

Perhaps the most substantial argument for the effectiveness of district energy is the continued success of many district energy schemes around the UK, such as those in London, Southampton, Birmingham, Exeter, Leicester, Nottingham, Newcastle, Woking, Sheffield, Shetland, Edinburgh, to name just a few.

The UK District Energy Association says its member schemes alone save more than 100,000 tonnes of CO_2 emissions each year, when compared to conventional alternative energy supplies.

Increasing numbers of local authorities now understand the potential benefits of district energy for their local areas. In tandem, the private sector makes these investments because it is financially viable to do so, on a long-term basis, delivering substantial carbon savings over the coming decades and providing consumers with operational cost savings when compared to conventional energy supplies.

Surely the fact that energy can be delivered at a lower cost than alternative supplies, and with a lower carbon content, is testament to the fact that district energy works. DECC's new heat strategy references Pöyry's 2009 report[2] into the potential of district heating networks, stating: 'Up to half of the heat load in England is in areas that have sufficiently dense heat loads to make heat networks economically viable.'[3]

Like all other low-carbon technologies, district energy is not a panacea; it is not generally appropriate for areas of low heat density and it requires genuine expertise to assess its feasibility, undertake its design and implement it correctly. However, when district energy and CHP are implemented appropriately, they can be the most cost-effective means of significantly reducing carbon emissions.[4]

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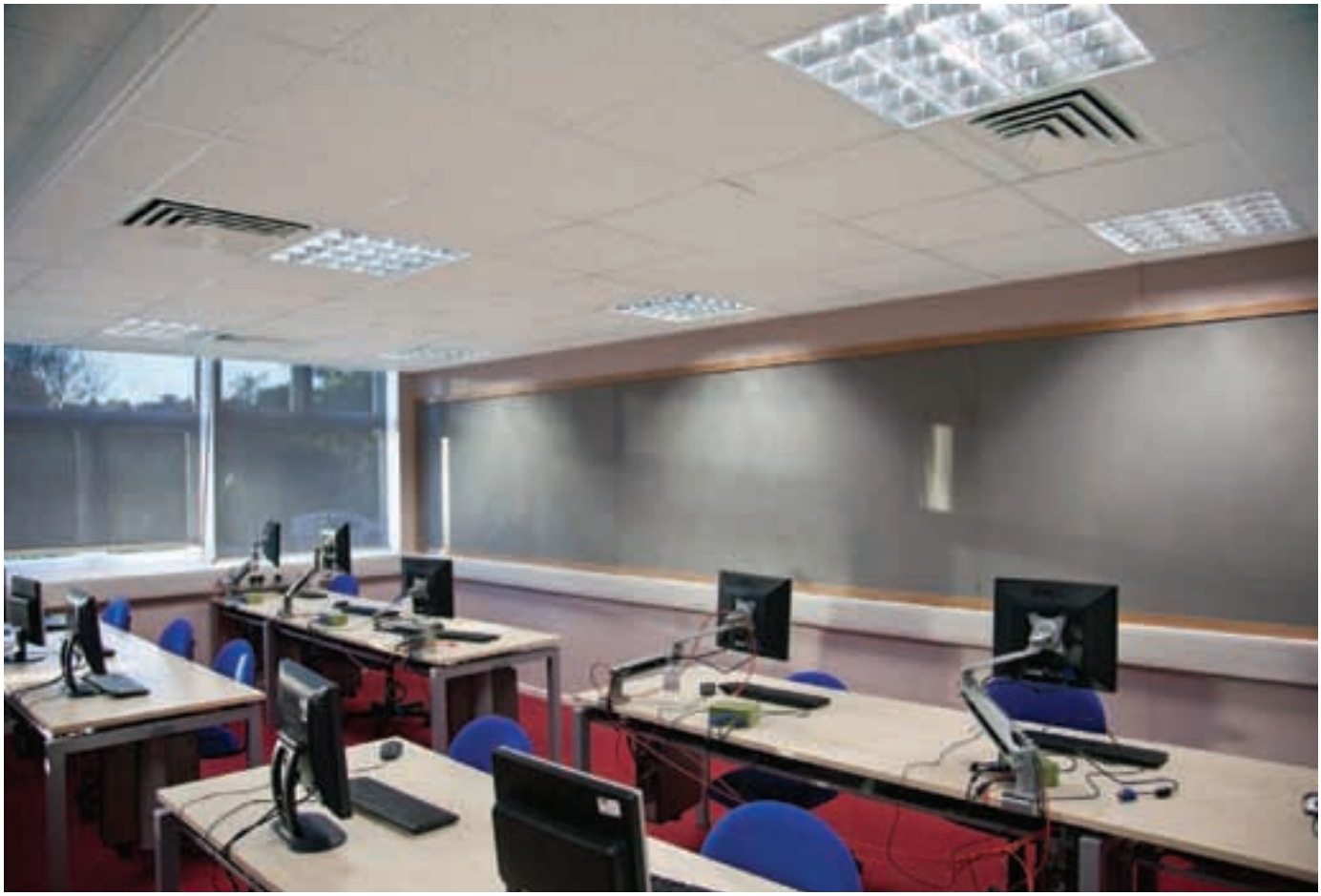

CHANGE MAKER

A thermal energy storage system is claimed to be an energy efficient alternative to air conditioning. **Andrew Brister** takes a look at this CIBSE award-winning product

Monodraught's Cool-Phase technology is a thermal energy storage system that uses phase change material (PCM), in combination with controlled ventilation, to ventilate and cool buildings as an alternative to air conditioning. Monodraught claims that the system – which was the Energy-using Product of the Year in the CIBSE Building Performance Awards 2102 – can reduce energy consumption by up to 90% compared with conventional cooling systems.

At the heart of Cool-Phase are what the company calls 'thermal batteries' that store energy when it is freely available and release it when it is needed. The thermal battery uses the latent heat property of PCMs to store energy as they change phase from solid to liquid. The main material inside the Cool-Phase system is a combination of water and a number of salts. The resulting material is non-toxic, non-flammable, and changes from liquid to solid at room temperature. Monodraught estimates that 1kg of this material stores the same amount of energy as it takes to heat up 200kg of concrete by one degree.

The thermal batteries are mounted in a module containing a heat exchanger. This allows heat to be transferred from the air to the thermal battery, or vice versa. Modules can be placed wherever cooling is required and are connected directly, or via a duct, to the air handling unit and ventilation system

The air handling unit (AHU) contains an intelligent control system, fan, damper and filters. The control system monitors indoor air quality, as well as temperatures both inside and outside, and controls the fan and dampers. The AHU controls the flow of fresh air into the building, re-circulation of air within the building, and how energy is released or stored within the thermal batteries. The filter removes particles, allergens and pollutants from the incoming air.

During summer nights cool outside air is passed through the heat exchanger to recharge the thermal energy store for use the next day. As temperatures rise, warm air is passed through the heat exchanger to provide cooling. The total cooling provided is a combination of the thermal energy stored within the unit, the effects of free cooling and night-time ventilation.

In winter, Cool-Phase works in reverse, trapping waste heat and using it to warm cool fresh air entering the building. The system works all year round to ensure a fresh and healthy environment, monitoring temperatures and CO_2 levels to automatically determine how much ventilation or cooling is required.

Of course, there are other thermal energy store solutions open to designers, not least the inclusion of exposed concrete in the building's structure, which can then be similarly used in conjunction with night-time ventilation to control internal temperatures. Yet, Cool-Phase, while also suitable for new build, is perhaps particularly attractive as it can be easily retrofitted, whereas concrete is only a solution for new projects, extensions or major refurbishment.

Monodraught hopes Cool-Phase will prove popular in commercial office areas where clients may wish to have a greater level of control over internal temperatures than natural ventilation offers, but without the energy costs and ongoing maintenance costs associated with conventional air conditioning systems. Similar arguments apply in the retail and healthcare sectors.

Schools are also a target market. Over recent years there has been a great deal of research into the optimum teaching environment. It is generally accepted that internal CO_2 levels should not exceed 1,200 ppm and design guides for school design state a maximum average of 1,500 ppm. Cool-Phase systems include CO_2 monitoring as standard and control the level of fresh air within classrooms to provide the ideal teaching environment.

'Demand is really starting to take off, not just in the education sector but also

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Case study Lessons learnt at Notre Dame School

The Victorian Notre Dame School in Southwark, London, had a number of areas where overheating was a problem because of external heat gains, changing usage patterns and additional heat loading due to computers.

A number of problem areas already had split system air conditioning units installed to provide cooling. However, due to concerns about running costs, sustainability and the difficulty of mounting external units, the school was looking to trial alternative solutions that were easy to retrofit.

Two Cool-Phase systems were installed in an IT classroom in April 2011. The 70 sq m classroom had high internal heat gains with 30 PCs and an overhead projector, while partly shaded windows on the north-west and south-east elevations meant the room suffered from solar gains.

	Temp >25(°C)	Temp >28(°C)	CO_2 >1000 ppm	CO_2 >1500 ppm	CO_2 >2000 ppm
Control-IT Classroom	69.8%	6.1%	58.2%	44.0%	31.7%
Control-Geography Classroom	59.0%	2.3%	39.5%	14.9%	6.4%
COOL-PHASE	2.3%	0.0%	5.0%	2.2%	1.3%

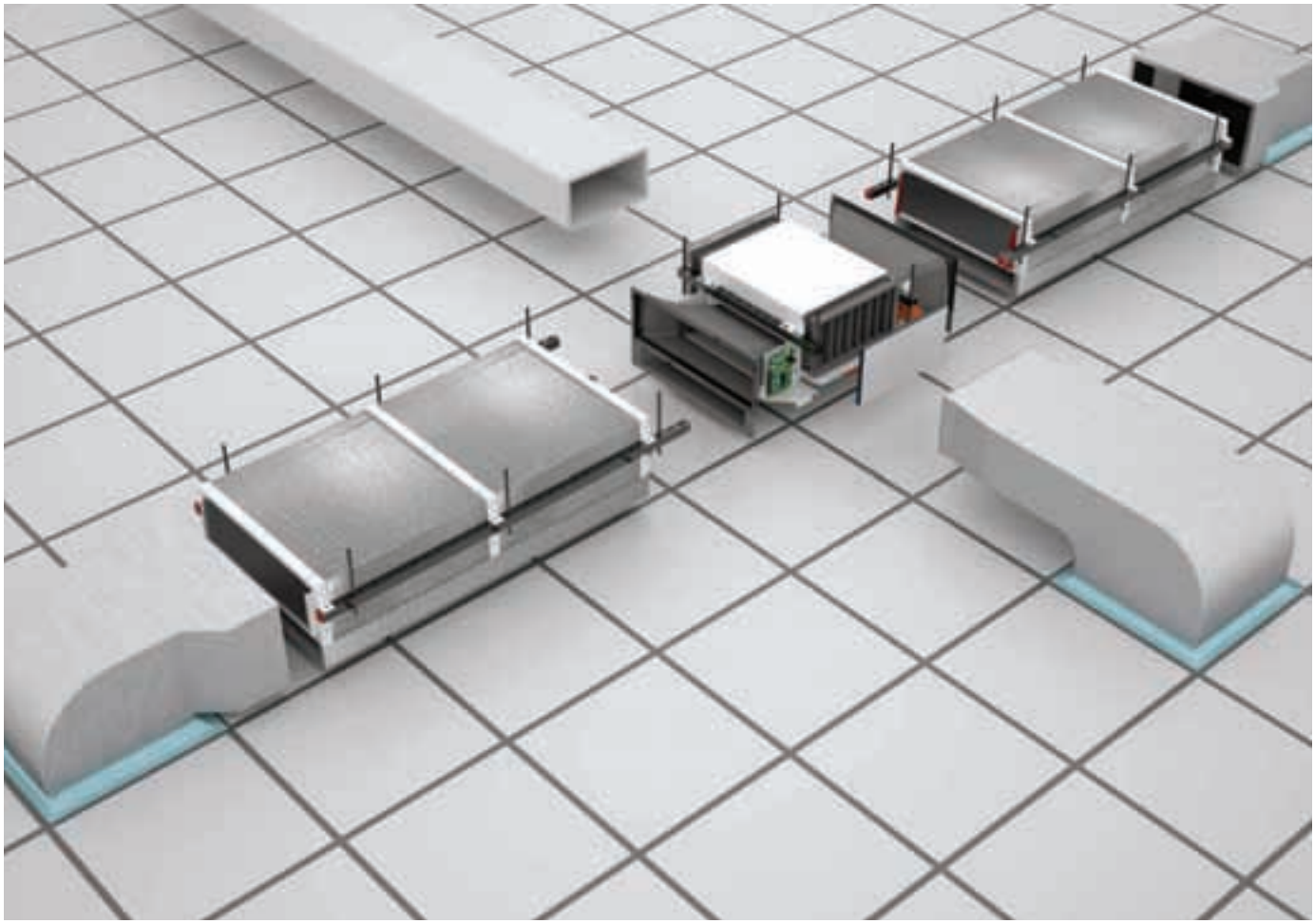
Two control rooms were chosen in order to provide a comparison to the performance of the Cool-Phase systems; the first was another IT classroom, also with 30 PCs and an overhead projector, resulting in similar internal heat gains. Due to solar gains from southwest-facing windows, there was a higher heat loading than the classroom where the Cool-Phase units were installed. This classroom had a split-type air conditioning system already installed to provide cooling.

The second control room was a geography classroom with much lower internal and external heat loading. This classroom had a single PC and overhead projector. The room was chosen as it was located next to the room with the Cool-Phase systems and would provide a baseline with which to compare performance.

Data logging equipment was installed in each of these classrooms. Temperature and CO_2 levels were monitored every minute. The data loggers were installed in February 2011 during the spring term, so that the two environments could be compared before the Cool-Phase systems were installed.

The room with the Cool-Phase systems installed has shown better performance than both the control rooms (see table). Despite having lower heat loading, the geography classroom had temperatures above 25C for 59% of the time, while in the room with the Cool-Phase systems this was reduced to just 2% of the time.

Furthermore, the classroom with the Cool-Phase systems has also shown better results than the other IT classroom which had the air conditioning system installed.



A false ceiling conceals Cool-Phase

in the commercial applications where the requirements can be more stringent,' says Mathew Holloway, product manager for Cool-Phase. 'Here we are seeing that the system, when used alongside conventional HVAC solutions, can reduce the capital costs of new builds and refurbishments, reduce on-going running costs and improve the quality of the indoor environment. It's this kind of win-win situation which means, I believe, that we will see a lot more of Cool-Phase in our buildings in the future.'

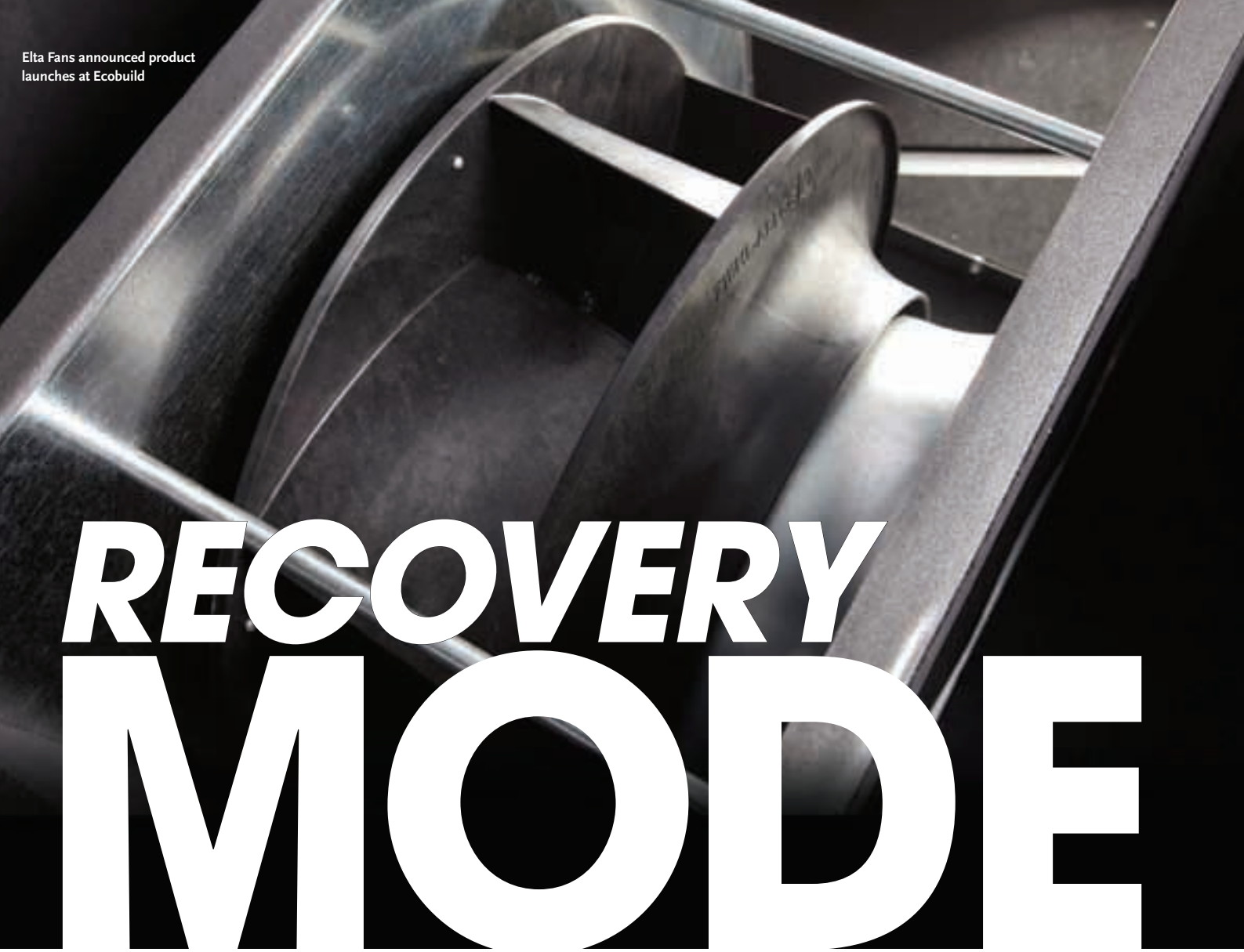
Certainly Monodraught can point to some impressive results so far. The company trialled Cool-Phase at Notre Dame School in Southwark, London, in an IT classroom that regularly suffered from overheating problems from internal and external heat gains (see case study opposite).

'I regularly teach in this classroom during the afternoons. The girls are normally using the computers and when the sun comes round it can get incredibly hot,' says Notre Dame's deputy headteacher Jocelyn Lewis.

'Since we have had the Cool-Phase system installed, it has had a massive effect on the girls and their learning. There has been a marked improvement in terms of temperature; it's much cooler and the environment is much more conducive to learning. There has been a profound effect; the students settle much more quickly and there is a much more focused start to the lesson.'

Lewis also compared Cool-Phase favourably with air conditioning, which is installed in some other classrooms in the school. 'There have been no complaints, which is evidence in itself,' she says. 'Elsewhere we have air conditioning installed and students sitting underneath the air conditioning get too cold. With the Cool-Phase system we don't have any of that dialogue with the students – I'm too hot, I'm too cold. It's much easier to teach in this classroom now.'

The fact that Cool-Phase uses less energy than traditional air conditioning and doesn't contain harmful refrigerants also provides an important lesson. 'As a school, we give a strong message that we should be looking after our environment,' says Lewis. 'With the Cool-Phase system we can tell the students within the school about how green it is and the difference that we are making as a community. I think it is a really positive message for the students.' **CJ**



Elta Fans announced product launches at Ecobuild

RECOVERY MODE

Several manufacturers highlighted their latest ventilation technologies at this year's Ecobuild event. **Andy Pearson** selects some examples, beginning with a focus on mechanical ventilation with heat recovery

The transition towards airtight, energy efficient homes in the UK means that purpose-provided ventilation to help eliminate condensation and pollutants is now more necessary than ever. Mechanical ventilation with heat recovery (MVHR), in particular, has started to gain a significant foothold in new housing developments. In 2010-11, more than 18,000 MVHR units were sold, with growth predicted to continue, according to the Zero Carbon Hub Ventilation and Indoor Air Quality Task Group interim report. This statistic may explain why there were so many MVHR systems featured at this year's Ecobuild show.

MVHR units generally comprise a small box, usually hidden in a cupboard or in the loft, which contains two electric-powered fans, one to supply air and one to remove air from the home. Warm moist air is extracted from kitchens and bathrooms and ducted back to the unit, while fresh outside air is ducted from the unit to other habitable rooms. The inclusion of a heat recovery unit to transfer energy between the supply and extract ducts can help reduce the heating load.

One of a new generation of MVHR units is Xpelair's Carbonlite Xcell 150QV, which was showcased at Ecobuild. These units have been developed for airtight two-bed apartments or smaller houses. Two models are available: a two speed unit, the QV, and a three speed unit with winter defrost, the QVW. The QV unit is controlled by a two speed day/boost controller and the QVW unit is controlled by a combination of controllers and sensors.

Both Xpelair units are manufactured with an insulated, lightweight structural foam body, complete with four 125 mm top entry spigot connections. The range features a heat exchanger, which claims to be 90% energy efficient, low-energy multi-speed motors and long-life filters. Xpelair claims the units can save up to 278 kg of carbon per year compared to a traditional air conditioning

heat recovery system and can achieve a Specific Fan Power as low as 0.66 W/l/s.

Xpelair was also promoting the Xcell 300 MVHR range of units for larger, three to five bedroom houses. The QV model features a manual two-speed controller, the QVW model features a three-speed controller, winter defrost cycle, filter inspection and motor failure indicators and the facility for automatic control of the unit through a combination of humidstats, CO_2 or smoke sensors. Steve Mongan, head of marketing at Xpelair, says the unit can save 'up to 480 kg of carbon dioxide each year compared to a traditional AC heat recovery system'.

Ventilation product manufacturer Titon used Ecobuild to promote its range of six whole-house ventilation units with heat recovery. All but the smallest of the units feature a summer boost option (with an override timer to prevent the units being accidently left in boost mode) to help reduce overheating in dwellings. Other extras include a 100% summer bypass and an option to automatically turn off – or reduce – the air supply when windows or trickle vents are opened. Each model can be fitted with either 125 mm or 150 mm round ducts, without the need for adaptors. The HRV1 Q Plus is the smallest unit, which has been developed for use in dwellings with three wet rooms or fewer. The largest unit is the HRV3 Q Plus, which has been designed for larger properties with three to seven wet rooms.

A previous generation of one of Xpelair's MVHR units

Total Home Environment's range of MVHR units was one of the more innovative products at the show. These MVHR units are unusual in that they incorporate a mini air-source heat pump in addition to a conventional counter-flow heat exchanger. This enables the units to deliver fresh, filtered air while reducing the total heating load of a property. The combination of passive and active heat recovery is claimed to make the units up to 250% efficient, which the manufacturer says can completely negate the need to heat ventilation air, saving approximately 50% of the total heating load of a home. There are also Combi versions of the unit using the same technology to produce up to 380 litres of hot water per day, which is stored within an integral 185 litre tank.

Alongside these whole-house solutions was Johnson & Starley's Q-Vent HRC 8x3 continuous mechanical extract ventilation solution for en-suite bathrooms. A heat exchanger recovers energy from the stale contaminated air drawn from the bathroom and uses it to temper the incoming fresh air supplied to the bedroom. The extracted air is then discharged to the outside via a single duct and grille. The unit will increase the rate of ventilation when the bathroom is being used for periods in excess of two minutes by switching to boost mode.

For larger commercial ventilation applications for schools, offices, retail and leisure outlets, Airflow's DV3600 Duplexvent Flexi Heat Recovery unit has an extract rate of up to 3,600 cu m/hr. It features a counter flow heat exchanger, which claims to be more than 90% efficient in its operation. The unit is also building management system (BMS) compatible and incorporates a motorised winter/summer bypass to isolate the heat recovery function during the hotter months.

Designers looking for a reliable contractor to fit an MVHR system should check out the BEAMA scheme. The association, which was speaking at the renewable heat focus area of the show, has launched an MVHR approved contractor scheme targeted at specifiers and installers. The scheme explains how to design, install and commission a domestic ventilation system. Once the course has been passed, an operative can sign up to an approved contractor scheme. Under the scheme, the approved contractor is responsible for completing a checklist to ensure an installation meets the performance laid out in the original design. Once the installation is signed-off, the

Monodraught has launched a 'performance component' for its Windcatcher system

scheme's SAP assessor will apply a reduced 'in-use' factor to the SAP assessment for the installation, reducing the system's specific fan power penalty from 40% to 30%, to help it meet compliance criteria.

Air movement

Mechanical ventilation with heat recovery is not appropriate for all applications; some schemes simply require extract ventilation.

EnviroVent used Ecobuild to showcase new range of centralised and decentralised mechanical extract ventilation (MEV) solutions suitable for houses, apartments and communal residences. This includes the Ozeo compact, whole house MEV unit which can be fitted with intelligent humidity sensing valves and PIR sensors to enable full demand ventilation. The company has also developed the Ozeo Ecowatt CP, an intelligent constant pressure MEV unit developed to enable the airflow inside the property to self-adjust in order to remain at a constant level without a drop in pressure, regardless of any 'boost' activity in other areas such as bathrooms and kitchens.

Decentralised extract ventilation systems in the home often require the use of a continuously running extract fan in rooms such as bathrooms, kitchens, utility rooms and toilets. Johnson & Starley's A1003 and E1004 energy efficient fans have been developed specifically for this application. The three-speed fans are designed to run continuously and almost silently at one of two lower-speed settings; users can then boost the fan speed to maximum performance when required.

For commercial applications, Fläkt Woods showcased their new series of 'plug and play' e3co Crown energy recovery units. The units have an airflow up to 1.3 m3/sec and are fitted with a high efficiency Eurovent certified counter-flow aluminium plate heat exchanger to capture the energy from the exhaust air stream which is used to treat the incoming ventilation air. E3co Crown models include a built-in proportional motorised bypass to enable them to be used for night cooling during the summer months and a free-heating or free-cooling self-regulating function for daytime use. The units also have full BMS functionality offering significant energy saving and improved control and management of the building operations.

Titon's HRV Q products were featured at Ecobuild

An older model of TotalHome's MVHR units

Elta Fans used Ecobuild to announce the first in a series of new product launches, which feature its products powered by motors and impellers from Ziehl-Abegg. This launch includes the first-ever fan in the HVAC market sector to feature the Ziehl FE20wlet impeller, which Elta says combines 'scientific insights into the owl's flight characteristics' with the Ziehl's extensive aero-acoustics knowledge to produce a completely new fan blade geometry with serrations on the trailing edge of the blade, like the owl's wing, to reduce noise. The blades also borrow from the aircraft industry and feature 'winglets' on each blade to smooth airflow near the blade tip.

EnviroVent's RetroVent is a single room extract system incorporating a heat recovery unit with a twist, literally, since unit has been designed to make the extract air corkscrew around the heat exchange cell to increase the amount of time it is in contact with the heat exchanger, increasing the heat recovered. The unit works by continuously extracting stale and moist air from a room. The air passes over the heat exchange cell which is supplying fresh, filtered air to the room. The manufacturer claims that the solution enables up to 89% of the heat to be recovered; an automatic summer bypass prevents the unit preheating supply air in the summer. The unit is suitable for different wall thicknesses and is available in two sizes: 100 mm diameter version for bathrooms and WCs and a 150 mm version for kitchens,

utility rooms and small office applications.

Some rooms just a need simple extract solution. Airflow's Loovent Eco features a two-speed, dual-function fan for continuous or intermittent extraction, either of which can be selected during installation. In continuous ventilation operation, the unit will provide a constant flow of either 8 l/sec, for toilets and bathrooms, or 13 l/sec, for kitchens. The unit features a low energy DC motor and a specific fan power of 0.3 w/l/sec. The fan can be mounted in horizontal or vertical configurations to reduce the need to make good the wall once fitted.

For buildings ventilated using passive or hybrid ventilation systems, Aereco's G2H extract grille can provide an energy saving solution. Primarily designed for use in kitchens, bathrooms and toilets, the G2H unit fits directly onto individual passive ventilations ducts. It incorporates a modulating damper to control the airflow and is suitable for both new and refurbishment projects. There are numerous options available to enable the grille to meet the needs of applications, including: humidity control to remove moisture; presence detection; and even remote control to exhaust odours.

Products to enable designers to bring outside air quietly into a room were also on show at Ecobuild. Titon, for example, showcased a new surface-mounted noise-reducing ventilator, which is suitable for PVCu, timber and aluminium windows. The unit is compatible with standard 13 mm ventilation slots and is suitable for domestic or commercial new-build and retrofit projects. The SF Sound Attenuator has been independently tested at a UKAS test house in accordance with BSEN2014010:1992, ISO14010:1991 and claims to provide up a sound reduction of up to 40 dB Dn,e,w in the open position and 50 dB Dn,e,w in the closed position.

To make specification simple, the SF Sound Attenuator Vent and Canopy are available in a range of size combinations to suit a variety of reveals, aesthetic preferences and required levels of attenuation. Paul Duke, technical manager, Titon said: 'With more and more developments being built on brownfield and urban sites, the design of ventilation systems is not just about ensuring adequate fresh air – the need to reduce potentially intrusive noise from roads or railways is now a priority.'

Monodraught has also made the specification of its Windcatcher natural ventilation system easier with the launch of the new Windcatcher Performance Component for the IESVE (Virtual Environment. IES launched the Windcatcher Performance Component Module as part of its Performance Components library within its VE software. The component allows 3D representations of the systems to be dragged easily from a product library/catalogue onto a 3D building model and the performance and potential energy savings to be assessed.

A less typical natural ventilation system comes in the form of Dyer's SOLIS – a solar-powered chain motor for opening windows and rooflights using only energy from the sun. **CJ**

Airflow makes heat recovery units for larger commercial ventilation applications

EnviroVent showcased heat recovery solutions at Ecobuild

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Solar thermal continues to rise

This module considers the case for installing solar thermal heating system technology

The industry that designs, manufactures, supplies and installs solar thermal heating systems was disappointed when, at the end of March, the UK government's Department of Energy and Climate Change (DECC) announced that the Renewable Heat Incentive (RHI) funding scheme for domestic installations was not going to commence in 2012 as had previously been anticipated. Commercial systems can already attract RHI funding; however, there are also good reasons for the application of this technology to domestic properties – not least its positive lifetime carbon impact. This article will develop from the previous *Solar thermal – solar hot water heating* CPD published in February 2009 (available at **www.cibsejournal.com**).

Solar thermal adoption

In a market report[1] published in 2011, the take up of solar thermal per capita in the UK was one third that of countries of similar climates, such as Ireland and Holland. Sceptics may consider that the solar resource is somehow different outside the UK but, as attested by the data in Figure 1, there is little variance in the solar irradiance between example locations at approximately the same latitude (Amsterdam, Birmingham and Limerick) or even for those in the more northerly locations (Belfast and Edinburgh).

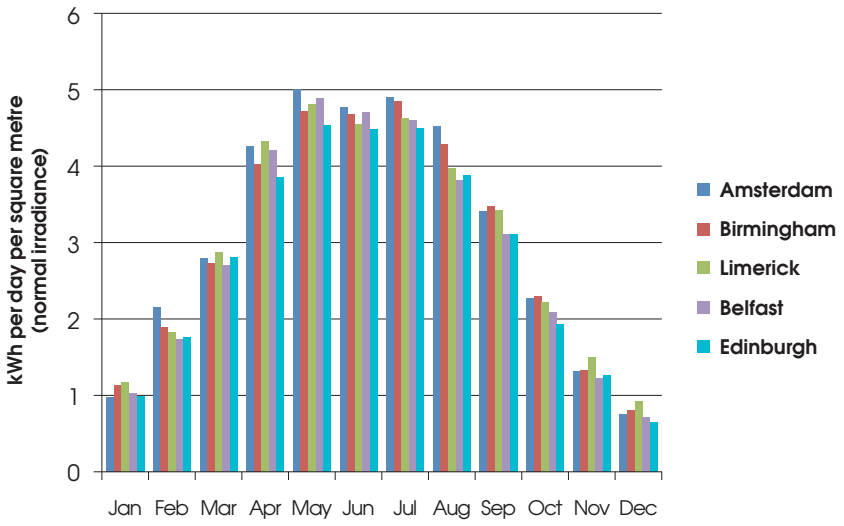

Figure 1: Average daily total normal irradiance in Amsterdam, Holland; Birmingham, UK; Limerick, Ireland; Belfast, Northern Ireland; and Edinburgh, Scotland (based on PVGIS[2] data)

There are strong reasons for solar thermal to be considered, even in maritime temperate climates such as the UK.

Properly sized and installed systems are responsible for almost no direct or indirect operational carbon emissions and, when combined with solar photovoltaic (PV) sourced power, the parasitic power consumption of the solar system pumps can be practically eliminated. So when predicting life cycle costs for solar thermal, the costs are independent of the vagaries of fuel prices, as well as there being a certainty of fuel security (although in operation the remainder of the domestic hot water system is unlikely to function without external power). The principal components of solar thermal systems have typically-quoted life expectancies of in excess of 20 years and, in a number of studies[3,4,5] (both in the UK and in other climates), such systems have been shown to have carbon payback well within the lifetime of these components. ('Carbon payback' is the CO_2 emissions due to system manufacture and installation,

divided by the annual reduction in operational CO_2 emissions when compared to a fossil-fuelled hot water heating.) Even when the sometimes-optimistic solar utilisation figures used in academic studies are replaced with the average measured data taken from the recent Energy Savings Trust monitoring[6] of domestic applications, the carbon performance is still beneficially positive. And, pragmatically, the application of solar thermal hot water can help meet the thermal requirements of the building regulations as part of an holistic design process.

Maintenance requirements are relatively low, and similar to that of a small hydronic heating distribution system. However, as the heat transfer fluid in closed indirect solar thermal systems is protected from freezing by being a propylene glycol solution, there is a greater propensity for leakage compared with plain water. So fill levels need to be checked regularly and the quality of the glycol solution should be checked annually, as it can degrade at high temperatures, reducing its anti-freeze effect as well as increasing its acidity.

As from 6 April this year, planning permission is no longer required to install solar PV or solar thermal on non-domestic buildings in England – there are already permitted development rights (PDRs) for domestic installations. This recent amendment to PDRs[7] in England is likely to encourage an increased number of retrofitted installations on commercial and agricultural buildings. The new rules will also mean that ground-mounted systems up to $9m^2$ will be able to go ahead without a planning application. There are limiting restrictions associated with the PDR that are mainly associated with the appearance of the installation.

UK government funding

The UK government has reaffirmed its support for renewable heating in domestic premises and will set out a firmer timetable for delivering this support in the autumn, with an anticipated introduction of a funding mechanism (likely to be the RHI) from summer 2013. The RHI is already in place for non-domestic applications but has only successfully registered a small number of installations to date. The level of RHI funding (now at 8.9p per kWh of metered heat output) is proving so attractive that some contractors are able to offer installation of solar thermal systems at no cost to the commercial users, by taking the RHI payments to pay for the scheme.

The Renewable Heat Premium Payment (RHPP) 'voucher scheme' has been available for domestic applications since the start of this month (May 2012) and provides a £300 voucher (valid for three months from issue) towards the cost of a domestic solar thermal installation when installed by a Microgeneration Certification Scheme (MCS) certified installer (eligibility is subject to the domestic premises having a specified minimum thermal performance). Although £300 may seem a relatively small amount compared to the typical domestic solar thermal cost of around £3,000 to £5,000, the assurance of having the system installed under the auspices of the MCS will ensure that the installations are eligible for support through the RHI, providing they meet the eligibility criteria of any future RHI scheme.

There are ring-fenced RHPP funds available for community renewable heating systems, and for social landlords to upgrade heating systems. Again, this is likely to encourage the further application of non-domestic solar thermal systems.

The positive life time economics of solar thermal water heating are currently dependent on the provision of subsidies and would not be likely to 'pay-back' in real cost terms when offsetting a fossil fuelled or even an electric hot water heating system.

The 'inefficiencies' of operating the solar thermal system

The performance of solar thermal is considered in different terms to that of a traditional heating resource. The energy resource itself is practically unlimited (and free), and the amount that can be utilised will be related simply to the area that is being captured and the effectiveness of transferring the heat from the incident photons of solar energy to the end use (in this case, hot water). In practical terms, Figure 2 provides an approximate breakdown of where the potential heat is lost. Many of the losses in the yellow and red boxes may be minimised by appropriately insulating the pipework, fittings and storage vessels. (In the EST 2011[5] survey, poor insulation of hot-water storage cylinders and pipes contributed significantly to heat loss and low performance, although it notes that this is a common issue with all water-heating systems and not just solar thermal systems.)

The typical control mechanism used by solar thermal systems, the differential temperature controller (DTC), as well as the anti-legionella protection, can have a significant effect on the efficiency of the systems, and so require properly considered design and operation. (Through novel control strategies, other than simple DTC, there are systems claiming that substantial increases of useful heat may be utilised in an annual cycle.) The energy used by the heat transfer fluid circulating pumps will be relatively small[5]; however, since they will be operating at all the times that the solar circuit is in use, they should be appropriately selected to operate at high pumping efficiencies at the design flowrates (the pump may, of course, be powered by solar PV).

The solar thermal system will also reduce the need for an otherwise potentially part-loaded boiler in summer, hence providing a gain in overall system efficiency.

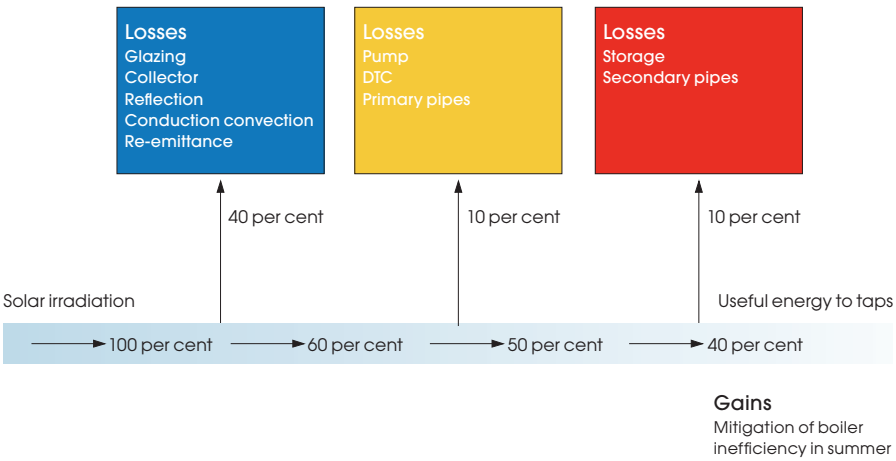

Figure 2: A representation of the indicative inefficiencies in a solar thermal system (Source: EST131, 2006)

The remaining 'inefficiencies', as shown in the blue box of Figure 2, are related to the physics of the collector. The principal form of the collectors (as discussed in the CPD in February 2009[8]) are 'flat plate' and 'evacuated tubes', and each has their own performance characteristics and particular attributes. However, the effectiveness of a solar collector may simply be defined by:

$$\frac{\text{Useful heat passed from the collector to the system}}{\text{Incident radiation striking the collector's absorber}}$$

And this relationship has been used to develop the commonly used performance equation for solar collectors – the Hottel-Whillier-Bliss equation[9,10], for when the solar irradiance is G (W/m²):

Useful heat =
collector area x G x$[(F_R \times \tau \times \alpha) - (F_R U_L(\theta_i - \theta_a)/G)]$

where:
τ is the transmittance of the clear cover;
α is the absorber's shortwave absorptance;
F_R is a 'heat removal factor' used to allow practically measurable temperatures to be used in the equation;
U_L is the overall heat loss factor – this rises as the value of $\Delta\theta$ increases; and
$(\theta_i - \theta_a)$ (or $\Delta\theta$) is the specific temperature difference between the inlet heat transfer fluid and the ambient air.

The clear coating (typically glass or plastic) needs a high value of τ at wavelengths associated with solar radiation, as well as providing good insulation to keep U_L low. The absorber surface coating needs to be 'selective', having a high absorbtance in the solar spectrum and a low emissivity in the thermal (infrared) spectrum. Plain metals such as copper and aluminium have low solar absorptance, and so a thin layer of a material with high solar absorptance and good infrared transmittance, such as 'black chrome', is applied to the metal .

In flat-plate collectors, thermal insulation is used around the casing to reduce losses.

Values of $F_R(\tau\alpha)$ and $F_R U_L$ are provided using independent tests (as specified by ASHRAE Standard 93 *Methods of Testing to Determine the Thermal Performance of Solar Collectors*) by manufacturers as a standardised way of characterising the output of a solar collector. In Europe, BS EN 12975 *Thermal solar systems and components — Solar collectors* is used as the standard method for defining a collector's performance. Although based on the same fundamental relationships, the BS EN 12975 test methods provide three values that are used to define the performance:

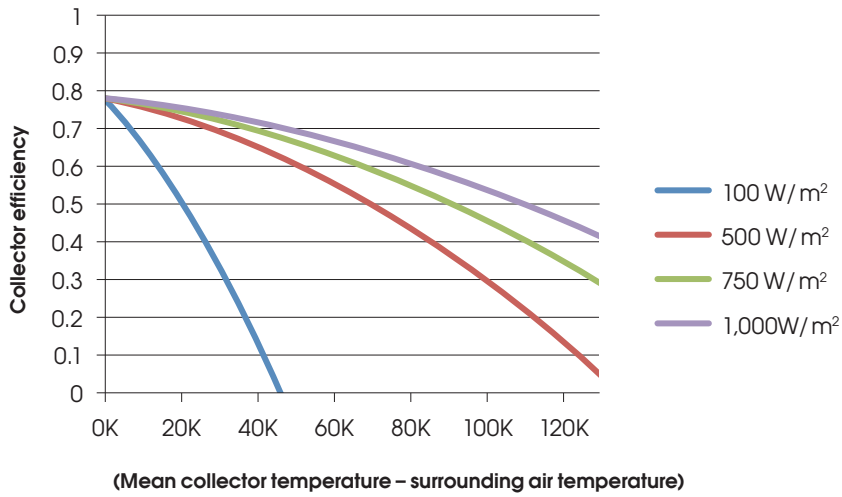

Figure 3: Efficiency of an example flat plate collector at different solar irradiances

Collector efficiency =
$\eta_o - (a_1 \times (\theta_m - \theta_a)/G) - a_2 \times (\theta_m - \theta_a)^2/G)$

where:
η_o is the efficiency when the collector is at the same temperature as its surroundings (and is often referred to as the 'optical efficiency');
a_1 and a_2 are loss coefficients; and
the 'collector' temperature is given in terms of its mean temperature, θ_m.

Using data from a manufacturer's catalogue ($\eta_o = 0.779$, $a_1 = 1.07$, $a_2 = 0.0135$), representations of collector performance may be produced, such as that in Figure 3.

The characteristics of collectors can vary widely and deserve appropriate attention (with the same rigour as any other piece of HVAC equipment) when being selected.

Properly designed solar thermal systems are a means of capturing the sun's energy for use in buildings that, until the cost drops or efficiency rises for photovoltaic technology, can provide a most carbon-effective method of generating hot water. To make them most cost effective requires careful selection, design and operation but, unfortunately, without subsidy they are unlikely to break even financially.

Further reading:

Solar water heating systems – guidance for professionals, conventional indirect models (CE131) provides a good overview of the technologies and is freely downloadable from the Energy Savings Trust: **www.energysavingtrust.org.uk**

The CIBSE *Solar heating design and installation guide* provides some detailed description on systems and appropriate installation details, and the CIBSE *Capturing Solar Energy* (KS15) (freely downloadable to CIBSE members from **www.cibseknowledgeportal.co.uk**) gives an accessible and succinct introduction to a number of solar technologies, including solar thermal.

BS EN 12975 and ASHRAE 93 provide extensive detail of the testing requirements for solar thermal collectors.

The US-based Solar Rating and Certification Corporation – **www.solar-rating.org** – provides data for numerous tested collectors.

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3 Croxford, B. and Scott, K., *Can PV or Solar Thermal be cost effective ways of reducing CO_2 emissions for residential buildings?* Solar 2006: Renewable Energy – Key to Climate Recovery. American Solar Energy Society: Denver, USA.

4 Beccali, G. et al, *Life cycle assessment of a solar thermal collector.* Ardente, F. Renewable Energy 30 (2005) 1031–1054.

5 Streicher, E. et al, *Energy Payback Time – A Key Number for the Assessment of Thermal Solar Systems*, EuroSun 2004.

6 *Here comes the sun: a field trial of solar water heating systems*, Energy Savings Trust 2011.

7 The Town and Country Planning (General Permitted Development) (Amendment) (England) Order 2012 – **www.legislation.gov.uk/uksi/2012/748/made**

8 Dwyer, T., *Solar thermal – solar hot water heating*, CIBSE Journal, February 2009 – **www.cibsejournal.com/cpd/2009-02/**

9 Hottel, H.C. and Whillier, A., *Transactions of the Conference on the Use of Solar Energy*, vol.2, part 1, Univ. of Arizona Press, 1958.

10 Bliss, R.W., Solar Energy 3, 1959.

Module 40

May 2012

1. What normal daily irradiance could be expected in April in Belfast?

- ☐ A 1 kWh·m^{-2}
- ☐ B 2 kWh·m^{-2}
- ☐ C 3 kWh·m^{-2}
- ☐ D 4 kWh·m^{-2}
- ☐ E 5 kWh·m^{-2}

2. Which of these is likely to be true of solar thermal systems?

- ☐ A They last less than 20 years but pay back financially in that time
- ☐ B They have a lifetime expectancy of more than 20 years and will provide a carbon payback of less than that time
- ☐ C They have a lifetime expectancy of more than 20 years but will not provide a carbon payback although, without subsidy, will pay back financially
- ☐ D They last more than 20 years but are only carbon beneficial when replacing electric hot water heating
- ☐ E Some academic studies of solar thermal may use over-optimistic data and, as a result, the carbon payback is a fallacy

3. What is the maximum size of commercial ground-mounted solar collector allowable under PDRs in England?

- ☐ A 1m^2
- ☐ B 3m^2
- ☐ C 5m^2
- ☐ D 7m^2
- ☐ E 9m^2

4. In the EST survey of existing solar thermal installations, what simple energy saving measure was specifically seen as lacking in many systems?

- ☐ A DTC control
- ☐ B Poor-quality collectors
- ☐ C Adequate insulation around pipework
- ☐ D Cleanliness of panel surfaces
- ☐ E Appropriate storage

5. For a collector with characteristics $\eta_o = 0.779$, $a_1 = 1.07$ and $a_2 = 0.0135$, what is its likely efficiency when the solar irradiance on the panel is 500 W·m^{-2} when the mean collector temperature is 95C and the surrounding air is 25C?

- ☐ A 10%
- ☐ B 30%
- ☐ C 50%
- ☐ D 70%
- ☐ E 90%

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MHS extends Nexus range with MF 40-20 TMTC unit

MHS Boilers has extended its range of versatile Nexus district heating substations with the introduction of the new Nexus MF 40-20 TMTC unit, featuring thermo-mechanical temperature controls. Suitable for district heating schemes, such as multi-occupancy apartment blocks and social housing schemes, the self-contained unit is designed to be inexpensive to maintain. The Nexus MF 40-20 TMTC can also be fitted with either a differential pressure control valve (DPCV) or a differential pressure bypass valve (DPBV).

● **For more information visit www.mhsboilers.com**

Latest Trend controllers prove size does not count

Trend Control Systems has launched the first two models in a new generation of building energy management system (BEMS) controllers. Though small in size, the Trend IQ411 and IQ412 offer a combination of capabilities not found on any other building services controller. The versatile new units – which incorporate a range of features that simplify installation, engineering and commissioning – are ideal for energy efficient local control of services, such as underfloor heating, natural ventilation, small air handlers and air conditioning terminal units.

● **For more information call 01403 211888 or email marketing@trendcontrols.com**

PH office – water pipe sizing and drainage design software

Design software having 5 calculators in one product: Pipe sizing water supply systems (with integrated LU conversion, head loss, and 'industry standard' tabulation), assessment of 'tail end' water design flow (based on probability), sanitary design flow (including mixed occupancy assessment), eaves gutter sizing, and storage capacities for rainwater harvesting systems. Keenly priced at just £95 + VAT; supplied with a CD and printed user guide inside a hard binder. To complement the success of PH office, GAS office is coming!

● **For more information visit www.phoffice.co.uk**

Celebrating two decades of CableCalc level P with a free version of new twin and earth calculations

To celebrate 20 years of CableCalc, Castline Systems has released a new, free version of its popular CableCalc program, which will calculate single phase radial and ring circuits wired in twin and earth cable. It even includes free technical support by email. CableCalc level P is a fully working, unlimited use version and provides far more than just simple volt drop calculations. CableCalc level P can be downloaded from **www.castlinesystems.com** free of charge.

● **For more information call 01293 871751 or visit www.castlinesystems.com**

Lightweight structure creates space

In a project led by Modus Workspace, Aluminium-Structures supplied their 100 series Quad system to create a framework to support AV and partition walls within a 30m x 10m open plan office. Our system was chosen as it is lightweight, available in bespoke lengths and could be powder coated black to blend in with the existing décor. The structure has made the huge space more 'flexible' as sections of the structure can be dismantled and rebuilt elsewhere.

● **For more information call 01707 390122 or visit www.aluminium-structures.com**

Multipurpose BACnet temperature controller from Titan

The BACnet enabled CCM-204 multipurpose temperature controller is designed to offer complete control flexibility for ventilation and air conditioning systems. With a vast array of inputs and outputs, the advanced application-specific controller can offer control strategies ranging from single stage heating or cooling to three-stage heating, venting and cooling. Designed and manufactured in the UK, the CCM-204 multi-purpose controllers can be used stand-alone, as part of a master/slave group or part of a building management system.

● **For more information call 0161 4066480 or visit www.titanproducts.com**

New kit meets MCS solar PV test needs

Seaward Solar has expanded its range of specialist test equipment for solar PV installation work, with a kit that provides the complete solution to MCS electrical testing needs. The MCS Test Kit enables all installers to meet the electrical test requirements of MCS and BS EN 62446 quickly, easily and safely. The kit makes the choice of system testing equipment much simpler by combining the multifunction PV100 electrical tester with the Solar Survey 100 irradiance meter, a clamp meter and supporting accessories.

● **For more information call 0191 5863511 or visit www.seawardsolar.com**

Telephone: 020 7880 7614 **Email:** lara.denton@redactive.co.uk

Forest Green Rovers point to a sustainable sport with PV array

The installation of a 46.92kW photovoltaic system onto a terrace roof for Forest Green Rovers FC is helping the Conference League team reduce its carbon footprint and earn an annual income for the Sustainability in Sport foundation. The Mitsubishi Electric array is the first in a series of green energy projects being undertaken by Sustainability in Sport – which was set up by former Manchester United star Gary Neville – aimed at reducing the environmental impact of sport.

● **For more information visit www.pv.mitsubishielectric.co.uk**

JS Air Curtains top the bill at BFI IMAX

The aesthetic design and controllability of the Rund air curtain from JS Air Curtains puts it top of the bill at the BFI IMAX cinema, London, whose reception and café were suffering from cold draughts at peak visitor times. Because of the location of the BFI IMAX in Waterloo, its main entrance is directly opposite a subway tunnel that funnels the wind straight off the Thames corridor into its reception area and café.

● **For more information call 01903 858656 or email sales@jsaircurtains.com**

Lochinvar announces triple relaunch

Boiler and water heating manufacturer Lochinvar has revamped three of its most popular product ranges, which will improve performance and safety in operation, while also reducing costs and installation time for contractors. The Knight, Charger and LBF direct gas-fired storage water heaters include a number of new features. The products are also now manufactured in Europe, considerably shortening lead times, as well as cutting transportation costs and reducing environmental impact. Lochinvar will hold its prices for 2012 at the same levels as last year.

● **For more information visit www.lochinvar.ltd.uk**

Cost-effective nurse call solution for North Tyneside Hospital

Many hospital trusts are upgrading ward facilities in a cost-effective way. Static Systems Group (SSG) has long recognised these needs and can call upon many years' experience in ward refurbishments. The latest refurbishment of four wards at North Tyneside General Hospital is just one example of how suppliers can sometimes be employed to work directly by a client rather than through tiers of management contractors. As principal contractor, SSG took full responsibility for all aspects of the scheme.

● **For more information call 01902 895551 or visit www.staticsystems.co.uk**

Total comfort with optimum function and design

TROX always offers the optimum diffuser, regardless of whether for inductive, displacement or procondive ventilation, by selecting the most effective and efficient air terminal device to obtain the best possible air quality in the occupied zone. This brochure shows a selection of new TROX products, including the XARTO swirl diffuser, available in 10 different face plates, and FLEXTRO plenum boxes, with a 50% weight saving and up to 60% transport and storage volume reduction without any comfort or performance reduction.

● **For more information visit www.troxuk.co.uk**

Johnson Controls appoints top systems integrators in UK

Johnson Controls, a global leader in delivering solutions that increase energy efficiency in buildings, has signed agreements with top systems integrators in the UK, providing access to its full range of products in integration, installation and turnkey projects in the marketplace, including the company's award-winning Metasys Building Management System (BMS). Deployed in more than 100,000 buildings worldwide, Johnson Controls' Metasys BMS is an innovative, IT-based open infrastructure that ensures all building systems operate together in harmony.

● **For more information visit www.johnsoncontrols.com**

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Electric heating from Dimplex – a real power house

Electric heating from Dimplex has been selected to help keep a major south coast power station running, with a selection of industrial fan heaters, panel convectors and radiant heaters, making sure workers are comfortable year-round. Fawley Power Station is an oil-fired facility, generating 1,000 MW of electricity from heavy fuel oil. It's available 24 hours a day, all year round, and the Dimplex heaters make sure all areas of the site offer a pleasant environment, whatever time workers clock off.

● **For more information call 0845 6015111 or visit www.dimplex.co.uk**

Hitachi alarm code App provides handy solution for engineers

Hitachi Air Conditioning and Refrigeration (ARG) has developed a handy new App for smart phones, that can also be viewed on the web, providing service engineers with fast, easy access to alarm codes and their meanings. The App is an alarm code identification tool, which also provides detailed 'troubleshooting' flowcharts directly on smart phones or via the web. This information is available 24/7, making diagnosing problems much easier – even for those not familiar with Hitachi equipment.

● **For more information call 01628 585394 or visit www.hitachiaircon.com/tomorrow**

Brighton house is top eco-property after Kingspan retrofit

A draughty, energy-hungry, Victorian villa in Brighton has been transformed into an energy efficient home, thanks to a retrofit using insulation from Kingspan. The Nook, owned by Two Piers Housing Co-operative, won funding of £150,000 from the Technology Strategy Board's competition, 'Retrofit for the future', which aims to reduce carbon emissions from the social housing stock by 80% by 2050. The Co-operative then provided a further £22,500, covering a shortfall in project costs, contingency, and decoration, to help transform the period house.

● **For more information call 01544 387384 or visit www.kingspaninsulation.co.uk**

St Mungo's selects air source heat pumps for community heating system

St Mungo's, a charity providing housing, health and employment services to homeless people, has chosen Mitsubishi Electric's Ecodan CAHV monobloc air source heat pump boilers for its new flats in Spring Gardens, Lewisham. The charity wanted a cost-efficient community heating and hot water system that used renewable energy and complied with stringent planning requirements. It needed to cope with the different heating loads required by a community scheme and deal with regular changes in tenancy and occupied hours.

● **For more information call 01707 282 880 or email commercialheating@meuk.mee.com**

Classroom ventilation units

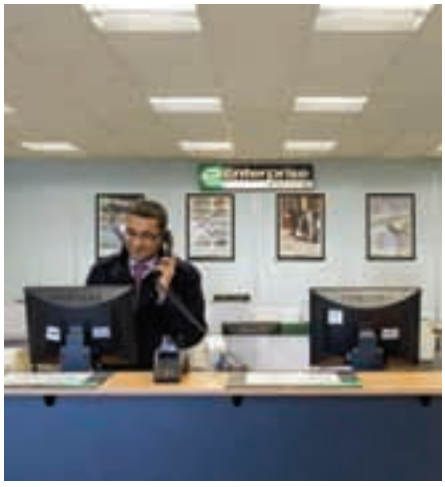
Aircraft Air Handling's 260mm-high classroom ventilation units are silenced to nr25. The plate recuperator is 60% efficient, with an air volume of 0-500 litres. Heating: LPHW/ELECTRIC. Cooling: CW/DX. Larger air volumes and bespoke units are available.

● **For more information visit www.aircraftairhandling.com**

Riegens supplies lighting energy savings for enterprise

An energy saving lighting scheme supplied by Riegens has been used at Enterprise Rent-a-Car offices as a pilot scheme in the north west of England. The scheme has been so successful that the company has chosen the system for retrofit in existing branches, as well as using it in any new build developments within the north west region. The original lighting installation at the three northern offices utilised mainly 1,200 mm x 600 mm louvered recessed fittings with 4 x 36W lamps, which were expensive to run.

● **For more information call 01376 333400 or visit www.riegens-lighting.com**



Baxi goes live with new solar PV collectors

Baxi, one of Europe's leading heating and hot water solution providers, has introduced the new Baxi Solargen – a high-quality, photovoltaic (PV) range of solar collectors for easy specification and installation in private and social housing developments. As a versatile, renewable energy option, the new Baxi Solargen range offers significant specifier benefits. They will help developers keen to meet Code for Sustainable Homes Levels 4 to 6 on their schemes, bringing an impressively low carbon rating under SAP.

● **For more information call 0844 871 1555 or visit www.baxiknowhow.co.uk**

Telephone: 020 7880 7614 **Email:** lara.denton@redactive.co.uk

SE Controls takes the heat out of new London apartment development

Safety and comfort are at the heart of a major new residential development by Linden Homes in Hammersmith, London, which is using a combined smoke and natural ventilation solution from SE Controls to protect residents in the multi-storey apartment building. Designed by HAP Architects, the new development is located on Hammersmith's Glenthorne Road and provides 81 apartments from ground floor to sixth floor penthouse level, together with a communal roof top terrace, private gardens and secure parking. SE Controls developed the smoke ventilation system to remove smoke from corridors and stairwells by using a mix of natural air buoyancy venting and fan extraction through smoke shafts. On floors one to five, smoke ventilation is provided by extract fans located in the building's cycle store, with replacement air being supplied through a ground floor and air inlet shaft, while the sixth floor is vented by a 1.5 m² vent in the top floor corridor and stairs by a similar arrangement at the head of the stairs.

● **For more information call 01543 443060 or visit www.secontrols.com**

Solatube launches Energy Care Optima range delivering exceptional thermal performance

The Solatube Energy Care Optima range meets the strict criteria set for passive house construction and is available as an upgrade for the Solatube Brighten Up Series. Independent tests show the Solatube Energy Care Optima range now meets the stringent criteria set by Passive House standards, with outstanding U-values. Independent testing was carried out to BS EN ISO 12567-1 2000 for windows and doors. The Solatube 160 DS Energy Care Optima produced a U-value of 0.5W/m²/K.

● **For more information call 01234 241466 or visit www.solatube.co.uk**

Let's focus on the now to show what renewables can achieve

Mitsubishi Electric used Ecobuild to highlight what can be achieved with existing renewable technologies to improve the energy performance of the nation's building stock. The company showed visitors to its stand to view live examples of new build and retrofits in both domestic and commercial settings that have been improved with renewable, energy saving equipment. Donald Daw, commercial director, said the extensive list covered Conference League football, solid brick Victorian buildings, high-rise housing, schools and offices.

● **For more information call 01707 282 880 or email domesticheating@meuk.mee.com**

New Condair CP3 from JS Humidifiers

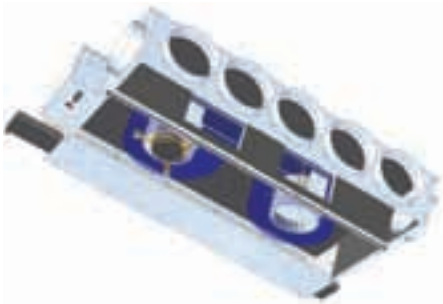
JS Humidifiers is launching the Condair CP3 electrode boiler humidifier. The unit is a very economic yet reliable steam humidifier that is easy to install, use and service. It can operate on standard drinking water and provides between 5kg and 90kg of steam per hour. JS is offering a 40% trade-in deal on any steam humidifier. Anyone who is replacing an existing commercial steam humidifier can get 40% off the price of a new Condair CP3, with a two-year warranty.

● **For more information call 01903 850200 or email dmarshallgeorge@jshumidifiers.com**

Advanced Air fan coils reduce carbon emissions

The highly energy efficient EPIC fan coil range from Advanced Air has specific fan powers (SFPs) as low as 0.2 W/l/s constant speed, or 0.15 W/l/s on VAV models. This system has a unique fan deck arrangement where the large EC fans are mounted horizontally instead of vertically. Much larger EC motors can be used – 250 watt compared to the existing 75 watt. With the use of a larger EC motor, many duties can be covered by utilising a single fan.

● **For more information visit www.advancedair.co.uk**



New heating systems revealed from Stokvis at Hevar 2012

Stokvis Energy Systems will feature an evacuated tube solar collector which, when coupled to a solar store and then linked to a plate heat exchanger, saves money by utilising free solar energy. Independent tests prove that the system produces more than 750kWh/m² per year in direct heating mode and a 850kWh/m² per year in pre-heat mode. Also featured will be the latest 'C' Series of Econoplate plate heat exchangers. Visit Stand V20, NEC Birmingham, 22 to 24 May 2012.

● **For more information call 0208 7333050 or visit www.stokvisboilers.com**

Telephone: 020 7880 7614 **Email:** lara.denton@redactive.co.uk

In a class of their own – Remeha boilers warm it up at MG Motor UK

Remeha Commercial's high performance boilers are driving up the energy efficiency levels at MG Motor UK with the effective delivery of low NOx, environmentally friendly heating. The British car manufacturer is renowned for the quality of its brand, design and manufacturing. No less famous is the historic Longbridge plant in Birmingham, which is the headquarters of MG Motor UK and home to the design, engineering and final assembly of the iconic MG6 range.

● **For more information call 0118 978 3434 or email boilers@remeha.co.uk**

smartMBR: the new generation of water recycling systems for buildings

Exploding city populations are demanding new ideas for water recycling solutions. HUBER is proud to announce the launch of a new range of innovative MBR systems to provide recycled water for large buildings, such as hotels, shopping malls and apartment buildings. The smartMBR systems have been designed to be attractive looking and simple to install and operate, while maintaining the high-build quality and technical standards for which HUBER is known. They come in six standard sizes, ranging in treatment from 10m³/day to 75m³/day. They treat conventional wastewater to produce clean, odour free and safe recycled water. While the distinctive clean design is already setting a new industry standard in visual appearance, this can be further enhanced by the use of graphics to enable a customer to decorate the units to their requirements. Appearance is important to city dwellers. The units are full stainless steel construction to ensure they are robust to handle the bumps of transportation, and a long operating life. All components and electrical cabling are pre-installed.

● **For more information visit www.huber.de/products/membrane-bioreactor-mbr/huber-smartmbr.html**

Manchester gets new data centre

With IT back-up a crucial aspect for ensuring business continuity and security, it is not surprising that facilities offering expertise in this area are growing. One such company is Telecity Group, which is about to open another new data centre in Manchester. With ambient temperature such an important aspect, making sure the M&E solution meets these exacting demands is even more important. EllisonAC was specifically selected as a partner by Telecity for its expertise in delivering bespoke containerised, packaged plant rooms.

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

InRak in-row cooling solution

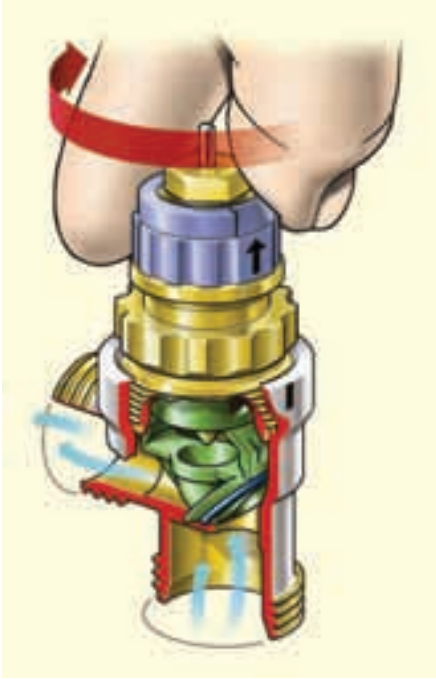
Global manufacturer Airedale International Air Conditioning has launched the InRak high performance, in-row cooling solution. Configured as DX (R410A) or chilled water, the InRak is designed to sit between industry standard server racks, where it precisely cools and conditions air in close proximity to the servers. The InRak accommodates the latest EC centrifugal fans, which offer up to 70% more efficiency at part-load, enabling the InRak to offer an EER of 39 and 56% annual power saving, compared with a conventional precision air conditioning unit.

● **For more information visit www.airedale.com**

Stop water hammer in seconds with bi-directional TRV from Danfoss

Danfoss, the leading heating controls manufacturer, has developed an instant solution to the common problem of system noise or 'water hammer' caused by chattering thermostatic radiator valves (TRVs), with the industry's first, and only, 'flow selectable' bi-directional TRV for domestic heating installations.

● **For more information call 0845 1217400 or visit www.danfoss-randall.co.uk**



New Polypipe ventilation website is instructive and easy to use

Polypipe Ventilation has announced the launch of its newly designed website, with a complete revamp, from content through to navigation and design, providing more in-depth information in an easy-to-access format. The design not only looks clean and fresh, but also makes for an effortless user experience. This has been further enhanced through improved navigation. Following Polypipe's acquisition of the goodwill and assets of Silavent, a dedicated Silavent landing page has been created.

● **For more information call 08443 715523 or visit www.polypipe.com/ventilation**

PRODUCTS & SERVICES

Telephone: 020 7880 7614 **Email:** lara.denton@redactive.co.uk

A Winning Combination from Havells-Sylvania

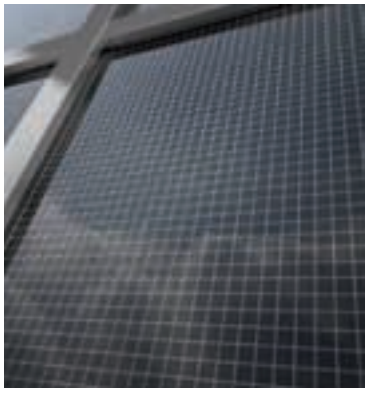
Drawing on its leading position in lamps and fixtures, Havells-Sylvania is pleased to announce that two of its renowned products are now available together in a single package. The Sylvania Superia CMI-T mini 20w lamp is teamed with Concord Beacon Spotlight (in spot or flood versions) for a combination of high performance lamp with award-winning spotlight to offer the perfect solution for retail and display lighting applications. The CMI-T mini 20W offers best in class performance for accent and display lighting.

● **www.havells-sylvania.com**

Schueco's Prosol TF+ thin-film PV is 30% more efficient

An up-rated version of ProSol TF, known as ProSol TF+, is now available from leading solar energy and building envelope specialist, Schueco UK. Designed as a BIPV product, ProSol TF+ is an advanced, higher-efficiency thin-film PV module that produces a 30% increase in electrical output over conventional photovoltaic thin-film products. The module's superior performance – typically 80 Wp/m² – is the result of a tandem cell structure that incorporates dual layers of microcrystalline and amorphous silicon, with a special laminate foil (PVB).

● **For more information email mkinfobox@schueco.com**



KSB wins Manufacturer of the Year Award at the British Pump Industry Awards

KSB Ltd has been presented with the prestigious 'Manufacturer of the Year Award' by the British Pump Manufacturers Association. The award was presented to KSB managing director Andy Ratcliffe at the annual British Pump Industry dinner on 22 March. The title of Manufacturer of the Year is the highest acclaimed celebration of excellence in the pump and related products industry. The winner of the award is voted for by pump industry peers and pump users in the UK.

● **For more information visit 01509 231872**

DIRECTORY

Your guide to building services suppliers

Telephone: 020 7880 6206 **Email:** cibsedirectory@redactive.co.uk

Air Conditioning

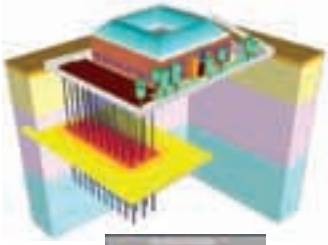
Air Handling

CAD Services

Controls/BMS/Controllability

LST Radiators

Energy Efficiency



Pump Packages

Are you One step ahead?

One Creative Environments Ltd believes better buildings and environments are created when traditional barriers between disciplines are removed, which is why all our engineers work alongside our in-house architectural design team to create high quality, low energy buildings.

Senior Building Services Engineer (Mechanical)

£40,000 - £45,000 dependent on experience

Building Services Engineer (Mechanical)

£30,000 - £35,000 dependent on experience

Location – Worcester

We're looking for mechanical engineers who can design robust, creative and high performance passive and active building services systems and support our architects in creating integrated design solutions.

The ideal candidates will have a well-developed understanding of regulations and the drivers for low carbon design in the built environment. In addition, the candidate for the post of Senior Building Services Engineer will have extensive client facing experience and an astute commercial awareness.

For full job descriptions and an application pack go to **www.oneltd.com** or email **Claire.Ruane@oneltd.com**
The closing date for applications is 1 June 2012.

INVESTORS IN PEOPLE

one

THAMES VALLEY POLICE

Property Services, Kidlington (Nr Oxford)

Building Services Engineer x 3 posts

Band 3H, circa £31,000 per annum with more for an exceptional candidate

Progression based on performance

Taking lead responsibility for the survey, maintenance, repair and replacement of Mechanical and Electrical Services installations and systems within one of the three geographical 'county' hubs as defined by the Local Policing Model. Duties will include ensuring the estates remain operationally functional, providing safe working conditions for users and are compliant with relevant regulations and best practices.

You'll have a recognised qualification in a building services engineering discipline e.g. BTEC, HNC or HND in Electrical or Mechanical Services; have a broad in-depth knowledge of a wide range of building services disciplines and have experience of managing projects and maintenance of building services installations within occupied buildings.

For further information and to apply online please visit **https://applyonline.thamesvalley.police.uk/alljobs** or telephone the recruitment line on **01865 855858** (internal **701 5858**) quoting reference **7493**.

Closing date: **Friday 11th May 2012**.

We are keen to recruit people with a wide range of skills and experiences and an understanding of cultural issues. We are particularly encouraging people to join us from black, Asian and other minority ethnic communities who are under represented in the Force.

Working in partership to make our community safer

www.thamesvalley.police.uk

BSV RECRUITMENT

Constructing Relationships
Engineering Careers

Tailored recruitment for the Construction and Engineering industry.

Mechanical Design Engineer

South East London | from £27-30k | Ref: 12743
A multi disciplinary consultancy who provide architecture, structural engineering, master planning and, of course, Building Services are looking to appoint. This unique role would appeal to Intermediate Mechanical Engineers looking for their next promotion.
Contact: darren.warmington@bsvrecruitment.co.uk

Chartered Design Engineer

C. London or Kent | from £45k | Ref: 12742
If you have added "Chartered" to your CV then this role is for you. This Consultancy employs engineers that know the "why" and not just the "how" to providing sustainable engineering solutions. Type "12742" into our job search. **Contact:** darren.warmington@bsvrecruitment.co.uk to learn more.

Intermediate Electrical Design Engineer

London | £32-36k | Ref: 12737
Award winning International multi-disciplined Consultant based in Central London. Ideally you should hold a recognised professional qualification and be able to demonstrate Energy-efficient and Sustainable Designs within High End Residential Projects. **Contact:** paul.bartlett@bsvrecruitment.co.uk

Junior/Graduate Electrical Design Engineer

Oxfordshire | £22-28k | Ref: 12741
Privately owned Building Services Consultancy focused on delivering Building Services and Sustainable Design. Due to recent significant project awards, they are looking to employ a Junior / Graduate Electrical Design Engineer to grow with their business with the full support and encouragement from the Directors.
Contact: paul.bartlett@bsvrecruitment.co.uk

For more vacancies please visit **www.bsvrecruitment.co.uk** or call today.

T +44 (0) 1483 768600 | E info@bsvrecruitment.com | www.bsvrecruitment.co.uk

b-a-r beeby anderson recruitment

Make us your first choice for Building Services Recruitment

"As well as gaining outstanding results they excelled through a highly professional, energetic and personal service which leaves other recruitment consultancies in the shade."
Mechanical Associate

".....gone above and beyond the call of duty on a number of occasions in order to maintain our business."
Resourcing Director

"They are approachable, trustworthy and demonstrate outstanding client care."
Mechanical Associate Director

"They have listened intently to my requirements and have visited me on a number of occasions in a bid to further understand my business."
Director

"Beeby Anderson Recruitment are a pleasure to do business with, and I have absolutely no hesitation in recommending them."
Electrical Associate

To discuss our services in more detail, call us on
+44 (0)203 176 2666
or browse our website **www.b-a-r.com**

Thinking of your future

Diamond Light Source is the UK's national synchrotron science facility. Located at Harwell Science and Innovation Campus in Oxfordshire, we enable world-leading research across a wide range of scientific disciplines and industrial applications.

Buildings and Services Design Co-ordinator

Ref: DIA0702/CG

Circa £45K

We require a highly capable engineer to manage the delivery of designs for buildings and building services installations. Duties will include interfacing with in-house scientific and engineering staff to prepare the brief and detailed room data sheets and then manage external design consultants, overseeing the development of detailed designs through to tender stage and contract award. Thereafter supporting the Construction Manager to resolve design queries through the construction stage to project completion. An essential requirement is to ensure that the structural, architectural, electrical and mechanical services are all co-ordinated to a high degree.

You will possess an HNC or degree in a relevant discipline, have significant experience of co-ordinating design works with a highly creative and dedicated approach. As an effective manager, strong team working and communications skills are essential, alongside the experience of manufacture, construction, testing and commissioning of systems. Good knowledge of Health and Safety including CDM regulations is highly desirable. A strong working knowledge of engineering drawings and Microsoft Office/Project is essential.

Diamond is committed to equality of opportunities for all, and offer a competitive salary (dependent upon skills, qualifications and experience), comprehensive benefits, an index-linked pension scheme and flexible working hours.

For an application form and further information including work permit and visa requirements for non-EU nationals please visit our website at www.diamond.ac.uk , telephone our recruitment line on 01235 778218 or write to us at the address below, quoting the appropriate reference number.

Closing date: 29 April 2012.

www.diamond.ac.uk

diamond

Diamond Light Source Ltd, Diamond House, Harwell Science and Innovations Campus, Didcot, Oxfordshire OX11 0DE

Talent acquisition consultants to the international Built Environment.

Talent Motion is working in partnership with a leading engineering design and consulting practice. Founded over 50 years ago, they are well known for their pioneering, technically challenging engineering design. Operating in over 40 countries, they are active in many fields including building engineering, civil and infrastructure engineering design. In the last 10 years the organisation has tripled in size. Despite the tough economic conditions, the practice has increased their global income by almost 10% in the last 12 months.

With significant growth across their East Asia business, we have been tasked to identify senior MEP design professionals currently operating outside of their local markets. As part of the senior leadership, you will be responsible for the development, design and management of large complex projects, procuring work, negotiating contracts and financial performance. As well as a market leading salary and benefits package, they offer a relocation package and Visa sponsorship.

Current requirements include:

Associate Director / Director – Healthcare
Hong Kong

Associate Director / Director - Building
Beijing

Associate Director / Director – Infrastructure
Bangkok

Associate Director / Director – Industrial
Shanghai

For a confidential discussion, please call Dominic Evans or Will Pearce on **+44 (0)207 614 3431.**
Alternatively, please forward your resume to **hello@talentmotion.com** **www.talentmotion.com**

Associate – Sustainability
London

Buro Happold

At the leading edge of sustainable design for the built environment, working on some of the world's most complex and challenging projects.

Our interdisciplinary team includes sustainability, low/zero carbon, economics, building physics and environmental modelling consultants, who provide expert advice based on extensive technical knowledge and the use and development of advanced simulation software.

You'll lead a global portfolio of projects collaborating with other disciplines in our London office, as well as forming international design teams with colleagues worldwide.

A passionate and innovative engineer you will assist in leading our team, bringing fresh insights and a strong background of building services design including energy modelling, evaluating building performance, procurement and strategy development.

To apply or find out more, please visit the **'Careers'** section at **www.burohappold.com**

Riverside Museum, Glasgow, UK **Image:** Buro Happold

FLAIR HANDLING SYSTEMS

Job title: **AHU Sales/Design Engineer**
Location: **Batley, West Yorkshire**
Salary: **c £50k**

An expanding and forward thinking manufacturer of bespoke air handling equipment requires a fully experienced air handling equipment sales/design engineer.

We currently manufacture a wide range of air handling equipment for a variety clients and applications.

Experience in packaged boiler/tank rooms would be an advantage though not essential.

The successful candidate will possess the self-drive required to undertake a leading role in the future development of an already thriving business.

The position will be generally office based, however we expect the successful candidate to allocate an unspecified amount of time to being out on the road securing new clients and business.

This is an excellent opportunity as, for the successful candidate, equity participation may be available on appropriate terms.

The package also includes a car / car allowance and the opportunity of participating in the Company Stakeholder Pension Scheme.

If you have the experience and strategic skills to meet this challenge please apply by sending your CV complete with a covering letter setting out how you would approach the role.

Please send your application FAO Mr Gerard Mitchell, Flair Handling Systems Ltd, Trident Works, Martin Street, Birstall, Batley, West Yorkshire WF17 9PJ

If you require any additional clarification you may call 01924 359752 for an informal discussion. *NO AGENCIES PLEASE*

blueprint recruitment

Specialists in Building Services Recruitment

Principal Mechanical Design Engineer | Portsmouth | to £50K | ref: 2680
An M&E consultancy is looking for an experienced mechanical design engineer to join the team. Candidates will have experience leading projects, representing the company at meetings and dealing with projects from initial concept to completion. Current projects include commercial and education.

Senior M&E Design Engineers | London | to £45K+ | ref: 2352
We are looking for senior level M&E engineers for a multi-disciplinary consultancy in central London. Ideal candidates will be Chartered, or working towards, and have airport and commercial project experience.

Mechanical Design Engineer | London | to £45K++ | ref: 2322
A large M&E contractor is looking for an engineer with significant experience in the design of railway stations. Ideal candidates will be degree qualified and be Chartered, or working towards.

Senior Lighting Design Engineer | London | to £42K | ref: 2281
Our client, a specialist lighting company, is looking for a senior engineer to help lead and develop the current team. Ideal candidates will have experience managing projects from concept through to commissioning and marketing for new business. Projects include residential and commerical.

Sustainability Engineer/Thermal Modeler | Essex | £30-£40K | ref: 2338
A D&B contractor is looking for a specialist thermal modeler / sustainability engineer to join the team. Ideal candidates will have experience of TAS / IES modeling and have specific knowledge of CFD, Part L, SAP and BREEAM.

Security Cleared Candidates | Berkshire | £HIGH! | ref: 1198
We are looking for Building Services engineers and cad technicians for a number of large government related projects. You will currently hold, or have held SC or DV clearance in the past 12 months and have extensive experience within your specialist area. Permanent and long term contract opportunities available!

t: 02392 603030

e: cv@blueprintrecruit.com **www.blueprintrecruit.com**
E3 & E5 Heritage Business Park, Heritage Way, Gosport, Hampshire PO12 4BG

b-a-r beeby anderson recruitment

Senior Electrical Design Engineer
London, £40k - £45k + Benefits

We are currently recruiting for an internationally renowned consultancy. The successful applicant will have previously worked on a variety of projects with a focus on projects delivery, initial and detailed design of building services, client liaison, attending design and client meeting along with conducting site surveys and writing specifications. Applicants will be degree qualified in electrical engineering or building services and ideally be a chartered engineer. BAR819/JA

Senior Electrical Building Services Engineer
South West, £37k - £43k + Benefits

Our client has been established for 150 years. Their work has been recognised through various engineering and environmental awards. They are able to offer exposure to varied and technically challenging projects including Data Centres, Commercial, Defence, Leisure, and Culture schemes. The ideal candidate will possess strong design skills, will be degree qualified, and will ideally be a chartered engineer or working towards CEng status. BAR795/JA

For further information and to apply, please call us on **+44 (0)203 176 2666** or email **cv@b-a-r.com**

Thinking of your future

Events & Training

NATIONAL EVENTS AND CONFERENCES

CIBSE Update on BIM
15 May, London
Understanding BIM's role in building services design, installation and operation.
www.cibsetraining.co.uk/conferences

The Facilities Show
15–17 May, Birmingham
All things facilities management.
www.facilitiesshow.com

Institute of Domestic Heating & Environmental Engineers (IDHEE) Conference
23 May, Loughborough
Design – the way to a greener future.
www.idhee.org.uk

All-Energy
23-24 May, Aberdeen
Renewable energy exhibition and conference.
www.all-energy.co.uk

Mind the performance gap – regulated vs unregulated energy
29 May, London
One-day conference examining actual performance and design.
www.cibsetraining.co.uk/conferences

ThinkFM
18 June, London
Industry leaders and thinkers talk about facilities management.
www.thinkfm.com

CIBSE GROUPS AND REGIONS

For more information visit **www.cibse.org/events**

Domestic hot water heating forum
8 May, London
SoPHE presents a technical seminar.
steve.vaughan@aecom.com

Daylight Group AGM, with colour habituation and the daylit interior
9 May, London
How natural light varies with place and time.
graham.phillips220@ntlworld.com

CIBSE AGM and presidential address
10 May, London
Registration is required.
www.cibse.org/agm

SoPHE Northern Celebration Dinner
11 May, Manchester
An evening event.
vwilliams@cibse.org

CIBSE Peninsular Site Visit
15 May, Plymouth (TBC)
Details to follow.
millham.orchard@tiscali.co.uk

Rainwater Harvesting
16 May, Manchester
Details to be announced.
m.atherton@dssr.co.uk

Institute of Local Exhaust Ventilation Engineers: annual general meeting
22 May
Details to be confirmed.
wally@inst-lev.co.uk

FläktWoods Factory Visit
22 May, Colchester
Lunch is included.
James.bourne@atkinsglobal.com

The Energy Challenge
24 May, Bristol
Peak oil and future energy trends.
millham.orchard@tiscali.co.uk

CIBSE South Wales region May Ball
26 May 2012, Cardiff
Being staged at the National Museum of Wales.
jno@neiloliver.plus.com

Part L/CIBSE South Wales annual general meeting
May 28, Cardiff
An evening event.
jno@neiloliver.plus.com

SOCIETY OF LIGHT AND LIGHTING

SLL Masterclasses – One building a minute
24 May, London
Speakers talk about refurbishment.
www.sll.org/events

CPD TRAINING

Visit **www.cibsetraining.co.uk** or call the events team on 020 8772 3672

Part B (Fire Safety) of the Building Regulations
3 May, London

Introduction to 11kV distribution and protection
3 May, London

Air conditioning inspection for buildings
4 May, London

Introduction to Renewables
7 May, London

Cooling and Refrigeration
9 May, London

Air conditioning basics 1: comfort, climate and heat gains
9 May, London

EPC update: conventions, audits and Green Deal
9 May 2012, Birmingham

Air conditioning basics 2: the air conditioning process
10 May, London

Introduction to Combined Heat and Power (CHP)
10 May, London

Rainwater harvesting and greywater recycling in the sustainable environment
15 May, London

Electrical Services Explained (three days)
15 May, Birmingham

Mechanical Services Explained (three days)
16 May, Birmingham

Display Energy Certificate Training
16 May, London

Design of heating and chilled water pipe systems
16 May, London

Introduction to Building Services
22 May, London

CIBSE update on BIM

15 May, London


www.shutterstock.com/Chuck Rausin

CIBSE's upcoming conference on Building Information Modelling (BIM) will look at the opportunities for success and the risks for the unprepared.

BIM requires innovative thinking, new working relationships and a creative approach to implementation in a field that once thought 3D CAD was the end game.

BIM is rapidly changing all stages of building services design, construction and operation, from conceptual building optimisation, to driving integrated project delivery and leading the occupier to a new era of sustainable whole-life operation. This upcoming event will cover:

- Moving business processes towards BIM;
- What systems do you need for BIM?
- Managing the evolving levels of BIM;
- Who controls the model? Who owns the data?
- Maintenance and post occupancy;
- Manufacturing, where are the products? and
- A selection of case studies;

For more information visit **www.cibsetraining.co.uk/conferences** or call 020 8772 3672.

AC inspectors – Lodgement Update
23 May, Birmingham

Power System Harmonics
23 May, London

Energy Efficient Heating
23 May, London

Sanitary and Rainwater Design using BS EN 12056:2000
24 May, London

AC inspectors – Lodgement Update
28 May, London

Air conditioning basics 3: air conditioning plant
29 May, London

Air conditioning basics 4: automatic controls and refrigeration
30 May, London

HSE guidance on control of Legionellosis explained
31 May, London

Introduction to Energy Efficiency
1 June, London

Fans for a greener future – the obligations of specifiers, manufacturers and users
6 June, London

Electrical Services Explained (three days)
6 June, Bristol

Practical controls for HVAC systems
7 June, London

Fire sprinkler systems: design to BS EN 12845
7 June, London

Mechanical Services Explained (three days)
11 June, London

Preparing FM and maintenance contracts
12 June, London

Specification Sales Manager
£40,000 to £50,000 a year Ref: ER12636

An experienced mechanical design engineer is required for an exciting new position within the Baxi Commercial Division Sales team for Central London.

Baxi Commercial Division are leading manufacturers and suppliers of Commercial boilers, Direct Gas Fired Water Heaters, CHP and associated Low to Zero Carbon products.

Reporting to the National Specification Sales Manager the role will entail assisting M&E Consultants with design and application of our product range within Commercial Properties together with generating and maintaining specifications.

Key activities include:

- Customer visits and, when required, site visits to support pre and post sale activities and developing client relationships;
- Analysis of hydraulic schematics, building layout drawings and project specifications to ensure the correct application and integration of the heating and hot water products and solutions offered by the Baxi Commercial Division;
- Regular feedback including, where appropriate, the use of the Company database and the production of reports; to assist with the Companies philosophy of continuous improvement;
- The delivery of Continual Professional Development (CPD) modules and targeted seminars to key customer groups.

The applicant must be qualified to a minimum of HND in Building Services Engineering (Mechanical) and membership of CIBSE is preferred.

This is a home based role, with benefits including Company Car, Laptop and Mobile phone.

If you meet our requirements and have the desire and determination to succeed in the role, please either email or post your CV, together with a covering letter including contact telephone number and email address, detailing your current salary and package details, as below:

By e-mail: vacancies@bdrthermea.com

By post: Emily Shenton, HR Department, BDR Thermea, Acorn House, Coventry Road, Warwick CV34 4RT

Closing date for applications: Thursday 31st May 2012

BAXI COMMERCIAL DIVISION

Andrews Water Heaters • Potterton Commercial • Baxi-SenerTec UK

Anglia Ruskin University

Cambridge & Chelmsford

BMS Engineer

Based in Chelmsford or Cambridge Ref: 000011-15
NPMA 15 £35,485

NPMA Ltd is a facilities management company and a wholly owned subsidiary of Anglia Ruskin University.

This challenging role is responsible for managing the controls and building management systems (BMS) across three campuses in Cambridge, Chelmsford and Peterborough, comprising more than 100,000m2 of building stock. The buildings range from classic 60's teaching buildings with radiators and opening windows through to cutting edge multi purpose buildings utilizing complex controls sequences for chilled beams, active natural ventilation, VRF and thermodeck systems. All of these buildings need to be kept comfortable for the changing needs of staff and students.

The role is responsible for managing the programming and control of the BMS, as well as the hardware within the buildings. Many of the buildings require constant fine-tuning and monitoring to maintain optimum comfort for the occupants. The successful applicant will have a strong focus on root cause and problem solving. The applicant will also be responsible for identifying opportunities for improvements and energy savings measures in the existing systems, specifying the work and hands-on management of contractors.

The applicant must a strong building services background with practical experience of how buildings work in occupancy. Good controls experience is a strong plus, but a more limited experience in controls is possible if the applicant is excited and willing to learn. Project management experience is desirable.

Closing date 9th May 2012

For further details and to apply please visit our website www.anglia.ac.uk. If you have any queries please contact our recruitment team on 0845 196 4927 or email jobs@anglia.ac.uk

We value diversity at Anglia Ruskin University and welcome applications from all sections of the community.

Positive about disabled people · Investors in People · Stonewall Diversity Champion

www.anglia.ac.uk

CMR

in complete control

CMR Controls manufactures low air pressure and air volume measurement sensors and control systems for standard air conditioning, clean rooms, sterile laboratories, containment facilities, and fume cupboard extract systems.

DPC CONTROLLER

Fast and accurate controls to drive high speed dampers or invertors. Full PID stand alone controls with BMS interface.

DPM PRESSURE SENSOR

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

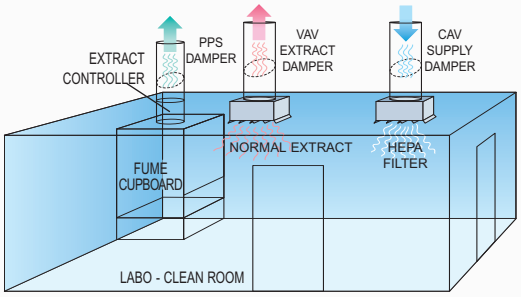
CAV AND VAV DAMPERS

Accurate air flow measurement with the unique CMR Venturi built into the airtight shut-off damper to control room pressure or constant volume.

Metal Damper

AIR MANAGEMENT SYSTEM

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



PPS EXTRACT DAMPER

Poly-propelene control and shut off valve incorporating the CMR Venturi Nozzle. This is essential when dealing with corrosive extract air especially from fume cupboard systems.

PPS Damper

PRECISION COMPONENTS FOR VENTILATION AND PROCESS CONTROL

CMR CONTROLS

A Division of C. M. RICHTER (EUROPE) LTD

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Basildon, Essex SS13 1LN. GB
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Tel: +44 (0)1268 287222
Fax: +44 (0)1268 287099
E-mail: sales@cmr.co.uk

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