

CIBSE

JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

November 2012

ON TARGET FOR GLASGOW

How London 2012's shooting venue
will be reloaded for future events

Morrell's challenge to industry
Keynotes and highlights
from the CIBSE conference

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Morrell points way to happy landings

Paul Morrell had some stark messages for delegates at last month's CIBSE Conference and Exhibition.

The chief construction adviser leaves his post at the end of November and used his keynote speech to call on industry to adopt radical approaches to cut carbon and fend off the economic challenge from China.

A reluctance to adopt new ways of thinking, such as building information modelling (BIM) and prefabrication, was holding back the construction industry, according to Morrell. He said BIM models could be used repeatedly to avoid the cost of designing projects from scratch. It's a valid point. As Morrell said, 'If you design the perfect layout, why keep redesigning it?'

The deep-rooted issue of class is still affecting industrial relationships in 21st century Britain, according to Morrell. The class divide in the sector sees architects at the top of the tree, followed by consultants, contractors and finally, subcontractors.

'Hard landings' are the result of the factionalism in the procurement chain and the 'determination to keep design and construction separate,' says Morrell. Lack of collaboration was borne out by panellists' comments in the ensuing debate, with examples of manufacturers and building services engineers being excluded from the design process.

But the conference wasn't all about soul searching, and elsewhere there was a real buzz around the Green Deal, despite

concerns as to how it would work in practice. Civil servants did their best to answer numerous questions from the delegate floor.

The core message was that the Green Deal would be targeting whole-house retrofits rather than improvements in isolation. This is good news, but puts more pressure on assessors to make the right call on the technical requirements of hard-to-treat properties.

Finally, congratulations to all the winners of the CIBSE Young Engineer awards last month, including Graduate of the Year Lee Tabis, a trainee design engineer at NG Bailey, and winners of the Employer of the Year – AECOM, Max Fordham and overall winner JDP.

Alex Smith, Editor

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In brief

SMITH NAMED TOP LOW CARBON CONSULTANT

Neil Smith, regional director at WYG Engineering, has won the CIBSE Low Carbon Consultant of the Year Award for 2012/13. The award recognises an outstanding contribution to low carbon performance via measured energy performance and carbon reduction calculated from submitted carbon return forms.

NEW YORK BENCHMARKS PUBLISHED

New York City has published the data from its first legally enforced energy benchmarking exercise. All privately-owned properties over 50,000 square feet are now required to measure and report their energy and water use annually. Nearly 1.8 billion square feet of built space was analysed.

LAHIFF TO GUIDE ENERGY CODES

ASHRAE fellow Ian LaHiff has been appointed as a special adviser to the US Department of Energy on developing and deploying building energy codes. He will help in areas such as residential and commercial code research and development; developing code change proposals; code compliance and energy code training.

Morrell blames 'class' for industry's inability to change



● Chief construction adviser says architects are still top of the food chain

The UK construction industry is still stuck in the Victorian era, operating on a hierarchical class system that will see the sector fail to meet its stringent carbon reduction targets if change doesn't occur swiftly.

That was the message from outgoing chief construction adviser, Paul Morrell, during his keynote speech at the CIBSE Conference and Exhibition.

He said the hierarchy still sees architects at the top of the food chain, followed by engineers, with manufacturers and installers at the bottom.

'This stems back to the Victorian idea that everybody should know their place,' Morrell told delegates.

This system, explained Morrell, is what leads to rowing between factions in the supply chain and, ultimately, is what gives clients a 'hard landing', invariably leaving them without the knowledge to run their buildings efficiently.

He went on to add that the

current economic situation was an impediment to the industry's growth, and that the sector has to become more client-facing and embrace new technology, like building information modelling, to progress.

During a debate on 'Retaining, recruiting and developing a robust pool of talent in the building services sector', Carol O'Neil, HR and training director at Cundall, told delegates that the quality of graduate engineers entering the industry was variable.

She said that, in many instances, young people have the necessary technical expertise but lack the wider communication skills needed to do the job.

'Communication is a real challenge, and that's a big part of what we do,' she added.

During the same debate, Nigel Clark, technical director of Hilsen Moran, said the lack of experience of working in a team was evident in many graduate engineers.

He said: 'We're making a point of moving them around the company so they get a different experience within the first two years and growing responsibility within the first four years.'

Turn to page 16 for an in-depth review of the conference

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Green Deal standards to underpin RHI

● Government wants to link payments to energy efficiency standards

The government plans to link Renewable Heat Incentive (RHI) payments to energy efficiency standards under the Green Deal scheme.

Ofgem is to manage the domestic scheme when it is launched next summer. Proposals for the commercial scheme, in operation since November 2011, are aimed at boosting sluggish take up of renewable heating technologies.

Householders planning to install renewable heating, or who have installed it since July 2009, will qualify for RHI payments, proposed to be 6.9-11.5p/kWh for air source heat pumps; 5.2-8.7p/kWh for biomass boilers; 12.5-17.3p/kWh for ground source heat pumps; and 17.3p/kWh for solar thermal technologies. Payments will only be made for installations covered by the Microgeneration Certification Scheme and that meet standards set for Green Deal installations.

The government has produced three documents as part of a consultation exercise into the RHI proposals and is inviting detailed feedback from the industry until December 7.

Domestic payments are expected to be made over seven years for each kWh of heat produced, and based on deemed heat usage. Householders living off the gas grid will enjoy higher tariffs.

'Our proposals aim to encourage even more uptake of clean green heating in industry and in our businesses,' said Energy and Climate Change Minister Greg Barker. 'We have also set out our views on long-term support for those who invest

in low carbon kit in their homes and we look forward to hearing your thoughts.'

He said the government was hoping to expand the commercial RHI by including heating only air-to-air heat pumps, with a proposed tariff of 0.97p/kWh. Air-to-water heat pumps are also to be included with a proposed tariff of 1.7p/kWh, but reversible air-to-air heat pumps are excluded.

Among other proposals are biomass direct air heaters (tariff of 2.1p/kWh under 1MW and 1p/kWh over 1MW); the extension of biogas combustion tariffs to installations over 200kW; the introduction of a specific tariff for heat from biomass CHP (4.1p/kWh); a new bioliquid CHP tariff (4.1p/kWh); and an increased tariff for deep geothermal installations.

For consultation documents go to the 'Technical resources' section of www.cibse.org



Funding for cities to act as guinea pigs

The government has released a fund of £12m to seven English cities so they can test elements of the Green Deal and kick-start projects.

The funding, which is part of the £200m launch fund announced by DECC earlier this year, is going to Birmingham, Bristol, Leeds, Manchester,



Newcastle, Nottingham and Sheffield. They will trial parts of the Green Deal framework, including assessment and installation through community-wide home retrofits. The cities expect to improve up to 2,500 homes and commercial properties. All of the cities are also proposing to generate match funding and/or provide direct support themselves.

It is hoped that the test programme will raise awareness of the Green Deal through community engagement and show homes, and provide support to local supply chains including trained Green Deal advisors and registered installers.

Funding for the cities was allocated by population, with the total amount being adjusted based on the nature of the proposals (including how closely the proposals mimic the Green Deal, the range of initiatives, properties and measures and the overall deliverability of the initiatives), according to a DECC statement.

Battery life seen as more important than efficiency

US consumers now favour energy-efficient appliances, but not necessarily for the right reasons, according to a report from the US Energy Information Administration.

It studied the market penetration of Energy Star products (those with high energy efficiency ratings) and found that they account for almost 100% of the sales of some appliances like dishwashers and televisions, but just 17% of desktop computer sales and 21% of the market for freezers.

Consumer analysts said that energy efficiency was only regarded as a secondary benefit. Energy Star notebook computers command 75% of the market, but they also have longer battery life, which is seen as the primary driver for buyers.

Cash boost for early adopters

The government is seeking to give its flagship Green Deal scheme a 'flying start' by offering early adopters a cash reward.

Financial packages to pay for Green Deal projects will be available from January 28 and households that apply early could also receive as much as £1,000 cash back. The more work they have carried out, the more cash they will receive.

The cash payments will come from a £125 million fund, but the best deals will be available from the first £40m to try and persuade households to be early adopters.

Energy Secretary Ed Davey urged businesses 'to take advantage of this transforming market', describing the launch as a critical period for the industry. 'Whatever your business does in this sector, the Green Deal will have an impact. So I say to businesses large and small – gear up, get training and get ready to take advantage of the Green Deal,' he said.

To qualify for the cash back, the householder must have a Green Deal assessment and then install at least some of the recommended improvements. Davey added: 'This cash back offer will help get the Green Deal off to a flying start.'

The Green Deal is the government's new initiative to transform the UK market for energy efficiency. It will enable householders and businesses to pay for energy efficiency improvements, like insulation, through expected savings on their energy bills.

Schools urged to keep it simple

New design guidance for school buildings stresses the importance of using simple, standardised solutions to improve quality and cut costs.

The guidance was produced in response to last year's James Review, which set out the case for greater use of standardisation in school buildings.

The Department for Education (DfE) designs, developed by the Education Funding Agency (EFA), encourage the adoption of 'simple rectilinear forms' to meet the targets of the Priority School Building Programme within shrinking public sector budgets.

The designs will suit a range of sites and orientations, according to the DfE and there is a 'kit of parts' available for more awkward sites where straight lines are not possible or where existing buildings must be incorporated into the design.

Copies of the guidance can be downloaded from the DfE website at www.education.gov.uk

Buyer beware on energy tariffs

The Prime Minister's announcement (subsequently hastily watered down by Ofgem) that that energy suppliers would be forced to give customers their lowest tariff has undermined confidence in the government's decision-making over energy policy, according to B&ES head of sustainability David Frise.

'You have to have a free market – people should be able to choose the product they want at the price they want – you can't nanny them,' said Frise.

'If you force one tariff on everyone, then that tariff will have to be a higher one so the suppliers can make a profit.'

CIBSE technical director Hywel Davies said: 'Energy tariffs are currently complex, and are not transparent to consumers.'

'But, as the Prime Minister appears to have learned, simplification is not a simple task.'

Passive approach crucial to avoid decades of high bills

Willmott Dixon's Passivhaus development in Highgate



Country faces 'disastrous legacy' of poor standard housing

Poor indoor air quality (IAQ) and high energy usage are the consequences of low levels of investment in building quality, according to research by the University of East Anglia's Adapt Low Carbon Group.

'There is huge concern about the lack of investment in housing and the housing shortage,' said Dr Bruce Tofield, author of the *Delivering a Low-Energy Building* report. 'This report highlights another housing crisis, which is less visible today but could be equally damaging over time.'

'Building as we do today could create a disastrous legacy, spanning many decades of higher bills, poorer health, and the country becoming unable to meet climate change targets.'

However, the UEA team that spent four years on this

research, which studied building performance standards in the UK, Germany, Sweden and other parts of Europe, added that both crises could be solved

Delivering a low-energy building recommends building ultra-low energy Passivhaus buildings that require up to 90% less energy for heating and cooling. As well as saving money in the long term, setting Passivhaus standards would accelerate innovation, skill formation and competitiveness.

The report calls for a radical reshaping of the traditional procurement model, arguing that poor teamwork across the construction supply chain leads to defects and is the main cause of buildings using more heating than predicted by both design engineers and in energy performance certificates (EPCs).

'Building to the Passivhaus quality standard is the route to better homes, lower bills, and better returns' said Tofield. 'Far-sighted developers now realise that this

is more cost-effective because maintenance will cost less, prices will be stronger, and rental streams better protected.'

The research details how low-energy buildings can be delivered, often at no extra cost.

It also shows how other industries have created the necessary processes, and highlights the financial benefits that come from the higher productivity of people working in low-energy buildings.

Best-practice examples cited in the report include UEA's own Elizabeth Fry Building and the Broadland Housing Group in Norwich, which is embarking on the UK's biggest-ever Passivhaus project.

Further economic benefits will include a high performance and competitive construction industry, internationally competitive supply chains, and the elimination of fuel poverty, the researchers claimed.

See 'Opinion', page 26

All party group calls for green evidence

The All Party Parliamentary Group for Excellence in the Built Environment has launched an inquiry into sustainable construction and the Green Deal. It calls on firms, organisations and individuals to submit evidence of best practice, as well as identifying challenges and barriers to the adoption of sustainable design.

It wants to consider the part that legislation is playing in this market, as well as seeing if the industry is 'playing its part'. The inquiry will also consider whether sustainability is suffering in the recession, and what more can be done to promote green construction in public and private sector building projects.

It will look in detail at the Green Deal and ask if it is the right policy. The committee would like all evidence submitted by 30 November. This cross-party group will then hold sessions from January to March next year, so that selected organisations can present oral evidence in support of their submissions, with the findings published before the parliamentary recess next summer.

Sir Tony Baldry, chairman of the group, said: 'If the UK government is to meet its challenging targets for reducing carbon emissions, then much has to be done to take carbon out of the construction and use of our buildings and facilities.'

MILKING IT

NG Bailey says off-site manufacture has helped it knock seven weeks off the delivery of a project at a £150m dairy in Aylesbury. It delivered 17 services modules in only five weeks; the firm said it would have been a 12-week job using traditional construction methods at the Arla dairy. The modules form a 204m run of main services distribution and contain piped services including chilled water, low temperature hot water heating, steam and condensate, process ice water and glycol circuits. It also includes high and low voltage distribution and separate containment runs for data and building management system control cabling.



Clarity needed over allowable solutions

● Potential investors in future zero carbon homes demand more details on the role and cost of 'allowable solutions'

A report from the Zero Carbon Hub, which explains how 'allowable solutions' would work, has received high-level support from clients, financiers and engineers.

It considers the role of investment in six potential solutions that could keep the government's policy on track to deliver zero carbon homes from 2016.

Allowable solutions is a way of accounting for some of the carbon emissions reductions that are difficult to deliver on site. The Hub calculates that residual emissions per property could amount to 10 to 14 Kg CO₂/m²/year, depending on the type of home. For a typical home, an allowable solutions payment would be about £1,200, based on the proposal that they should cover a 30-year

period and be paid at £46 per tonne of carbon.

Allowable solutions under consideration would require housing providers to invest in the Green Deal; district heating; social housing retrofits; renewable energy projects; embodied carbon initiatives; and low-carbon lighting.

The new report, *Allowable Solutions – Evaluating Opportunities and Priorities*, measures the potential solutions against a series of critical success factors.

The report identified a need for certainty from government and agreement on key operational aspects of the framework, including price, verification and fund management. The report also recommends a programme of trials to test the proposals and examine the real-life practicalities.

The report findings were widely welcomed. John Slaughter, director of external affairs at the Home Builders Federation, said there was considerable concern among developers about

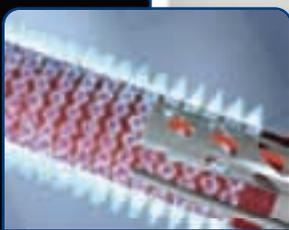
the current lack of certainty – particularly the cost of the allowable measures. He called for the government to take the report's findings on board and develop 'a workable and credible system'.

E.ON's Marco Marijeywyc added that the report had 'the potential to catalyse cross sector innovation and the economic rejuvenation of our communities'.

Guy Battle from Deloitte LLP claimed it was 'an innovative mechanism that will permit developers to deliver this requirement cost effectively'.

Battle added that it could 'harness the creativity of the industry to inspire innovation in materials and systems, to create new jobs, drive growth and establish the UK as a leading low carbon economy'.

A copy of the report can be downloaded from: www.zerocarbonhub.org



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Concerns grow after nuclear switch-off

German Chancellor Angela Merkel is facing a popular backlash over rising energy prices 18 months after switching off her country's nuclear power following the crisis at the Japanese Fukushima plant.

Energy consumers face 50% rises in energy taxes next January to pay for a huge increase in renewable power with a typical family of four expected to pay an extra €250 a year. A special tariff of 5.3 cents per kilowatt hour will be levied on users – up from 3.6 cents – but many politicians fear that the country will still be left with an energy gap that could result in increased use of coal-fired power stations.

'Electricity should not become a luxury item,' said Michael Fuchs, a leading figure in Merkel's coalition government. 'The energy switchover will only be successful if it is met with broad public support.'

Germans swoop on UK ductworker

Major UK ductwork contractor Senior Hargreaves has been sold to German engineering group M+W.

The takeover of the £20m turnover firm was described as 'logical' by the Hargreaves senior management and will result in it changing its name to Hargreaves Ductwork.

The Lancashire-based company employs 200 staff and provides ventilation systems to a range of major commercial and industrial users.

'I am very pleased to announce the disposal of Hargreaves to M+W and to wish the management and employees of Hargreaves all the very best for the future with their new, and more logical, owners,' said Senior's chief executive Mark Rollins.

M+W is a global engineering, construction and project management company based in Stuttgart. It had sales of €2.5bn last year and employs 7,000 staff.

'The Hargreaves team has a long history and extensive experience in technology-based projects, which fits well with our strategic plans for sustained growth in our target markets of science and research, technology manufacturing facilities and energy-based programs,' added Peter Greenhalgh, chief executive of M+W UK.

NG Bailey engineer is Graduate of the Year



SIMON WEIR

● Winner scoops trip to Dallas as VIP guest of ASHRAE

Lee Tabis, a 22-year-old trainee design engineer with NG Bailey, has been named the CIBSE ASHRAE Graduate of the Year 2012. He received his award from CIBSE President David Fisk during the CIBSE Young Engineers' Awards, sponsored by Lochinvar and Ruskin Air Management, held at the Institution of Mechanical Engineers on October 11.

JDP was named the Employer of the Year for its outstanding record of investment in the education of young engineers and its advanced apprenticeship programme.

Lee, a graduate of Leeds College of Building, was selected from a shortlist of seven outstanding young engineers. Each finalist was challenged to give a presentation to an audience and a distinguished judging panel that included the presidents of CIBSE and ASHRAE (the American

technical society) and last year's Graduate of the Year Angela Malynn.

Lee's prize is a trip to Dallas, Texas to attend the ASHRAE Winter Meeting in January. There he will be a VIP guest of the Society and will serve as CIBSE's 'ambassador' for young engineers.

Chris Marien, of Brunel University, and design practice Calfordseaden was the runner-up and received a cheque for £500 from the Rumford Club. Imran Shaikh, a graduate of BITS Pilani in India and a design engineer with CKR Consulting in Dubai, was placed third and received £250.

Also shortlisted were Dinachi Onuzo of Imperial College and AECOM; Georgina Donnelly from Cambridge University and Arup; Baljit Bhogal of Coventry University and WSP; and Tom Greenhill from Bristol University and Max Fordham.

Each finalist had just five minutes to address the topic: 'How will I help to engineer better communities?' This subject was chosen to complement the theme of ASHRAE President Tom Watson's talk to the UK industry on 'Broadening Horizons', which was another highlight of the packed programme.

David Warriner received the IMechE Construction and Building Services Division (CBSD) special achievement award following the inaugural CBSD lecture by Professor Tony Day.

In the Employer of the Year Awards, AECOM was named winner of the large company category; Max Fordham won the medium company section; with JDP taking the small employer award, as well as the overall accolade. Shortlisted were Hoare Lea; Cundall Johnson and Method. www.cibse.org

BIM the focus of new design framework

BSRIA's Design Framework for Building Services (BG6) has been updated to help project teams manage design activities related to building information management (BIM) as well as the production of building information models.

The research body said the third edition of the framework was important because greater use of BIM 'can help avoid confusion amongst the project team by defining more clearly the different stages of model development'.

'It can also assist with avoiding the conflicts that sometimes occur during the handover of information from designer to installer,' BSRIA added.

There are now direct references to BIM

deliverables, including the different types of model appropriate for design of building services; definitions of the range of building information models for building services design; clearer sub-division of RIBA Stage F1 into parts dealing with detailed design and co-ordination of building services; along with an overview of the activities required to deliver Soft Landings.

However, BSRIA added that this would only be an 'interim document', as the pace of change and wider adoption of BIM meant that a fourth edition of the Framework would be required 'within the next couple of years'.

The Framework is priced at £50, or is available as a free download to BSRIA members.

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Members will soon be able to renew their CIBSE subscriptions for 2013.

A statement of fees and how to pay will be sent to members shortly, with renewal due on 1 January 2013.

There are several payment methods available. UK residents with a UK bank account can pay by direct debit, thus benefitting from a 5% discount.

Members can also pay by direct debit in three instalments, although no discount will be available with this option.

Members overseas can pay by continuous credit card authority. These payments will be collected on 1 February 2013.

Alternatively, renewal can be completed online at www.cibse.org/members,

by phone with a debit/credit card, or by sending a cheque. Members should also check that the Institution has their correct address details at www.cibse.org/members

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- Many networking opportunities
- Extensive opportunities for professional development

Winners of Employer of the Year Awards revealed



Ant Wilson accepts the award on behalf of AECOM

JDP, Max Fordham and AECOM have been confirmed as winners of the Employer of the Year Awards 2012.

The awards recognise employers

who have shown excellence and innovation in developing the engineers of the future.

For the first time, the awards took place alongside the Graduate of the Year Awards, as one single event sponsored by Lochinvar and Ruskin Air Management.

Each of the winning companies showed particular commitment to championing newly qualified engineers in the building services engineering industry, and in supporting them in

employment and education. JDP won the award in the small company category, with Max Fordham winning the medium company category, and AECOM taking the large company award.

JDP was named the overall winner for its outstanding record of investment in the education of young engineers and its advanced apprenticeship programme. Nigel White, managing director of JDP, said: 'We are pleased to be recognised by CIBSE for our commitment to supporting the development of our young engineers through internal training, formal education and an advanced apprenticeship programme.'

The winners received a trophy and £1,000 of CIBSE training vouchers.



Alasdair Reid collects the certificate for Max Fordham



Nigel White collects the award on behalf of JDP

Volunteer referees needed for CIBSE Technical Symposium 2013

The CIBSE Technical Symposium has invited 50 authors to submit papers, all of which will need to be peer-reviewed. Therefore, we are seeking volunteers to act as referees. Any members and fellows who are willing to review papers should contact

the Institution, providing a few sentences on their practical areas of technical expertise.

As well as helping to ensure that the papers presented are of a high standard, it will give referees a chance to find out about some of the developments that will be

presented at the event. Anyone interested in helping should email groups@cibse.org

The CIBSE Technical Symposium will take place on 11 and 12 April 2013 at Liverpool John Moores University. For more information visit www.cibse.org

ALL PICTURES BY SIMON WEIR



Deivy Riquier collects his award from David Fisk

Awarding excellence

- The Presidents Dinner, held last month, highlighted some of the talent within CIBSE membership. A range of awards were given, and CIBSE congratulates all who received them



David Chambers (centre), with Lisa Jo Taylor, from Hays Building Services, and David Fisk.

Ken Dale Travel Bursary

Deivy Riquier is the winner of the CIBSE 2012 Ken Dale Travel Bursary. Riquier, from France but living and working in the UK, investigated 'Advanced district cooling technologies: an international insight'. His study tour has so far included two countries, Sweden and Japan, and he was due to visit the USA at the end of October.

The Ken Dale Travel Bursary, now in its fifth year, is made possible by the kind donation of the family of the late Ken Dale, a past president of the Institution of Heating and Ventilating and an Honorary Fellow of CIBSE. The bursary makes awards available to CIBSE members at the development stage of their career who wish to spend three to four weeks outside their own country researching aspects connected to their field of work and which

will benefit CIBSE, their employer, their clients and the profession of building services engineering.

Hays Building Services President's prize

David Chambers, from Leeds Metropolitan University, won the 2012 CIBSE Undergraduate Award. Chambers, who studied for a BEng Hons in Building Services

Engineering, won with his project entitled, *Leeds Metropolitan University Rose Bowl "Phase 2 LZC feasibility study and building services design and integration report*. He won a £500 prize and trophy.

The CIBSE Undergraduate Award,



Dr Robert Hoare collects his award from Lady Happold



David Coley, Matthew Eames and Tristan Kershaw with David Fisk

sponsored by Hays Building Services, is designed to encourage students to develop their potential and aim for excellence. It is awarded to students in their final year of a building services course accredited by CIBSE, recognising their academic achievements at the end of their course of study.

A trophy was also awarded to Professor Alan Newall, representing Leeds Metropolitan University, as acknowledgement of its achievement.

Andrew Taylor, from Coventry University, and Christopher Vingoe, from University of Leeds, were both runners-up.

The Happold Brilliant Award

The Happold Brilliant Award 2011-2012 was awarded to Glasgow Caledonian University, and accepted by Dr Robert Hoare on behalf of the university. This annual award recognises excellence in the teaching of building services engineering.

Technical awards

Two awards for technical papers published in the Building Services Engineering Research & Technology (BSER&T) were awarded on the night.

The Napier Shaw Bronze Medal for best paper on a research topic was awarded to David Coley, Matthew Eames and Tristan Kershaw for their paper on 'The Creation of Future Probabilistic Design Weather Years'.

The Carter Bronze Medal for best paper relating to application and development went to Rory Smith, Richard Peters and Elizabeth Evans for their paper, *The appraisal of lift passenger demand in modern office buildings*.



Rory Smith and Richard Peters with David Fisk



Obituary

Clifford Stanley Howard

By James Fretwell

● **CIBSE Fellow is remembered for his contribution to the industry**

Clifford Stanley Howard joined the industry in 1956 as a student apprentice with Norris Warming. He became a student member of the Institution of Heating and Ventilating Engineers (IHVE) the following year, and was later chairman of the London branch. He worked as a project engineer at

Matthew Hall, before switching to consulting engineering with DSSR. He also worked for Dunwoody & Partners, and Hoare Lea & Partners before setting up his own consultancy. He worked for a wide range of clients and projects, from private housing to hospitals and work for the Ministry of Defence, to railway projects and airport developments, both military and civil. Throughout his working life Cliff was an active supporter of CIBSE, and became a Fellow

in 1982. He was an associate lecturer at Brunel University, where he was awarded an Honorary Fellowship. A consummate professional, he had the ability to disseminate his knowledge to students around the world, which earned him a great debt of gratitude from so many who prospered through his mentoring skills. Cliff was a Freeman of the City of London and a Liveryman, his spare time activities including the charitable aspects of Freemasonry. He died in July this year following an illness. Our profession needs engineers of the calibre and constitution of the much-respected Clifford Stanley Howard; he will be well remembered and missed by so many. CIBSE extends condolences to all his family and friends.



New members, fellows and associates

FELLOWS

- Brailsford, Richard Martin**
St. Albans, UK
- Chan, Kan Ip Philip**
Kowloon, Hong Kong
- Chan, Sheung Yan Kenneth**
North Point, Hong Kong
- Day, Antony Robert**
Bishop's Stortford, UK
- Hancock, Paul Alan**
Shipleigh, UK
- Kinson, Peter Charles**
Slough, UK
- Landa, Gurbaksh Singh**
Leeds, UK
- Li, Kin Kwok Kenny**
Sai Kung, Hong Kong

- O' Mahony, Denis**
Cork, Republic of Ireland
- Wong, Lok Toon**
Singapore

MEMBER

- Abdurahman, Ross Dara**
Edmonton, Canada
- Caneborg, Jan Lars-Ove**
Dubai, United Arab Emirates
- Chan, Pak Ho**
Tai Kok Tsui, Hong Kong
- Chan, Cheuk Him Edwin**
Hong Kong, Hong Kong
- Chan, Wai Tung Matthew**
New Territories, Hong Kong
- Chapman, Robert**
Birmingham, UK

- El Sayed, Omar**
Beirut, Lebanon
- Fawzi, Ahmed**
Dubai, United Arab Emirates
- Gaines, Simon**
Auckland, New Zealand
- Gillies, Peter John**
Olney, UK
- Ho, Yung Ching**
Singapore, Singapore
- Lau, Wing Cheong Simon**
Hong Kong, Hong Kong
- Leung, Tai Wai**
Tseung Kwan O, Hong Kong
- Lim, Hong Teng**
Singapore, Singapore

- Mak, Tsz Fei**
Sheung Wan, Hong Kong
- Price, Oliver James**
Dubai, United Arab Emirates
- Still, Michael**
Leatherhead, UK
- Stirling, David Graeme**
Melbourne, Australia
- Tai Pui Ling, Kowloon**
Hong Kong
- Taylor-Hannell, Douglas Raymond**
Doha, Qatar
- Tezkavusan Kircaali, Seda**
Doha, Qatar

- Varghese Methrail, Abby**
Doha, Qatar
 - Wong, Nai Shing**
Kowloon, Hong Kong
 - Wong, Fai Pun Brian**
Hong Kong, Hong Kong
 - Wong, Kengwoon Gorman**
Wanchai, Hong Kong
 - Yip, Kai Lun**
New Territories, Hong Kong
- ASSOCIATE**
- Ahmed, Alik**
South Shields, UK
 - Gillies, Peter John**
Olney, UK
 - Matheson, Graeme John**
Dundee, UK

- Skibicki, Marcin**
Motherwell, UK
- LICENTIATE**
- Avery, George Allan**
Colchester, UK
 - Bates, Richard Paul**
Didcot, UK
 - Campbell-Drummond, Anthony**
Birmingham, UK
 - Norton, Phillip**
Abbot Langley, UK
 - Roberts-Arnold, John George**
Bristol, UK
 - Stevens, Chris**
Milingavie, UK

FELLOWS



Kin Kwok Kenny Li

Kenny Li has more than 25 years' experience in the electrical engineering field on turnkey projects for electrical, building service, intelligent control and communication systems. He is currently a sales and operation director with ABB company in Hong Kong.



Wong Lok Toon

Wong Lok Toon is a director with Squire Mech, a leading building services consulting firm in Singapore. He has more than 36 years' experience in building services, accumulated through his involvement in design, installation, operation and management of many different types of buildings in various countries. He actively promotes sustainable design and construction productivity.



Peter Kinson

Peter Kinson started in the industry in 1970 at Andrews Weatherfoil as a technical apprentice. He is now an associate public health engineer

at Ove Arup & Partners. Kinson leads a team of public health and fire engineers in the Arup London office, developing a wide range of new-build and refurbishment projects both in the UK and abroad, from concept to construction. The range of his projects include healthcare, laboratories, data centres, office and industrial buildings.



Kenneth Chan

Kenneth Chan has more than 32 years' experience in building services engineering, specialising in plumbing and drainage system. He is the vice president of The Hong Kong Federation of Electrical and Mechanical Contractors, chairman of the Supervisory Council and past president of Hong Kong Plumbing and Sanitary Ware Trade Association.



Gurbaksh Singh

Gurbaksh Singh is a technical design manager for Crown House Technologies, a subsidiary company to Laing O'Rourke. He has more than 25 years' experience in heating, ventilating and air conditioning designs, project management, installation supervision and

commissioning. As a qualified energy assessor he focuses on low energy and low carbon solutions.



Denis O'Mahony

Denis O'Mahony is the managing director of Matt O'Mahony and Associates, a Cork-based building services engineering and energy consultancy firm with an extensive private and public body client base, working mainly in Ireland. O'Mahony has been with the business for 15 years, having previously worked in a multinational engineering role at Lintel.



Professor Philip Chan

In 2000, Professor Philip Chan was elected as expert of industrial engineering by the Chinese Mechanical Engineering Society and certified senior mechanical engineer in 2009. He actively contributes to community services in engineering fields, including honorary president of the Hong Kong Institution of Incorporated Engineers (HKIIE) and professional assessment assessor of the Hong Kong Institution of Engineers (HKIE), among others. He was also recipient of the Prime Award for Outstanding Leader in 2011.

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'THE FUTURE IS HERE'

Innovate or die – that was the message to the UK construction sector from outgoing chief construction adviser, Paul Morrell, who warned of growing competition from China at the CIBSE Conference and Exhibition. Alex Smith, Carina Bailey and Mike Sewell report



UK industry has to fundamentally change and introduce radical thinking if it is to compete against the industrial powerhouse of the east, warned outgoing chief construction adviser Paul Morrell.

'Change really is coming – and it has to. The future is already here,' Morrell told delegates at this year's CIBSE Conference and Exhibition.

Speaking at the London Olympia event last month, he said that the revolution required in the UK construction sector still hadn't occurred, with a number of 'old' problems continuing to persist, including: the fact that industry either over-exaggerates or under-appreciates technological change; that change is not happening as fast as one would think; that change is not popular; and the industry's 'fashion for retro' disguises progress to make it feel a bit more comfortable.

'There's not enough cash and there's too much carbon – these ought to be very powerful drivers for change if there were no others. But now we face new competition – China,' exclaimed Morrell.

Sounding a word of warning, he said: 'They want everything in the single market. It's modern progress that's massively productive and we can't compete with it.'

Speaking of the extraordinary competitive power of Asia, Morrell said: 'Were I 30 years younger, I would be heading east.' He added: 'We have to have something that China wants to buy. How do we apply our skills to it?'

'We are not an industry that exports, and we have to. We have to make our living beyond our shores.'

As well as a skills shortage, one of the biggest challenges facing Britain is the 'class'

system, which is endemic in the sector.

The consequence is a hierarchical system that sees architects placed at the top of the construction tree, followed by consultants and then contractors, with the tradesmen who actually install the systems and products at the bottom. These factions row, ultimately leading to a 'hard landing' for the client, who is invariably left with buildings that don't work and are impossible or expensive to maintain, explained Morrell.

He described the tradesmen as 'the innovators' and part of the solution: 'These people are pleading to get their ideas at the table.'

In terms of IT, Morrell said industry needs to 'stop being scared' of it, and utilising software simulation, such as building information modelling (BIM), will introduce new ways of thinking, such as prefabrication, which Morrell said he expected to 'challenge a lot of things'.

'If you design the perfect layout, why keep redesigning it?' One example of where this

6 One of the biggest threats facing Britain is the 'class' system, which is endemic in the sector, with architects at the top and tradesmen at the bottom



Catching the cowboys

A heartfelt plea from a delegate provided a stark reminder of the threat that could be posed by 'cowboy builders' trying to exploit the Green Deal.

She challenged those responsible for rolling out the Green Deal to make sure elderly and vulnerable people are not exploited by unscrupulous builders.

'Alarm bells are ringing in my head,' she said. 'What protection have you got for these people, because I guarantee they will be targeted.'

Speakers at the session acknowledged there would be some 'cowboys', but Charles Phillips, deputy director for the Department of Energy and Climate Change, said that in such instances the buck should stop with the Green Deal providers. 'They must make sure the consumer is not ripped off,' he said, pointing out that there would also be a regulatory body to oversee the Green Deal.

Earlier Trewin Restorick, chief executive of Global Action Plan, had warned about the

tensions resulting from the economic model for the Green Deal. The only way to pay for Green Deal assessors was for them to make a profit from their work, which might mean that an assessor would 'turn up at your door and sell you something that's not right for your house'. He said there were concerns about the robustness of the Green Deal compared with the Energy Company Obligation (ECO), which is due to start in 2013.

Reflecting on the slow roll-out of the Renewable Heat Incentive (RHI), Neil Turner, business development manager at Renewable Energy Systems, criticised the government's silence on the issue. 'I have not seen a single politician standing up and saying, 'This (RHI) is good''. I would love that to happen.'

Problems around the introduction of feed-in tariffs had caused knock-on damage to this and many other carbon-cutting energy schemes, he added.

could be used in schools, where it could be used specifically as a BIM object. 'It's already happening in operating theatres – it could happen to whole buildings,' enthused Morrell.

Radical thinking, said Morrell, is, in part, the answer: 'Some 100,000 people are living in substandard accommodation. If we had had a war, we would be having an emergency response to it. Economically, I think we are in a similar place.'

'When we responded in an emergency we were damn good. I'm advocating that kind of thinking as an answer to our problem.'

But one delegate questioned the UK's ability to become an exporting nation if countries such as China continue to 'rip off' Britain's best innovations.

Collaborating across the procurement chain

Asked what the industry is ignoring or needs to take more account of, Morrell accused parts of the sector of having a 'determination to keep design and construction separate'.

Robin Nicholson CBE, senior partner at Edward Cullinan Architects, said collaboration is hindered by clients, such as house builders, who refuse to appoint services engineers, even though they are an essential part of a design team. 'We've been trying to get the industry to collaborate for years,' he added.

But, according to Paul Wendon, technical director of TROX UK, manufacturers want to collaborate, but they are obstructed. He said: 'We don't get involved generally because the tradition is the building services industry will not specify a unique provider of a product.'

'We can be more involved early in the process to advise and understand the interaction between the product and how it's being used and costed.'



Broadcaster Tim Wilcox chairs the main conference sessions



Sarah Cary, sustainable developments executive at British Land, has concerns about soft landings and the liabilities period



A panel of experts debate the challenges and opportunities facing industry

Some 100,000 people are living in substandard accommodation. If we had had a war, we would be having an emergency response to it. Economically, I think we are in a similar place
– Paul Morrell

As regards the introduction of soft landings – the period when buildings are handed over to the client by the project team – Sarah Cary, sustainability executive at British Land, fears it will interfere with the contracted relationship between each section in the supply chain. ‘You’re trying to mess with the difficulties period and liability period.’

She said she saw a danger in appointing a soft landings consultant. ‘This needs to be the job of the building services engineers and the designers who have been involved.’

Soft landings

This issue of soft landings was debated at length during the first afternoon by Gary Clark, project director for REALL Project, School of the Built Environment, Heriot Watt University, and Tamsin Tweddell, partner at Max Fordham.

Clark said industry’s failure to evaluate the performance of buildings after handover meant structures were performing less efficiently than had been intended.

‘Despite the principles of soft landings being known for 50 years, we still fail to consistently evaluate and fine-tune the in-use performance of our buildings,’ said Clark.

Clark said he was encouraged by the recommendation by MPs that post-occupancy evaluation (POE) should be made mandatory on all public sector projects worth more than £5m. The MPs say that POE would help determine good and bad design practice,

and inform design decisions.

To ensure that the project team had a continued interest in the performance of the building once it was occupied, Clark recommended that practical completion was moved back 36 months to what he called ‘a practical occupation point.’

When asked by the audience about the cost of soft landings, Clark said POE would cost around £30,000 for projects up to £30m.

Tweddell said it was essential that soft landings with realistic energy targets are embedded in the project team at the start of the design process, to help close the gap between expectations and operational reality.

Tweddell said it was important to identify operational risks and mitigate against them in the design process. She cited cases of schools not performing as well as expected because users did not understand their buildings. For example, operational windows were overridden because of noise, and night cooling switched off because of fears over security and birds flying in.

Tweddell said it was important to tell contractors what the mission-critical areas were. ‘The lessons learnt can’t be value engineered out,’ she says. ‘Soft landings need to be integrated in the contract and not bolted on at the end.’

The financial climate

On day two, the current economic situation and subsequent funding challenges were

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Making their views known... the audience contributes to the conversation



► examined. Myles McCarthy, managing director of Carbon Trust Implementation Services, explained that, for any business to achieve a 20%, 30% or even 40% reduction in its energy use, they need to invest capital into their energy-efficiency retrofitting.

However, the capital to create these reductions isn't necessarily easy for a client to find – particularly in the current economic climate – which is why the Carbon Trust has teamed up with Siemens Financial Services to create an energy efficiency financing scheme.

'Finance should be an enabler, allowing business to implement new technologies,' explained Darren Riva, head of green finance at Siemens Financial Services.

He highlighted what already happens in the car industry – where motorists can use finance deals to replace their car every three

years – as an example of how finance can be used to help keep technology forward-looking and progressive.

But the construction industry hasn't had ready finance available to it since the liquidity issues of 2008.

Emerging markets, such as solar, are more risky to fund – and, despite the technology for solar being around for 20 years, it is driven by external factors, such as the feed-in tariff, which exposed it to substantially more risk. That solar bubble has now burst, and businesses generally are finding it difficult to unlock funding, he said.

'Finance should be the enabler for us as suppliers, installers and customers to get the technologies that we desire,' added Riva.

He admitted that it was much harder to make the energy efficiency deal more compelling in the domestic sector, but added: 'We should just use the damn stuff [energy] more efficiently.'

Retrofitting

The Green deal was a key theme at the conference, and it was standing-room only for the presentation by Tracey Vegro, a director of the Green Deal programme at the Department of Energy and Climate Change (DECC).

Vegro quickly had delegates' attention when she said the Green Deal could create £10bn of investment over the next 10 years.

She was keen to emphasise that the Green Deal was open to all, and that it wouldn't be a 'stitch up' by the big six energy companies. She revealed that the first two approved providers were a small plumbing firm and building services giant Carillion, which won the £600m Green Deal contract for Birmingham.

Vegro said the Green Deal wasn't a government programme but a framework

Measure, learn and then do... CIBSE president David Fisk's advice to delegates



Simplicity is best

'Keep it simple,' CIBSE president David Fisk told delegates when he opened this year's CIBSE Conference and Exhibition.

Reinforcing the message in his presidential address earlier this year, he stressed the importance of 'normal engineering' and avoiding 'green wash'. On the public debate about whether green is good for the economy, he said that, of the 10 best performing economies in the world, all were definitely greener than Britain's. But, he cautioned, 'bad green regulation is the worst of all worlds'.

'It's not usually very green and it's jolly expensive,' he asserted.

At the heart of the green economy conundrum, energy management would allow a clever planet to 'sort the rest out', he insisted, adding that our power margins over the next few years are perilously narrow, and that it was about time engineers declared that we, as a nation, are using too much energy.

He concluded by asking delegates to keep in mind a dictum used by one of his own college professors: 'Measure, learn and then do.'

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Mike Hitchmough, of 3DReid, and Neil Billett, of Buro Happold, give their views on delivering sustainability



Brendan Patchell FRICS explains how to deliver sustainability from start to finish in a cost effective way



“ We should just use the damn stuff [energy] more efficiently – that’s the most important point
– Darren Riva

to create a new market for energy-efficient goods and services. She said that the grants the Green Deal was replacing offered products such as insulation in isolation, rather than in a holistic way. Vegro told delegates that incentive packages such as the £125m Green Deal cash-back scheme would focus on incentivising a whole-house retrofit approach. ‘We have to spend it wisely,’ she cautioned.

The biggest challenge of the Green Deal, said Vegro, would be encouraging occupiers to become more engaged in energy efficiency. ‘People have spent government money on loft insulation and they don’t appreciate it,’ said Vegro. ‘We have done little about changing behaviour to make the house work

better. People have got used to having their thermostats set high.’

The DECC official hopes a new helpline offering information and impartial advice would convince consumers that the Green Deal is worth doing.

Integrated approach – 2012 Games

Wrapping up the conference during a seminar entitled ‘The Games 2012 – understanding how we delivered an integrated approach’, it was revealed that only half the expected electricity load was used during the Games.

Kelvin Freeman, London 2012’s group lead for energy services and associate director at Atkins, will be heading to Rio de Janeiro in November to help present a major ‘transfer of knowledge’ document, outlining lessons learnt from London 2012. He told delegates the document would advise the organisers of the Rio Games not to be ‘as cautious as we were regarding capacities’.

Questions came thick and fast from an audience full of praise for the successes achieved by Games’ organisers.

New broadcasting technology required for high-definition television had posed a particular challenge, with broadcasters demanding additional locations for cameras and more lighting than ever before, they heard.

But Philip Johnson, principal of Olympic Stadium architects Populous, said the most important lessons revolved around the overall approach to the project. ‘It was about taking things back to first principles and not necessarily relying on previous experience.’

David House, associate director for Arup, reflected on the ‘amazing’ level of co-ordination required to deliver the stadium project on time. The technology used may not have been exceptional, but the ‘fast and furious pace’ certainly was, he said. **CJ**

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Your letters

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This month: Engineer's spellchecker roulette, teacher awarded E-minus at parents' evening and quantitative easing to replace Green Deal?

Lost for words

The following is based on a real conversation at a parents' evening, which left me lost for words.

The progress of an eight-year-old schoolboy was discussed between the parents and teacher.

Teacher: 'Does Alex ever talk about what he would like to be when he grows up?'

Parent: 'Alex wants to be an engineer.'

Teacher: 'Well, at least you will have someone to mend your washing machine/car/computer when it breaks down.'

Parent: [Speechless]

Can anybody suggest what the parent should have said?

Catherine Applegate

• *CIBSE Journal* will publish readers' best suggestions here.

Easily misunderstood

Over the last year or so I have noticed that some of our allegedly helpful technology can introduce unexpected twists into technical documentation. I have termed this 'engineer's

spellchecker roulette', and some of the images conjured in my admittedly twisted imagination are enclosed. If you feel there is room in the *Journal*



for a sideways look at our field, please feel free to publish. Otherwise file them in the usual place.

*Peter Hill MCIBSE
Leicester*

Green Deal and the economic crisis

Just a handful of economists questioned neoclassical economics during the boom, warning that banks creating money and the rise of private debt-to-income ratios would end in financial crisis. Quantitative easing (QE) has done little for bank lending, and the coalition's austerity measures mean there is little prospect for immediate economic growth, especially considering the high price of oil – which is not high enough to persuade oil companies to drill for 'difficult oil'.

Meanwhile building services engineers welcomed the Green Deal, but many question whether it can take off with such high interest rates?

Government seems to have a policy dilemma. Tightening the efficiency ratings of energy performance certificates (EPCs) through Council Tax or at letting, or sale, would promote the Green Deal, but could leave homeowners with more debt on the property than the current market value. For example, consider those Green Deal loans against lowly rated properties – they may have low improvement potential that does not meet future EPC thresholds.

Some £375bn of QE has so far gone into the UK financial sector. UK private debt is saturated – lacking willing lenders and willing borrowers. Some economists call for public stimulus to head off a deeper financial crisis. It's radical. But it would get QE into a real economy suffering feedbacks from austerity. If the Green Deal fails, could its urgent objectives be publicly-funded at the much lower interest rates (1-2%) they see in Germany?

Chris Jones



MANUFACTURER'S VIEWPOINT

Government – and industry – needs to focus on the ‘purple agenda’ if it is to realise its energy efficiency and carbon-cutting plans, says **Martin Fahey**, of Mitsubishi Electric

As previously mentioned, I attended all three main party conferences in Brighton, Manchester and Birmingham as part of an initiative called the Sustainability Hub, which was seeking to educate our politicians about the direct financial benefits of the green agenda.

One of the comments I heard during these events was whether we should refer not to the green agenda, but instead to the ‘purple agenda’, because that is the colour of £20 notes.

It is certainly true that people are more engaged if they can see a direct financial benefit or consequence of their actions, and this was part of the debate we were trying to

have under the Sustainability Hub partnership – to show the direct savings that can be achieved through greater efficiency and renewable technology.

As a manufacturer, we know that we have our part to play, but we also realise that collaboration is key.

All three political parties made warm and encouraging noises about the need for more renewable technologies, and I was able to personally speak briefly to ministers Ed Davey, Caroline Flint and Greg Barker at the conferences – although unfortunately, I did fail to get an audience with Boris!

Government has an incredibly important role to play in delivering the legislative backdrop to encourage and – where necessary – force businesses and individuals to consume less energy.

Buildings, in all their forms, account for nearly half of all emissions in this country – more than either transport or industry. It is important to note that, on

average, 60% of the energy consumed in the UK goes on heating. Research also shows that moving just 12% of this heating requirement away from fossil fuels to renewable technologies will help the country get a third of the way to the tough renewable targets that must be met.

We need more of this sustainable thinking, not

only within government, but also within our own industry and among end users.

As an industry, I know we have the skills and workforce able to help. As a manufacturer, I know that the products exist right now.

What we need is a clear demonstration of support and commitment from all political parties, and the engagement of all parties involved in delivering building services – which includes the building designers, specifiers, operators, manufacturers and installers.

I think the politicians have got it. Let's see if they can put action behind their warm words.

Martin Fahey is Sustainable Solutions Manager at Mitsubishi Electric. Join the debate by visiting the Green Gateway LinkedIn group, or following Martin's Twitter account (@green_gateway) which offers followers a chance to receive up-to-the-minute news and views from those within and outside the industry, including key opinion leaders.



Conference cheer

I am writing to you to let you know how much I enjoyed the CIBSE Conference and Exhibition this year.

Although I was only able to attend on the one day, I not only found it technically useful, but also very inspiring.

With more than 42 years' experience in engineering, it is interesting to see how the industry is evolving and still continues to move forward.

While we have been using building information modelling for more than two years, it was intriguing to see that we are in fact behind the rest of the world.

Paul Morrell's use of metaphors and imagery made, for me, one of the best talks of the day. He provided an insightful statistic that is very

prominent for both engineer designers and facilities managers: 'Three percent of the capital cost of the building is spent on support for mechanical engineering post construction.'

Stephen Allen
Managing director of Cavendish Engineers

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

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

From the forums

Do energy benchmarks work?

CIBSE LinkedIn group

Andrew Cooper: Please visit www.fm-world.co.uk/features/the-trouble-with-energy-benchmarking to view a feature that I have written for *FM World*, the magazine of the British Institute of Facilities Managers. In this I look at energy benchmarking and I consider if the benchmarks used in the UK are outdated and therefore of any practical use.

Rob Farman: Comparing apples and pears is always hard and when that includes different buildings in different areas, in different years with different weather patterns, it becomes more so. As implied by your comments on energy

performance certificates and display energy certificates, it does need quite a large number of samples to draw valid conclusions. With government seeking to make post-occupancy evaluation (POE) mandatory on its projects, we may see a lot more information in greater detail than we now have. The only drawback is that I know of at least four POE methodologies, and comparing results from POE 'method A' with POE 'method B' could be tricky.

Ian Knight: I hope the iSERV project – in which CIBSE are participating – might be of interest to you (www.iservcmb.info). The project is looking at benchmarking the energy use of buildings and their services by the activity mix in the building. The benchmarks are being derived from detailed measurements undertaken in buildings from around Europe.

● Join the debate at www.cibse.org/linkedin

WE NEED PASSIVHAUS



The UK will fail to meet its low energy buildings targets if it does not adopt the Passivhaus standard

Nearly a third of all energy use in the country is for homes. Around two thirds of this energy is for heating alone. Yet we know how to build homes – to the Passivhaus standard – that are so energy-efficient that they don't need central heating. Sadly, this is neither standard today nor proposed by regulation for the UK.

Earlier this year, we provided detailed evidence¹ of the several major barriers to low-energy construction – political and structural barriers, industry barriers, and social barriers – and how these could be overcome. We have now published an analysis for the UK of how low-energy buildings could be successfully delivered². Sadly, we conclude that unless design and construction improves quality radically, this ambition cannot be met.

Politicians of all parties agree on one thing: we're not building enough houses. There's a housing crisis. But new homes and buildings don't perform as they should. Every thorough study of new UK buildings for the last 20 years has found that they use more energy – sometimes a lot more energy – for heating and cooling than their designs indicate.

The implications are profound and worrying. If we carry on building homes – and other buildings, too – in the way we do today, energy use and carbon emissions will be far higher than planned. There will be a disastrous legacy of higher bills and potentially poorer health, with the UK unable to meet its climate change targets. This problem of the energy performance gap is the second housing crisis.

As we discuss in the *Delivering* report, the endemic quality problems in construction are displayed, in miniature, in the installation and performance of mechanical ventilation with heat recovery (MVHR) systems which, as new homes become much more air-tight, is likely to become the

Unless quality across the design and construction process radically improves... the low-energy buildings ambition cannot be met

New Passivhaus homes at Wimbish Green in Essex by Hastoe Housing Association



MARK BALCANT

dominant means of ventilation. Where Passivhaus quality is not present, however, problems are likely to appear in MVHR installation and operation, just as they appear elsewhere. Rather than providing excellent indoor air quality, poorly designed or installed MVHR systems can create noisy and potentially unhealthy environments³.

There is a simple solution: build homes to a high quality standard. Building to the Passivhaus standard is the route to better homes, lower bills and better returns, as well as a more competitive and innovative construction industry. A major Passivhaus building programme over the next several years would help solve both the housing crises and create the skills required to undertake quality refurbishment of the existing building stock.

Indeed, far-sighted developers now realise that building passive can be more cost-effective because maintenance will cost less, prices will be stronger and rental streams better protected. Broadland Housing Group, of Norwich, is using private investment to embark on the UK's largest Passivhaus project to build more than 200 apartments close to the Carrow Road football stadium. Andrew Savage, executive director for business growth,

has said: 'All housing associations, private rental developers and savvy investors should now be thinking passive, as Broadland is.'

References

- 1 *Refurbishing Europe: an EU strategy for energy efficiency and climate action led by building refurbishment*, Bruce Tofield and Martin Ingham, February 2012; see www.buildwithcare.eu/news/231-refurbishing-europe for background, which has a link to the report at www.buildwithcare.eu/images/pdfs/refurbishing_europe_full.pdf
- 2 *Delivering a low-energy building: making quality commonplace*, Bruce Tofield, 17 October 2012; see www.buildwithcare.eu/news/244-delivering-a-low-energy-building; report at www.adaptcbe.co.uk/CBE/downloads/reports/delivering_a_low-energy_building_oct_2012.pdf; press release at www.uea.ac.uk/mac/comm/media/press/2012/October/Passivhaus-bruce-tofield
- 3 A recent Zero Carbon Hub report notes that: 'The Task Group considers that examples of failures in typical design, installation and commissioning practice are all too common. ... Badly performing systems may not deliver the anticipated carbon savings and may result in degraded IAQ (indoor air quality) with related consequences for health.' (*Mechanical Ventilation with Heat Recovery in New Homes*, interim report, ventilation and indoor air quality task group, Zero Carbon Hub, January 2012, www.zerocarbonhub.org/resourcefiles/ViaqReport_web.pdf)

● **BRUCE TOFIELD** led the University of East Anglia's activity in the international Build with CaRe project (2008-2012; www.buildwithcare.eu), which has stimulated innovation and learning about Passivhaus construction in the East of England.

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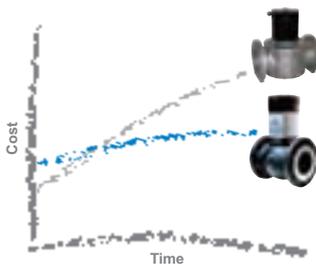
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BALANCE OF THE SEXES

A new CIBSE women's network called WiBSE aims to close the engineering skills gap by inspiring more females to enter and progress through the building services industry

The engineering industry is poised to play a vital role in the regrowth of Britain's economy. Yet there is a real skills shortage: over the next four years, it has been predicted that Britain will need to train 96,300 new engineers and scientists – just to replace those who will retire. These figures come from the recent Royal Academy of Engineering (RAE) report, titled *Jobs and Growth: the importance of engineering skills to the economy*, which was published in September this year.

Boosting the number of women working as engineers will play a huge part in tackling this challenge. With increasing industry emphasis on collaborative working and communication skills, alongside core engineering know-how, women bring a powerful mix to the table. In times of recession, the industry needs to be agile and to maximise all its assets to make a significant and sustainable contribution in the 21st century.

To meet that challenge, Sarah Davis, Susie Diamond and Gay Lawrence Race reinvented the CIBSE Women network as WiBSE (Women in Building Services Engineering) in early 2012.

The WiBSE vision is to 'inspire the next generation and create the support network that will enable more women to join, stay and progress within industry and the Institution.'

WiBSE is open to all. The steering group consists of eight members and reports into the CIBSE diversity panel. It is a formal CIBSE network with a microsite (www.cibse.org/wibse) a Twitter account (@CIBSEWomen), its own email address (wibse@cibse.org), and a LinkedIn group at www.linkedin.com

WiBSE will be running a series of events including debates,

presentations, personal development sessions, informal social gatherings/fun events and formal training sessions, all aimed at meeting the needs of its membership.

It is planning a spectacular launch party in London for spring 2013 – sign up for its newsletter for further announcements.

There will be regional branches of the group, which is already established in London, Yorkshire and Australia.

Anyone who may be interested in joining the new group should visit www.cibse.org/wibse and use the link to join the LinkedIn group, or contact it via wibse@cibse.org. New members will be added to the mailing list.



GAY LAWRENCE RACE

As a CIBSE fellow I have worked with schools and careers initiatives, and I have seen the female graduate intake increase, but there are still only 12 female Fellows in CIBSE out of nearly 1,000. It is evident that women are leaving the profession or not progressing as they should, and this network is a great opportunity to listen, and challenge some of these problems.'

Women bring a powerful mix to the table



SARAH DAVIS

I am passionate about making our industry better and encouraging growth, and I believe greater gender diversity can assist this. Both the Davis and Kinsey reports note that more diverse management teams make better strategic decisions and show increased profitability. I have seen and experienced the benefits of bringing like-minded women together to support and encourage each other. We need to highlight female role models, give access to mentoring and offer personal development and training sessions. Our industry is amazing and I want more women to experience it.'



SUSIE DIAMOND

I want WiBSE to be a powerful conduit for discussion and change in the industry. I'd love the opportunity to bring together all the various stakeholders to develop solutions for these complex issues. WiBSE will provide a safe environment for honest discussion without prejudice, and I think that's an exciting proposition. We are engineers – we can solve problems!'

- **SARAH DAVIS** is responsible for business development at OSRAM
- **GAY LAWRENCE RACE** is a specialist in building services guidance
- **SUSIE DIAMOND** is a founding partner at Inklung LLP

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AN INSPECTOR INVOICES



If an HSE inspector calls and finds that you are breaking health and safety laws, you may now be charged a fee to recover the costs of enforcement and for helping you put things right. Hywel Davies explains

Ever since the coalition government took office in May 2010, there has been a view that aspects of health and safety law are a burden on UK business, and so a target for the drive to deregulate and eliminate red tape. This has already led to the Lofstedt review of health and safety legislation, and to a major review of the Health and Safety Executive's (HSE) Approved Codes of Practice.

At the same time, government

has been looking to cut costs and raise revenues. And so the Health and Safety (Fees) Regulations 2012 place a duty on the HSE to recover the costs of carrying out its regulatory functions. These include inspections, investigations and taking enforcement action in cases where material breaches of health and safety law are found.

Government believes businesses that break health and safety laws should pay for the time HSE spend



Government has been looking to cut costs and raise revenues

helping to investigate and correct the breach and on taking enforcement action. This has previously been paid for out of public taxation.

Introduction of the Fee For Intervention (FFI) is intended to encourage businesses to comply in the first place, or put matters right quickly when they don't. It also aims to discourage businesses that try to gain competitive advantage by not complying with health and safety law, putting people at risk.

Fee for intervention

HSE inspectors visit workplaces to inspect work activities or to investigate incidents or complaints. If, when they visit, they see material breaches of health and safety law, they will now charge a fee, based on the amount of time the inspector spends identifying the breach, helping to put it right and for any investigation leading to enforcement action.

A 'material breach' occurs where the workplace has broken a health and safety law *and* the inspector judges the breach serious enough to notify the employer in writing. They may notify a contravention, issue an improvement or prohibition notice, or prosecute.

This will be determined by the circumstances, and by application of the HSE's Enforcement Policy Statement (EPS) and Enforcement Management Model (EMM). Fundamental to these is the principle that enforcement action should be proportional to the health and safety risks and the seriousness of the breach.

Examples of material breaches include: not providing guards or effective safety devices to prevent access to dangerous parts of



SHUTTERSTOCK / PAVEL PARIK

machinery; or materials containing asbestos in a poor or damaged condition, resulting in the potential to release asbestos fibres.

The inspector's written notification will make it clear which contraventions are considered material breaches, for which a fee is payable.

To calculate the fee, inspectors will record the time spent identifying the material breach, helping to correct it and investigating and taking any enforcement action. This will include: time spent visiting the site – including all the time spent during the visit identifying the breach; writing notifications of contravention and improvement or prohibition notices, and reports; taking statements; and, in complex cases, obtaining specialist support.

The total time will be

multiplied by the FFI hourly rate to give the invoice total, which must be paid within 30 days. It is worth noting that there is a 21-day deadline for raising queries.

The HSE has published guidance to help businesses and organisations understand the FFI and how it operates within HSE's overall approach to enforcement. It explains the general principles and approach of the FFI scheme, and explains the process

for handling queries and for disputing invoices. The longer guidance document provides examples of material breaches, although it does not cover every scenario where FFI might apply.

● For previous coverage of the Lofstedt report, see the legal column in *CIBSE Journal* in July 2011 and March 2012. For the review of the ACOPs, see the legal column in the August 2012 issue.

Government believes businesses that break health and safety laws should pay for the time HSE spend helping to investigate

FURTHER RESOURCES

The HSE guidance may be downloaded from the HSE website. For the 37-page guidance document go to <http://www.hse.gov.uk/pubns/hse47.pdf>. For the short four-page summary of what the new system entails, see <http://www.hse.gov.uk/pubns/hse48.pdf>.

HSE's Enforcement Policy Statement <http://www.hse.gov.uk/pubns/hse41.pdf> and Enforcement Management Model <http://www.hse.gov.uk/enforce/emm.pdf> may also be downloaded from the HSE website.

For the current FFI hourly rate, visit www.hse.gov.uk/fee-for-intervention/index.htm

DATES TO REMEMBER

● **EPC CONVENTIONS**
12 NOVEMBER, LONDON
 An update on changes to Energy Performance Certificate conventions, focusing on areas where the conventions are not interpreted or used correctly. The event will also look at requirements for audit and common reasons for failure.
www.cibsetraining.co.uk

● **AIR CONDITIONING INSPECTIONS**
14 NOVEMBER, LEEDS
 The Energy Performance of Buildings (Certificates and Inspections) Regulations 2007 require inspection of systems with outputs over 12 kW. This explains how to undertake them in complex buildings.
www.cibsetraining.co.uk

WHY YOU NEED TO KNOW ABOUT BIM



Building information modelling isn't just about software – it's about building better buildings with enhanced collaboration and integration, says **Ian Chapman** of NBS

Engineers have been modelling M&E services for years using a variety of methods and softwares, so what's new about building information modelling (BIM)?

It is all too easy to say there's nothing new. Engineers are already experts in modelling many aspects of the built environment, including daylighting, fire engineering, lighting, thermal analysis, and ventilation and energy, to name but a few.

Modelling takes place on a daily basis, whether it's on hand-written calculation sheets or through the use of computational algorithms in software programs; engineers are adept at these design refinement processes. However, BIM is not about using individual tools and softwares to develop design, it's about the big picture, producing better buildings with improved efficiencies through enhanced collaboration and integration. So what else is new about BIM?

Firstly, there is now clear recognition that making a building work in the digital domain is cheaper and more productive than fixing things on site. Architects are modelling buildings as part of their design process for projects of all sizes, and this isn't just about drawing in 3D. Building fabric modelling can include, for example, embodied carbon assessment and accessibility checking. Engineers need to play a key role in developing early stage models for projects.

The recently published third edition of the *BSRIA Design Framework for Building Services* offers a useful framework and guidance, and the right tools can enable early stage project information to be created and developed in a structured information environment.

Secondly, technology is developing fast and engineers must do more than keep pace, they must

lead. The NBS National BIM Survey revealed that 21% of construction professionals were neither aware of, nor using, BIM. The majority of engineers I've met recently admit that they haven't heard of information exchange formats such as COBie, which enables the exchange of information in an open, transparent way.

Open BIM protocols and formats enable information-sharing, and engineers should become familiar with delivering rich information models to building occupiers for effective operation of buildings.

Thirdly, the UK government is asking for BIM. If you work on public sector projects, ensure that you understand the UK government *Construction Strategy*, published in May 2011. Engineers often look beyond a project's capital expenditure and design with efficient operation in mind; the government has this same view. There is a huge opportunity for engineers to lead the use of BIM for facilities management (FM) and the time to act is now.

Finally, BIM enables greater integration and collaboration. For many years, engineers have partnered with architects to win business and deliver projects as part of an integrated service to clients.

● *Ian Chapman BSc CEng MIET is a chartered engineer and head of specification at NBS. He is also director of buildingSMART UK and is a member of the government BIM Technologies Alliance working party. Follow Ian on Twitter: @IanChapmanNBS, or make contact via LinkedIn: www.linkedin.com/in/ianchapmannbs*

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IMPROVE YOUR BODY IMAGE

Professional engineering bodies must focus on demonstrating value to employers to reverse the drift of young engineers away from industry activities, according to a panel of recent graduates and senior industry figures. **Ewen Rose** reports

“ Napoleon was only 27 when he invaded Russia, but putting a 27-year-old in a uniform doesn't make them Napoleon
– *Andy Pearson* ”

Many young engineers regard membership of a professional institution as little more than a 'tick box' exercise required to meet qualification requirements. They are allowed little time by their employers to attend events hosted by the professional bodies or volunteer to take part in activities.

This was the conclusion reached by a panel considering the topic, 'What have professional institutions ever done for young engineers?'

The discussion, which was hosted by the Institution of Mechanical Engineers (IMechE) and chaired by last year's CIBSE ASHRAE Graduate of the Year, Angela Malynn, brought young engineers representing CIBSE, ASHRAE, IMechE and the Institute of Refrigeration (IoR) together with the presidents, chief executives and other senior engineers.

They concluded that bodies must find ways of demonstrating how time spent by young engineers in meetings and setting up industry initiatives is valuable to their employers – especially during economic austerity.

The debaters also agreed that the institutions should collaborate more effectively to make better use of volunteers' time and create more 'networking' sessions to encourage different professions to come together and exchange ideas.

'Without employer support we are toast,'





Stephen Matthews (left) and Jairo Jaramillo



Ruth Shilston (left) and Angela Malynn



Left to right: Morwenna Wilson, Jeff Littleton, Tom Watson and Jolyon Thompson

said ASHRAE executive vice president Jeff Littleton. 'That is why we send a lot of letters thanking employers for helping their engineers attend our meetings.'

Win over the employers

ASHRAE has set up a roundtable of 15 major US employers that will gather for the first time at its Winter Meeting in Dallas in January. Littleton stressed that links with employers needed to be forged at a local level and the society intended to do this through regional chapters and its Young Engineers in ASHRAE (YEA) network.

ASHRAE president Tom Watson said his employer saw a clear economic benefit from his involvement with the society as a young engineer: 'I got involved in the committees that were relevant to our areas of work – so it was quite a commercial decision at the beginning because I was a source of information for my employer. Then I got more involved in wider society issues and it grew from there.'

Involvement in voluntary work through your professional body can be a 'major CV enhancer', according to Jolyon Thompson, a tunnel ventilation expert with Parsons Brinkerhoff and young member of the IoR. 'However, some of those committees can be hard to break into – they are a bit of a clique and the institutions need to work on being

Some of the committees can be hard to break into – they are a bit of a clique and the institutions need to work on being more welcoming
– Jolyon Thompson

more welcoming,' he added.

Morwenna Wilson, a recent CIBSE ASHRAE Graduate of the Year, said smaller employers were the key. 'It is harder for them – most participants come from the larger firms that have the money and flexibility to be supportive – but most employers in our industry are SMEs and they need to see some benefit,' said Wilson, who now works for King's Cross developer, Argent.

Employers value positive PR, according to Ruth Shilston, vice chair of the IMechE Young Members' Board. The IMechE monitors national and local press and reports back on coverage gained by young engineers that reflects well on their employers.

If an employer is supportive, then a young engineer is more likely to feel loyal to them, according to Jairo Jaramillo, chairman of CIBSE's Young Engineers' Network (YEN) London Centre. 'I would like to think that loyalty is not an archaic thing; my employer has supported me in my work with YEN and that makes me feel a sense of loyalty,' he said.

Many employers seem to fear that if they invest too much time in a young engineer and give them opportunities they will leave. Jaramillo said it was better to invest in someone good and encourage them to stay, rather than end up with a less competent person who then can't – or won't – leave.

However, IoR president Andy Pearson

Jairo Jaramillo and David Fisk



“This is a profession; we are not nursemaids. To expect that somebody will hold your hand until you are 40 is not a good place to be – Stephen Matthews

cautioned against institutions falling into the trap of tokenism.

‘They should be involved in our activities because they are good – not because they are young,’ he said. ‘Napoleon was only 27 when he invaded Russia, but putting a 27-year-old in a uniform doesn’t make them Napoleon.’

The forgotten middle

Panellists said there was a danger of losing ‘the people in the middle’ if institutions are focused too much on young engineers. Wilson said that the first five or six years were relatively straightforward, as there were paths to follow through education and then chartership. ‘After that you can begin to feel a bit lost.’

Malynn suggested that the professional bodies could define career paths on behalf of employers, so young engineers would know what to expect at each stage of their development. She said this was where institutions could be most influential, as they have the status to put an overall structure in place that all employers would respect.

The global economic situation is building

up pressure on young engineers and the panellists were concerned this was making them obsessive about career choices. ‘Society puts pressure on you to have a plan,’ said Jaramillo. ‘Why does the industry expect me to know what I will be doing next year once I am in the workplace? It is clear where I am going as a student, but there is no structured path once you move into employment.’

Bruce Arnold, chairman of the IMechE’s construction and building services division, said engineering careers often just evolve from things you get interested in or by following ‘the path of least resistance’. ‘Very few engineers have a great plan,’ he said.

Mentoring schemes are popular, but CIBSE president David Fisk added that it was not right for everyone. ‘Sometimes it is just good to chat,’ he said. ‘We won’t make a decision for you, but we have been there so can give you confidence that you are making the right choice.’

‘There is a role for the old fart in the corner who can point out that something has been tried before and why it didn’t work.’

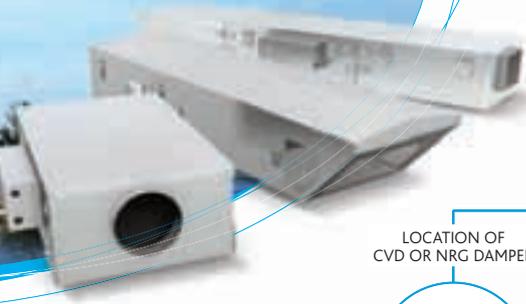
IMechE engineering director Colin Brown said the role of an institution was to provide ‘leadership’. ‘The institutions can give young engineers the chance to meet top people and talk to them.’ Shilston added that all the organisations provided great opportunities and support, but needed to advertise them.

In the end, it is up to young engineers to decide whether they want to be involved in institution work and they have to make their own career choices, according to CIBSE chief executive Stephen Matthews. ‘There comes a point when you have to take away the safety harness and let individuals take responsibility. This is a profession; we are not nursemaids – there are hard choices to be made. To expect that somebody will hold your hand until you are 40 is not a good place to be.’ CJ

● The debate was part of the CIBSE Young Engineers’ Awards 2012. See page 9 and 12

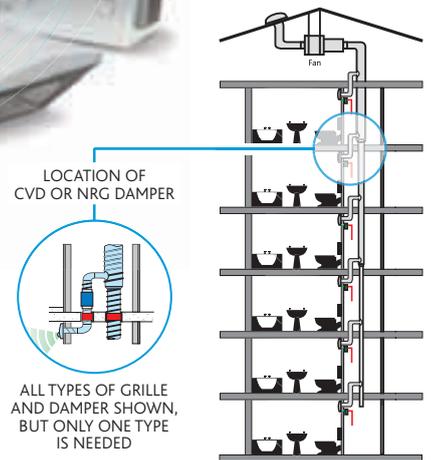


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The 2012 Olympic shooting venue was designed to be dismantled and reused with the minimum of fuss. **Andy Pearson** looks at how BIM enabled the design team to create a lightweight, reusable building that also provided optimal conditions for Olympic shooters

BIM & BULLETS

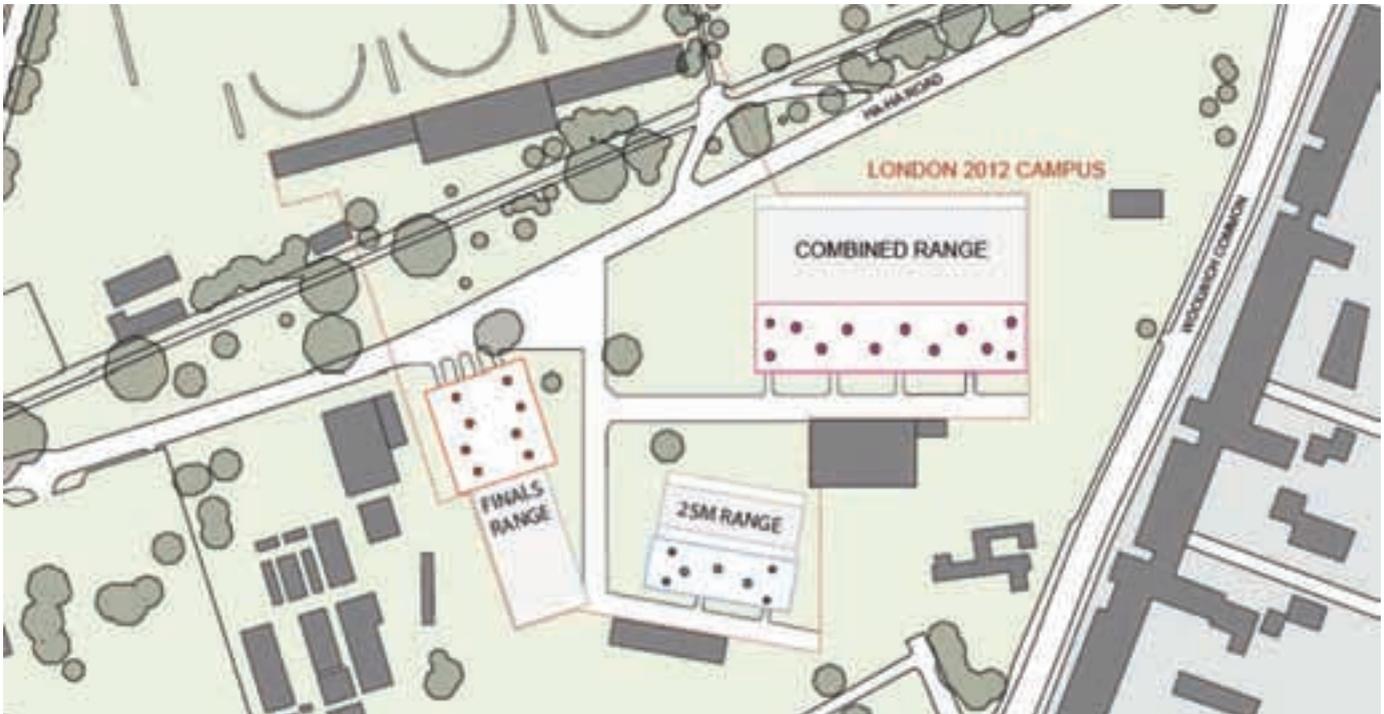
Teletubby Land. That was the moniker unkindly given to the Olympic shooting venues by some of the competitors. It is not difficult to see how the epithet came about. The three white, fabric-clad buildings, situated in the grounds of the Royal Artillery Barracks in Woolwich, Southeast London, are studded with vibrantly coloured protuberances, like blocks of psychedelic Swiss cheese which would not look out of place on the eponymously named children's TV programme.

What is less obvious from the building's ostentatious appearance is that these are some of the most sustainable buildings of

the London 2012 Olympics. All three venues have been designed to use existing components or materials that can be reused or recycled. In addition to the structure and fabric, the venues have also been designed to be predominantly naturally ventilated and to reduce the need for artificial lighting.

With the Olympics over, now that the three venues are in the process of being dismantled their sustainable credentials are coming to the fore. To understand what makes the disassembly of these buildings so remarkable it is necessary to understand how they were designed and assembled in the first instance.

These distinctive buildings were designed by consulting engineer Mott MacDonald working with Berlin-based exhibition designer and architect Magma and ballistics architect Entec. One building housed the 25m qualifying range; another building was home to both the rom ➤



The three shooting ranges on the 2012 site



LIGHTING

With the exception of the finals range, which had to be blacked out for broadcast, the designers had an aspiration to eliminate artificial lighting. This objective came about because the building's fabric skin is translucent.

There was a limit, however, as to how translucent the design team could make the building's fabric. 'The more translucent we made fabric, the less strength it had,' says Mott MacDonald director Leon Higgins.

The design team opted for fabric with 8% light transmission. 'The translucency means the fabric glows; on a summer's day you get 100 000 lux hitting the fabric, which means there is enough light to hold an event,' says Higgins.

That said, even with the translucent fabric a basic lighting installation was still required to enable the maintenance teams to prepare the spaces overnight. Higgins says that despite the team's aspiration, lighting was used during events 'in case it clouded over'.

and 50m qualifying ranges; while the third range is where all the shooting finals took place.

All three buildings are similar in design; each comprises a rectangular box to house the audience and shooters. In the 25m range the audience was seated on tiered rows of seats banked against one of the box's longer walls. The lower section of the wall opposite was open. Depending on the discipline, the shooters either stand or lay on a 3m wide concrete strip with their backs to the audience and fire through the opening at targets positioned out in the open. A canopy above the shooters helps protect them from the sun, wind and rain while rows of angled wooden baffles, suspended along the length of the range, prevent stray bullets leaving the range.

The design of the 50m range is similar to that of the 25m range with the exception that it has a sliding wall, which allows range to be shortened and the venue to be converted into the 10m air pistol and rifle range. The Finals building, too, is similar to the 25m range with the exception that this building is fully enclosed. The ranges are orientated so that the shooters face north, away from the sun.

A key tenet of Mott MacDonald's sustainable approach to the design for each range was that the structure of each was to be built using rented components – the same trusses used to carry lights and speakers at rock concerts and festivals. 'We thought it would be horrific if we were to put something up for the games that was

then taken down and put in the bin,' says James Middling, associate director at Mott MacDonald.

To build the venues using a kit of parts Mott MacDonald turned to Building Information Modelling (BIM) software. The BIM model started with the architect's concept design, which was produced in the freeform modeling program Rhinoceros 3D. Mott MacDonald took this concept model and developed a supporting structure for the concept using plug-in software Geometry Gym in addition to Autodesk's Robot software for detailed structural analysis. Once the building's concept and form were defined, the model was exported to Revit to produce detailed structural drawings and to take off quantities.

To design the building's fabric outer skin, Mott MacDonald exported the Rhinoceros 3D design into the Oasys GSA suite of programs. The buildings are clad in a white phthalate-free recyclable PVC membrane. The architect originally conceived the buildings with relatively flat walls and roofs. This would have required the building's fabric skin to be stretched taut to prevent it flapping in the wind. Instead, by modelling the skin, Mott MacDonald introduced the vivid protuberances to give the surfaces topography. The curves helped to reduce the amount of fabric pre-tension needed so that cheaper fabrics could be used.

The addition of the coloured protuberances also helped with roof drainage and provided openings for ventilation while the ground level

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protrusions provided spectator access to the venue.

The BIM models were also rendered so that the design team could check that shadows would not affect the shooters.

With the cladding designed, Mott MacDonald turned their attention to thermal and airflow modeling and to the lighting analysis (see box on page 38) to ensure conditions inside the buildings would provide perfect conditions for competitors and audience alike. 'There was no environmental criterion for the venues,' says Leon Higgins, a director of Mott MacDonald and the man responsible for the scheme's MEP design.

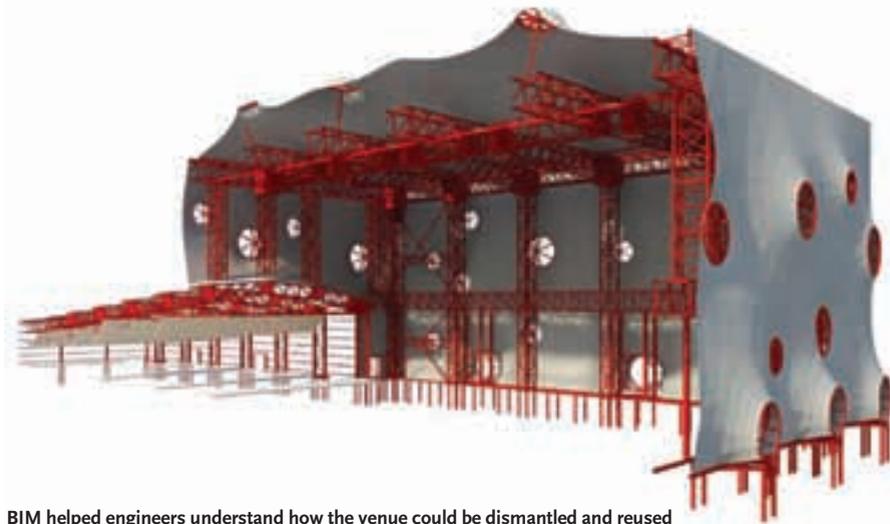
All three venues are ventilated naturally using stack effect ventilation. The buildings are fitted with an inner skin, which helps hide the structure and, more importantly, it helps to control the airflow through the buildings.

Fresh air enters the buildings through the ground level protrusions. Some air will rise up in the void between the inner lining and outer skin before exiting through openings

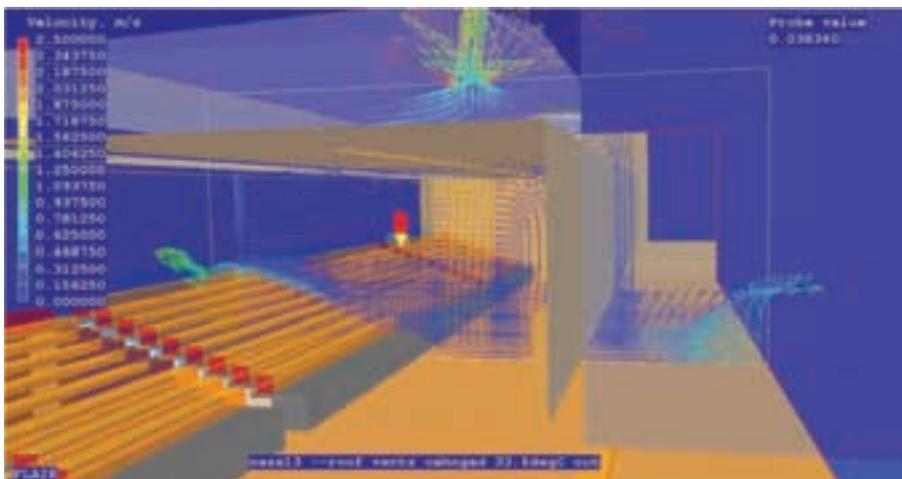
in the side of the rooftop protrusions. The remainder of the fresh air passes through holes at the base of the inner lining and into the void beneath the spectator seating. From here it permeates out through perforations beneath the seating before making its way upwards and out through the roof; drawing in cold air at low level in the process. The venues' seating was provided by LOCOG so Mott MacDonald used a TAS model to develop the permeability of the seating system and to check spectator comfort.

Stack effect ventilation is also used to remove the puff of smoke emitted when the guns are fired. A small grill is fitted to the canopy above each of the shooters for this purpose. 'It is not guaranteed to work in all conditions, but modelling showed that under most conditions the grille will provide a natural extract system at the firing line,' explains Higgins. Because the shooting targets are situated in the open, fresh air will also enter the venue through the opening adjacent to the shooters.

Computational Fluid Dynamics (CFD) modelling was undertaken to verify that



BIM helped engineers understand how the venue could be dismantled and reused



Air speed was modelled to ensure there was no excessive air movement in the 10m range

For the record, the actual trusses used to support the venues started life as the staging for Madonna's Sweet and Sticky tour

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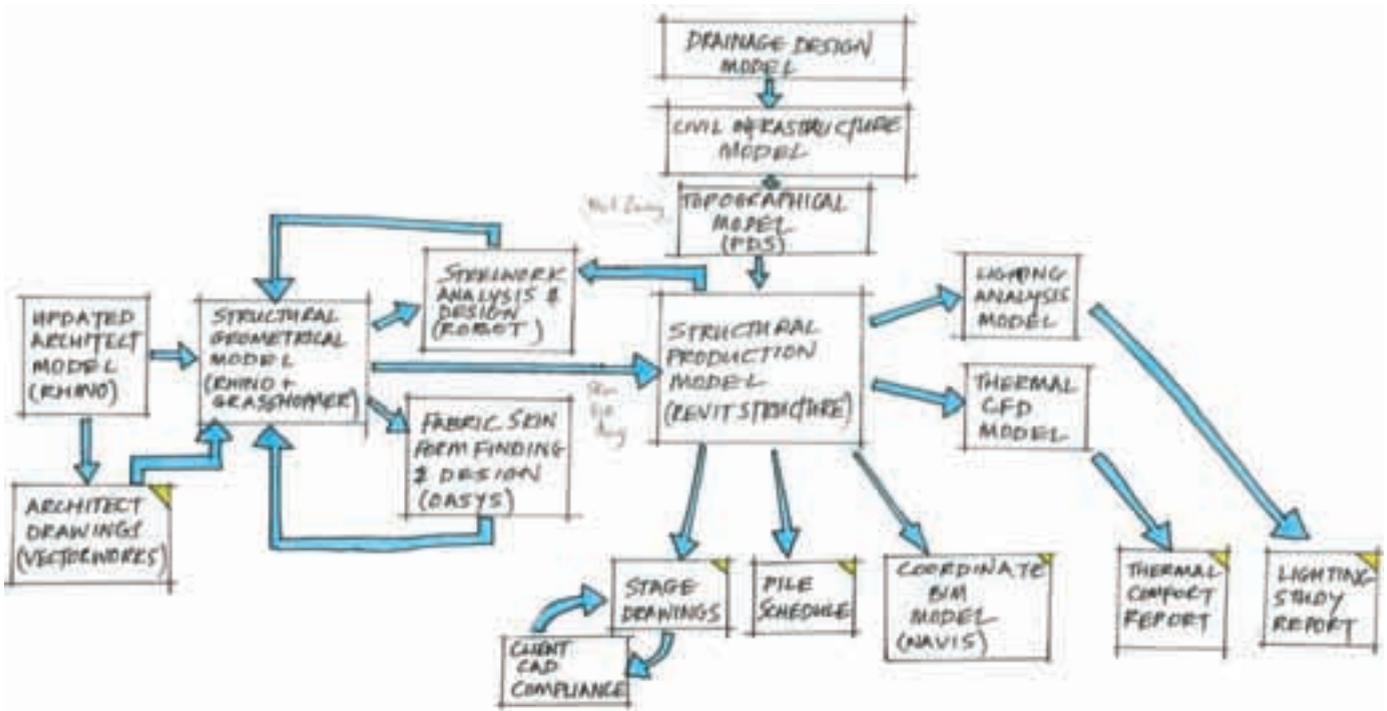
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Detailed design stage BIM workflow

the natural ventilation system would work under Games conditions. The modelling was based on a peak external air temperature of 29°C. Modelling showed that the dry bulb temperature at the firing line was approximately equal to the external temperature. It also showed the temperature in the seating zone would be between 30-31°C dry bulb. The comfort of the spectators was helped by the building's inner lining, which reduced the radiant effect of the buildings' outer skin. 'It makes a 1 or 2 degree difference,' says Higgins.

In addition to air temperatures, Mott MacDonald also modelled the air velocity inside the venues. The only specified design criteria was that the air speed had to be maintained below 0.2m/s for when shooters were firing air pistols and air rifles on the 10m range. There was no maximum air velocity criterion for the 50m and 25m ranges.

A study was undertaken to demonstrate conditions at the firing line for average and peak wind conditions using 2005 CIBSE Design Summer Year Weather Data for the most frequent occurring wind directions and corresponding wind speeds during the event's opening hours. 'The modeling showed that we couldn't naturally ventilate the combined range when it was being used for 10m air pistol and rifle shooting because the stack ventilation will fluctuate, causing excessive air movement if the wind

is gusty,' explains Middling.

To keep air velocities in the combined 50m/10m range within acceptable limits, the design of the range was tweaked so that when used in the 10m mode, it could be isolated from outside using a sliding partition. 'To achieve the level of control required we had to close the building to the outside and use a mechanical ventilation system,' explains Leon Higgins.

The simple mechanical ventilation system developed for the 10m range uses axial fans mounted behind some of the low-level protrusions. These pull air through the structure and into the fabric plenum and the void beneath the seating. Inside the venue, the warmed air will rise upwards to exit through the rooftop protrusions. Interestingly, mechanical ventilation was not deemed to be necessary for the Finals range. 'The Finals range was such a huge volume that we didn't need to mechanically ventilate during the 10m finals, the event only lasted for about 45 minutes,' says Higgins.

BIM modelling was also used to show how the venue could be built. The structure's rock music pedigree meant that the suppliers were confident it could be erected in a matter of months and the building completed and fitted out in less than four months. The ODA was unconvinced; it wanted the venue completed 12-18 months before it was needed.

To reassure the Authority, Mott



DRAINAGE

All drainage is recyclable PVC, including manholes and soakaway crates, no concrete is used. The buildings are not connected to the local drainage infrastructure, which eliminated the need to dig long connection trenches. Instead numerous soakaways are buried in the surrounding playing field. 'There is a lot of attenuation on the site because the ranges are such a big area,' says James Middling, associate director at Mott MacDonald. The drainage is set to be exhumed and reused or recycled.

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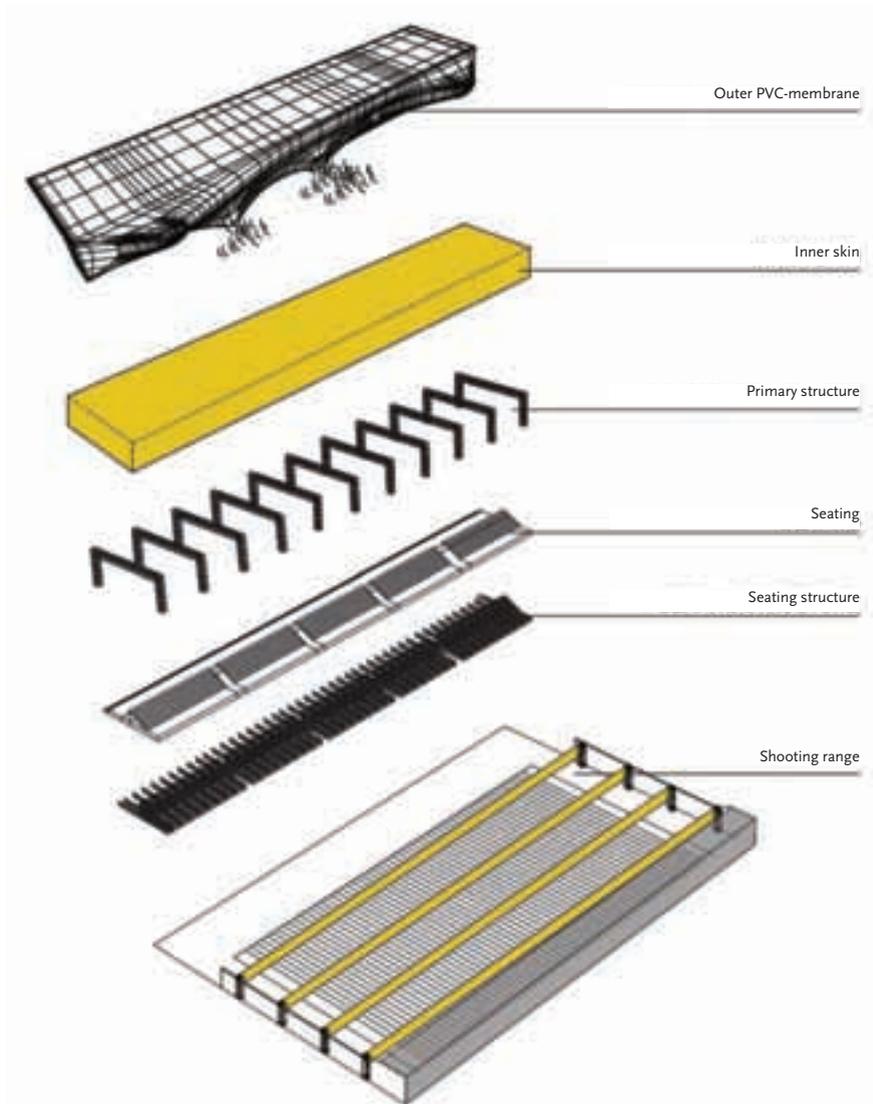
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Exploded view of range showing layers covering seating area

MacDonald used the BIM model in a 4D Navisworks analysis package to show how the building could be put together in the timescale. ‘These were not all from a construction planning background so if we’d put a programme chart on the wall they’d have struggled to understand it but, because they could see it being built virtually, everything was immediately clear and they bought into it,’ says Middling. The result was a compromise, with lead times reduced to six months.

The detailed modelling paid off. The venues were completed on time and were used successfully for the Olympics. For the record, the actual trusses used to support the venues started life as the staging for Madonna’s 2008 Sweet and Sticky tour. And, true to Mott’s sustainable ethos, the structure is supported on piles which are actually sections of oil pipeline reclaimed in Aberdeen. The piles have been driven into the ground and fitted with a specially developed pile cap. Once the structures have been dismantled the piles will be pulled from the ground and used elsewhere.

Fittingly, the final use of the BIM model was to visualise the process for taking the buildings down; a process now currently underway. However, if you missed the opportunity to visit the venues at the 2012 London Olympics, negotiations are underway for venues to be re-used at the 2014 Glasgow Commonwealth Games – now that would be a truly sustainable Olympic legacy. CJ

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ACTIVE SERVICE

Widely used in the UK and Europe, chilled beams have only recently taken off in the US. The lessons and experience from America can usefully be applied elsewhere, including optimising the primary airflow and maximising the use of water coils in the beam. ASHRAE members **Andrew Livchak** and **Chris Lowell** report

Active chilled beams have been used for more than 20 years but are only now gaining popularity in the US where, as both cooling and heating solutions, they are often called 'active beams' or simply 'beams'.

This article reflects American experience where beams are being designed with higher airflows to match increasing space loads. The article is derived, and converted into SI units, from one originally published in the *ASHRAE Journal* in April 2012.

Beam designs with primary airflows significantly exceeding space latent load and minimum ventilation requirements, are also driven by engineers attempting to reduce system first costs and total number of beams. Unfortunately, this approach compromises the system's energy performance and diminishes advantages of active beam systems over all-air systems. This often leads to active beams being

used as expensive diffusers.

Primary air in active beams (*Figure 1*) is supplied into a mixing chamber through rows of nozzles. Negative pressure that is created in the mixing chamber induces room air through the cooling coil and the cooled air mixes with the primary air. This mixture of recirculated cooled air and primary air is supplied to the space. In an optimum design, primary airflow is intended to satisfy space outside air requirements and dehumidification to avoid any condensation on beam's surfaces. The cooling coil is used to meet only the space sensible load. Primary air is cooled and dehumidified before it enters a beam.

Designing chilled beam systems

When first introduced in northern Europe, the design objective for active beam systems was to separate ventilation load from space sensible load and handle space cooling and dehumidification with minimum airflow. Water is a more effective medium than air to transport energy, due to its higher density and specific heat. One unit volume of water can carry about 3,500 times more energy than air.

Already high space loads in the US are often further overestimated by design programs not accounting for transient heat transfer, as well as the tendency of engineers to put

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a 'safety margin' on top of the estimates, resulting in HVAC systems designed with oversized cooling capacity. In active chilled beam applications, this leads to beams designed to operate with excessive airflows. As a consequence, the active chilled beam often works as an expensive diffuser, with the water valve shut and all cooling provided by primary air. Indeed, beam cooling output is controlled by either a mixing valve, regulating water temperature in the coil, or by an on-off valve modulating water flow through the coil. This valve closes when the space thermostat setting is satisfied. When the system is oversized and primary air provides sufficient space cooling, the water valve stays closed. The authors have observed installations where all of the control valves on active beams were closed throughout the entire summer.

Active beam total cooling capacity is the sum of cooling capacity provided by the primary air and the water flowing through the beam coil.

$$P = P_a + P_w \quad (1)$$

Cooling capacity provided by the primary air is calculated using the following equation:

$$P_a = m_p \times c_{pa} (t_p - t_r) \quad (2)$$

Assuming primary air is supplied at 13°C and space temperature is maintained at 24°C, this provides cooling of about 13 W per L/s primary air. Figure 1 demonstrates the contribution of air (P_a) and water (P_w) to the total cooling capacity of an active beam (P) as a function of primary airflow. As the primary airflow increases, the water contribution to the total beam cooling capacity drops and the air contribution in total beam cooling capacity increases. This chart is representative of a beam designed to operate at fairly low primary airflow. There are chilled beam systems operating at above 30 L/s per metre linear beam with primary air contributing 60% or more to the total beam cooling output.

C. Wilkins and M. Hosni¹ demonstrated that plug loads are overestimated for office buildings. This, along with added safety design factor for HVAC equipment, often results in the air-conditioning systems operating at only 80% capacity on a design day. Most active beams are designed as constant air volume systems with water in the coil providing space temperature control. So considering an office space with an active beam sized with primary airflow to cover 60% of total cooling load, assuming 20% safety margin for extra cooling capacity leaves only $(100\% - 1.2 \times 60\%) = 28\%$ for cooling output adjustment via cooling coil. This is not enough to respond adequately to the variation in space load in the intermediate season. As a result of this inappropriate sizing, the building will be

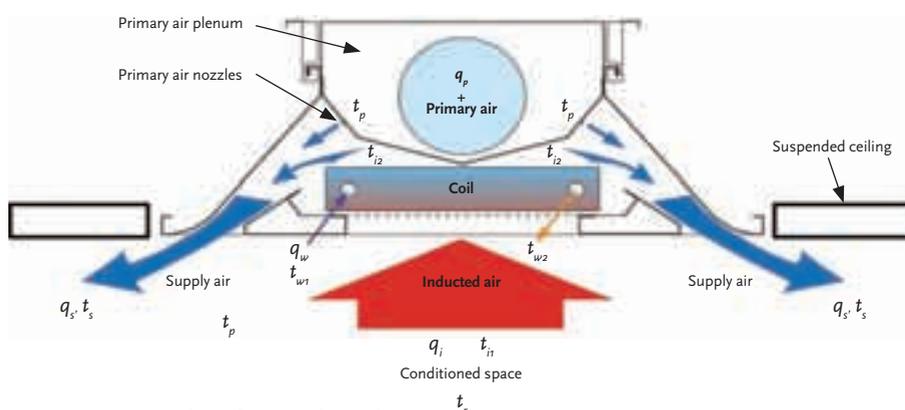


Figure 1: Cross-sectional view for a typical active beam

overcooled in summer, with thermal comfort compromised and overall HVAC system energy consumption increased. This is not an attribute of the beam but of poor design; when properly applied, beams can practically provide an energy-efficient, low maintenance and comfortable system.

Designing beams for minimum primary airflow

The most efficient chilled beam system is the one that operates at minimum primary airflow and satisfies space sensible load primarily by using the cooling coil. The most efficient active beam, by cooling performance, is the one that provides the highest cooling output at minimum primary airflow per unit length of beam.

We will define a parameter that represents this important performance of an active beam and call it *Coil output to primary airflow ratio* (COPA). COPA represents the amount of cooling (or heating, when active beams are used for heating) produced by the active beam coil per volume of primary air used. COPA is calculated at typical space temperature, inlet water temperature and water flow through the coil.

$$COPA = \frac{P_w}{q_p}$$

The higher the COPA ratio, the more efficient chilled beam design, the more effectively primary air is used. COPA is an important parameter to consider when selecting active beams with primary airflows exceeding minimum outside air requirements. In spaces with high latent load or high outside air requirements, where primary air provides most of the cooling along with dehumidification, application of active beams operating as a constant air volume system becomes less desirable and the COPA ratio loses its importance.

As an example, the chart in figure 3 demonstrates the relationship between coil cooling capacity and primary airflow for a

The most efficient chilled beam system is the one that operates at minimum primary airflow and satisfies space sensible load primarily by using the cooling coil

NOMENCLATURE

A	Coil heat transfer area, m^2
A_{j_2}	Coil free cross-sectional area perpendicular to the direction of induced airflow, m^2
a, a', b, c, n, n_1, n_2	Empirical coefficients
c_{pa}	Specific heat capacity of air, $kJ/kg\ K$
c_{pw}	Specific heat of water (liquid media), $kJ/kg\ K$
K	Coil heat transfer coefficient, $W/m^2\ K$
K'	Coil heat transfer coefficient times coil heat transfer area, W/K
K_{in}	Induction coefficient $K_{in} = q_i/q_p$
m_i	Mass flow rate of induced air, kg/s
m_p	Mass flow rate of primary air, kg/s
m_w	Water mass (liquid media) flow rate, kg/s
P	Chilled beam total cooling capacity, kW
P_a	Cooling capacity, provided by primary air, kW
P_w	Coil cooling capacity, kW
P_w'	Coil cooling capacity per beam length, W/m
q_i	Induced airflow, L/s
q_p	Primary airflow, L/s
t_{i1}	Induced air temperature entering the coil, $^{\circ}C$
t_{i2}	Induced air temperature leaving the coil, $^{\circ}C$
t_p	Primary air temperature, $^{\circ}C$
t_r	Average room air temperature, $^{\circ}C$
t_{w1}	Temperature of water (liquid media) entering the coil, $^{\circ}C$
t_{w2}	Temperature of water (liquid media) leaving the coil, $^{\circ}C$
Δt	Average temperature difference between cooling media in the coil and induced air temperature before and after the coil,
	$\Delta t = \frac{t_{i1} + t_{i2} - t_{w1} + t_{w2}}{2}, K$
ρ_i	Induced air density, kg/m^3
ρ_s	Supply air density, kg/m^3
ω	Velocity of water (liquid media), measured in the cross-section of the coil pipe, m/s

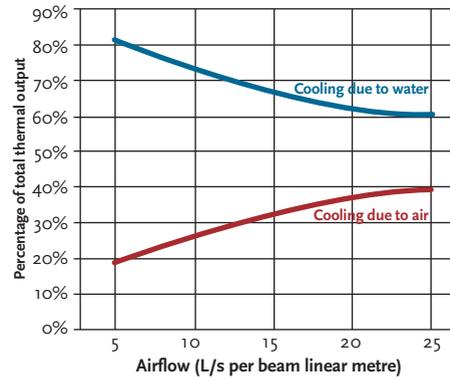


Figure 2: Contribution of air and water to total cooling capacity of an active beam

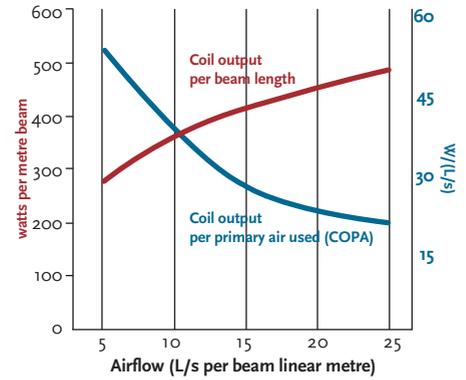


Figure 3: Coil cooling output as a function of primary airflow

particular active beam. As primary airflow increases from 5 to 23 L/s per metre of beam, coil cooling output increases by 70%; however coil cooling output per primary airflow (COPA) becomes three times smaller.

Even though a given beam design with a fixed-nozzle configuration may have the same induction coefficient, correlation between coil heat transfer coefficient and primary airflow is not linear (as expressed later in equation 8). As the primary airflow increases, the coil heat transfer coefficient increases at a slower rate than the cooling capacity of primary air. In the previous example, water cooling output increased by 70% while cooling by the primary air (at constant supply air temperature) increases in direct proportion to the primary air flowrate – 360%.

How to increase beam effectiveness

Increase cooling coil output while maintaining minimum primary airflow. In this section we present equations governing active beam cooling capacity to better understand their performance.

Coil cooling capacity

Referring to figure 1, the following system of equations describes coil heat transfer under steady-state conditions, assuming no condensation on the coil surface.

$$P_w = m_w \times c_{pw} (t_{w2} - t_{w1}) \quad (3)$$

$$P_w = K \times A \times \Delta t \quad (4)$$

$$P_w = m_i \times c_{pa} (t_{i1} - t_{i2}) \quad (5)$$

It is not uncommon in design practice to see the chilled beam water side cooling capacity estimated using single equation 3. Often, the water temperature difference is assumed to be 2.2°C to 3.3°C and the other two equations affecting coil cooling capacity are neglected. It is important to understand that the temperature of water leaving the coil t_{w2} is a function of several parameters, including the temperature and velocity of induced air travelling across the coil, as well

as the temperature and velocity of the water passing through it. For a given coil, heat transfer coefficient K is a function of all the previously mentioned parameters, and it should be calculated but never assumed. The effectiveness of the active beam is defined by its heat transfer coefficient and coil heat transfer surface area. The higher the KA value, the higher the coil cooling output, the higher the COPA.

Coil heat transfer coefficient

Coil heat transfer coefficient K for a given chilled beam design depends on:

- **Mass velocity** (velocity times density or mass airflow divided by free cross-sectional area of the coil) of induced air travelling across the coil v_p ; and
- **Velocity of water** in the coil ω .

It is governed by equations of forced convection for air passing through the coil with water (or other cooling media circulating inside the coil) and can be described by the following empirical equation.

$$K = a' (v_p)^{m_1} \omega^{n_2} \quad (6)$$

Convective heat transfer coefficient from the water to the pipe is significantly higher than that from the coil fins to induced air passing through the coil. That is why v_p has dominant effect in equation 6 (where there is turbulent water flow as is normally the case). The authors' own measurements show that power factor n_1 is three to four times higher than n_2 .

Since the coil heat transfer area is constant for a given beam, a similar equation can be used to calculate heat transfer coefficient times the coil surface area or coil cooling output per degree of temperature difference Δt .

$$K' = KA = a (v_p)^{m_1} \omega^{n_2} \quad (6a)$$

The velocity of induced air v , which is defined by induced airflow per unit length of coil and coil cross-sectional free area, depends on primary airflow q_p , beam induction coefficient K_{in} and temperature difference Δt . The first two parameters (in [7]) take into

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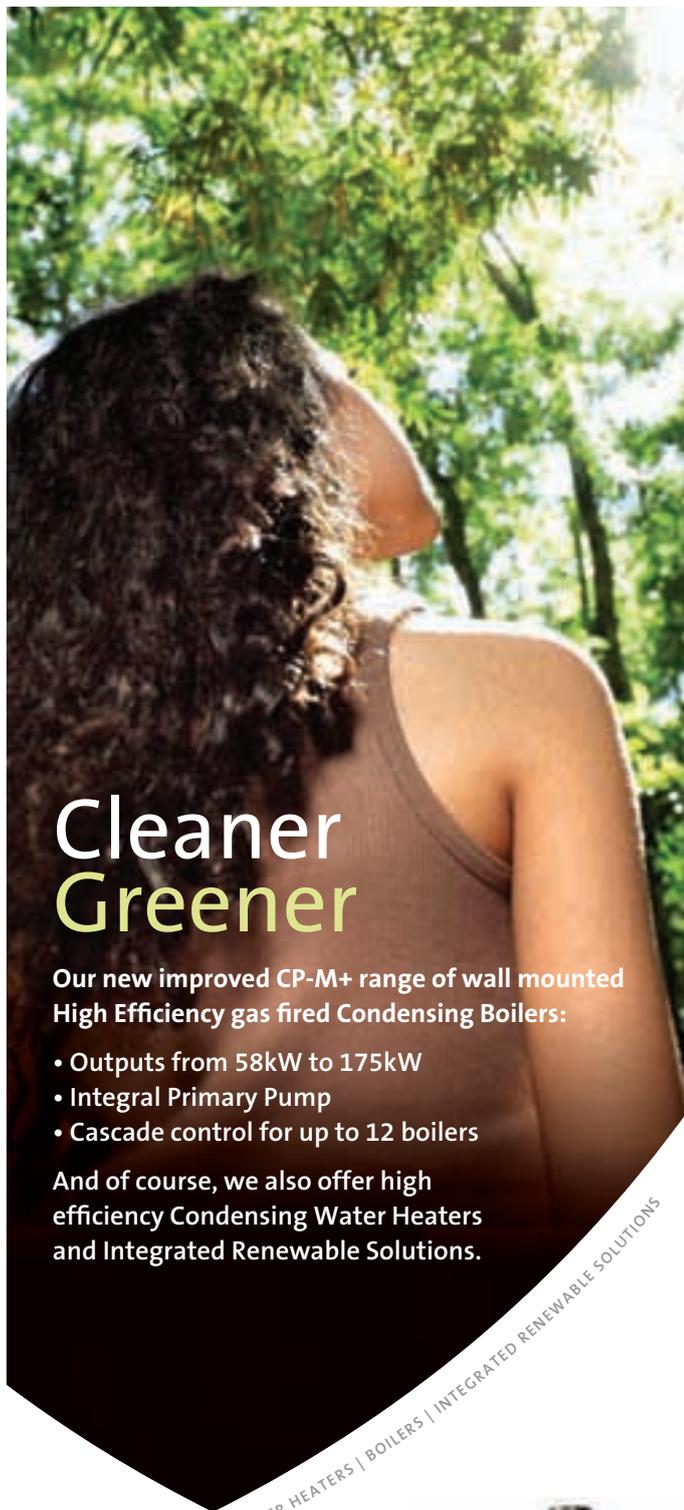
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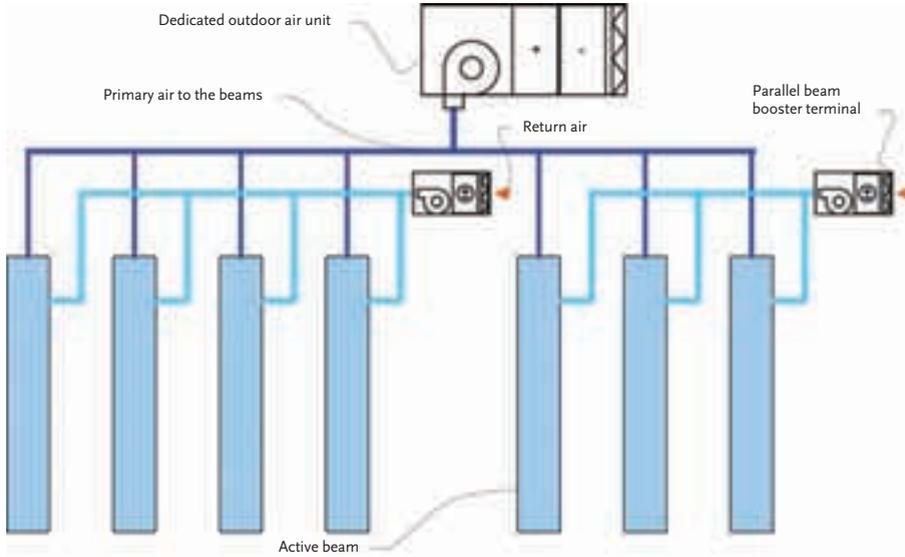


Figure 4: Variable air volume beams with the parallel boosting terminal

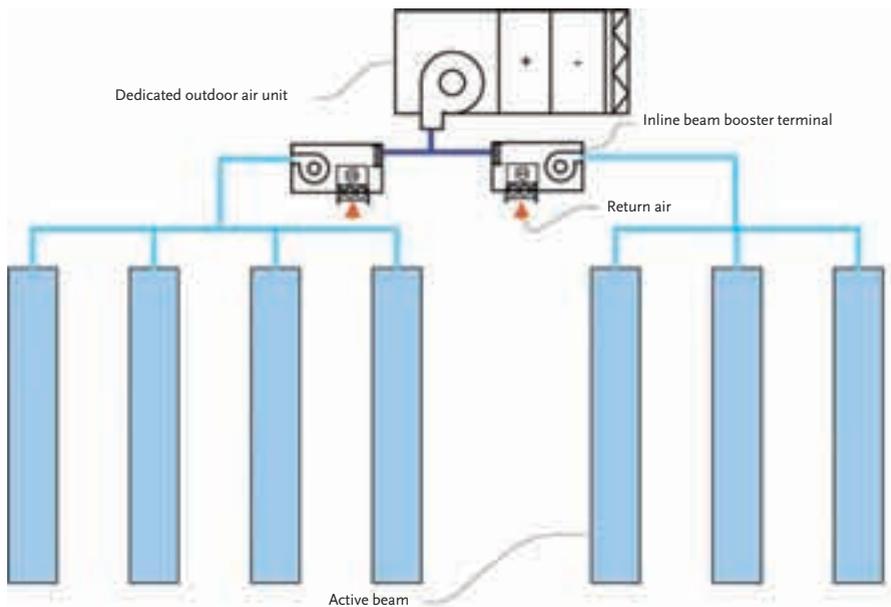


Figure 5: Variable air volume beams with the inline boosting terminal

► account active beam induction force and the second pair consider the buoyancy force acting on non-isothermal air moving in a vertical direction across the coil. For example, if warm induced air moves up across the coil, it cools down and buoyancy force slows its motion. On the contrary, if active beam design deploys downward movement of induced air, this buoyancy force will be accelerating the air movement across the coil when in cooling mode.

$$v = \frac{K_m \times q_p + b \times \Delta t}{A_f} \quad (7)$$

Combining Equations 6a and 7, and taking into consideration that A_f is constant for a given beam design, an equation is defined relating coil heat transfer coefficient as function of temperature difference Δt , velocity of water in the pipes ω and primary airflow q_p .

$$K' = a [(c \Delta t^n + K_m \times q_p) \omega]^{n_1 \omega^{n_2}} \quad (8)$$

In active beams with induced air moving horizontally across the coil, coefficient b in Equation 7 becomes zero because velocity across the coil is not affected by buoyancy force and Equation 8 is reduced to:

$$K' = a (K_m \times q_p \times \omega)^{n_1 \omega^{n_2}} \quad (8a)$$

Equation 8a can also be used to define the heat transfer coefficient for passive beams, where airflow through the coil is determined by convection forces only as represented by the following equation.

$$K' = a (\Delta t^n \times \omega)^{n_1 \omega^{n_2}} \quad (8b)$$

Equation 8 and its derivatives are important for understanding what parameters affect coil cooling or heating output. They provide sufficient information to simulate any active beam in energy simulation software. All empirical coefficients a , c , n , n_1 , n_2 and K_m are constant for a given beam design and can be derived from the manufacturer's cooling and heating (when testing active beams for heating) capacity tests. The test sequence, along with the calculation procedure to determine these coefficients, can be part of the method of tests for active beams currently being developed by ASHRAE. This would help integration of active beam systems in the energy simulation software.

Power factor n_1 in these equations is three to four times higher than power factor n_2 . That leads to the conclusion that increasing K_m has a major effect on the COPA. The higher induced airflow through the coil, the higher the coil output, hence the higher the COPA.

The evolution of active beams: VAV beams

A fan-assisted, or VAV, beam uses a built-in fan to increase the circulation of room air during peak loads. Such a system designed for hotel applications is used to boost the cooling or heating output of a beam by up to 30% during peak load hours, and to accelerate room conditioning at the start of 'occupied' mode.

Figures 4 and 5 show beam booster terminals (BBT) that increase the cooling/heating output for a group of beams. A BBT, fitted with a cooling coil and a condensate drain, can also be used for dehumidification in case of excessive latent load in a zone served by this unit.

The parallel booster terminal (Figure 4) is similar in design to a fan-coil unit with a variable speed fan, increasing return airflow and boosting cooling/heating output. It is similar to a fan-powered terminal, but induced airflow can be controlled independently of primary airflow. As shown in Figure 5, the inline BBT requires no additional ductwork and can work with regular active beams. It relies primarily on increased



circulation through the beam. Both designs with the inline and parallel BBTs are applied when the cooling or heating capacity of the coil in an active beam has reached its limit, but a space thermostat still calls for cooling or heating.

Conclusions and recommendations

When designing active beam systems, don't simply limit size beams under peak load conditions; verify beams' performance under partial load. Design objective should be to minimize primary airflow and maximize use of water coil for cooling and heating.

Minimum airflow shall satisfy space latent load and minimum ventilation requirements. If such design is not feasible, explore using alternatives such as variable air volume active beams to maximize use of water cooling/heating under partial load conditions.

Active beam coil output to primary airflow ratio is an important parameter in active beam selection. The higher the COPA value, the more efficient the active beam design. **CJ**

Acknowledgment

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Further reading

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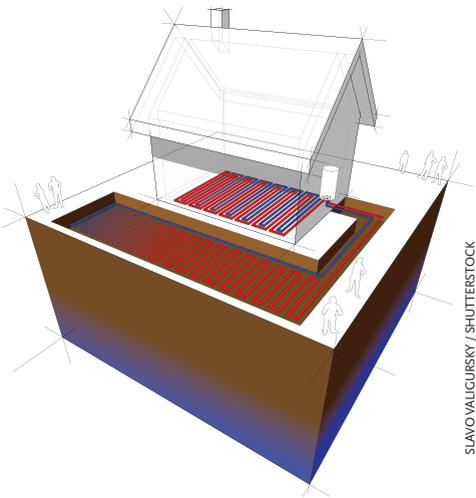
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BLOWING HOT & COLD



The installation of cheap but inefficient and inappropriate ground source heat pumps to achieve ‘simultaneous’ heating and cooling must stop, declares **Andy Howley**. Here he analyses four systems to see which works best

What is simultaneous heating and cooling? Is it cooling and heating at the same time? Is it cooling and heating at the same time with the same equipment? Or, is it heating and cooling loads in the same day, week or month? Loopmaster Europe sees all manner of systems asking for simultaneous heating and cooling and there is often very little understanding of the energy flow or the associated timings of the different loads.

If we consider a conventional heating and cooling system using boilers and chillers, simultaneous heating and cooling, is quite clearly possible with two separate systems running at the same time. The boiler can provide low temperature hot water (LTHW) on demand and the chiller system can provide chilled water (CHW), again on demand, assuming the distribution system is capable. The two function independently of each other and can provide heating and

cooling up to the maximum plant capacity if required, at the exact same minute of the day.

As regards heat pumps, what would a simultaneous heating and cooling system look like?

Firstly, we must define just how ‘simultaneous’ the load actually is, to decide which system best suits the loads. Is it simultaneous on a ‘second by second’ basis, or on an hourly basis? Is there a heating load in the morning and a cooling load in the afternoon? Is there a distinct heating season and a separate cooling season? All of the above have, at some time, been described as ‘simultaneous’ in specifications and tender documents.

However, only the first – on a ‘second by second’ basis – is truly a simultaneous heating and cooling load. Hourly and daily loads can be shifted to a certain degree to provide them simultaneously to a store to be used when required. Of course, using ground source systems for heating and cooling provides energy storage in the ground; the summer’s heat rejection can be stored in favourable geology and used to enhance the heating performance during the winter, and vice versa in the summer.

So, in order to determine how simultaneous a load is, we need load data. Figure 1 shows an annual profile by month for a ground source heating and cooling system in Yorkshire. Although this is probably sufficient to design a simple system, does this provide sufficient information to decide which type of heat pump combination is the most carbon and operationally cost effective? Looking at the month of May, this

District system monthly load profile

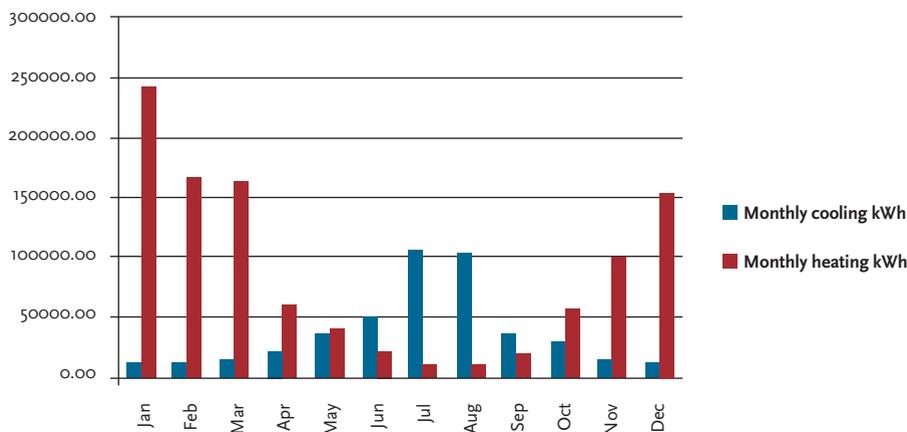


Figure 1: Annual district heating system load profile

would appear to be virtually balanced in terms of monthly load, but just how much of this occurs at the same time? This can only be determined with an hourly load profile.

If we concentrate on simultaneous heating and cooling in the true sense of the description – that is, at the exact same time – which heat pump configurations actually deliver it? And which deliver and provide carbon savings to shout about?

Of course, one can enhance the design of any system, including the first of four examples outlined below, but all of these comparisons are based on a basic system configuration, as outlined in the following schematics for comparison purposes.

Option 1: Single refrigerant reversible heat pump

Let's first look at a single refrigerant reversible heat pump, which is a packaged unit with one or two compressors with a 'ground side' and a 'load side' fluid flow path. Heating is provided by using the ground side heat exchanger in the heat pump as an evaporator and the load side as a condenser. When cooling is required, the reversing valve changes the flow direction of the refrigerant and the ground side then becomes the condenser and the load side becomes the evaporator.

This system can only deliver either a heating load or a cooling load in its simplest form. It cannot deliver both at the same time from the heat pump. This type of system is relatively simple and is suited to a load profile that has totally separate heating and cooling loads, even if it is only hours apart (see figure 2 and 3).

In short, this set up cannot provide simultaneous heating and cooling directly from the heat pump and, quite often, the heating and cooling emitters are the same system, keeping controls relatively simple. This system is well suited to domestic or small commercial systems where control is by thermostat or even simple manual 'on demand' switching.

Option 2: Slider header systems

To use refrigerant reversible heat pumps – as many do – to provide simultaneous heating and cooling, multiple units are needed and a header configuration that can direct flow to either the CHW or LTHW systems separately. These header systems are often referred to as a sliding header, as shown in figure 4.

This system can provide 100% heating load and 100% cooling load by opening

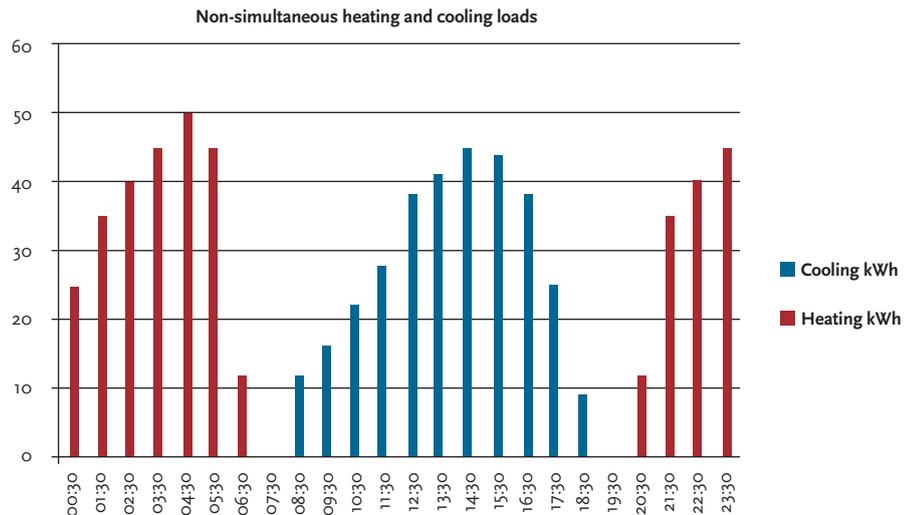


Figure 2: Morning and afternoon separate loads can be delivered by a simple reversible heat pump system

and closing two port valves in the header to divert to either the LTHW or CHW systems. However, it can only provide 50% heating and 50% cooling simultaneously with two heat pumps, and 33%/66%, for example, with three heat pumps. Either way, it cannot provide full or greater than 50/50 simultaneous heating and cooling unless additional heat pumps are used to increase the overall capacity. For example, to provide 100% heating and cooling simultaneously, 200% heat pump capacity is required. This system will also provide the load to a controlled set point for both heating and cooling loads.

The analysis carried out in this paper can only be done with hourly loads. Anything else is futile and merely a guess

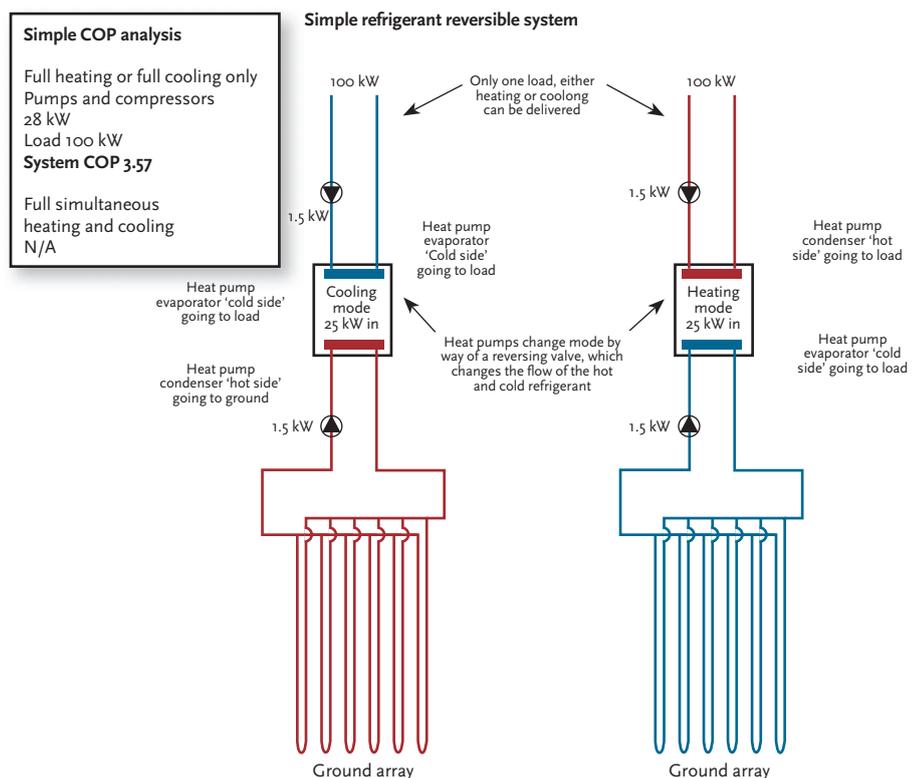
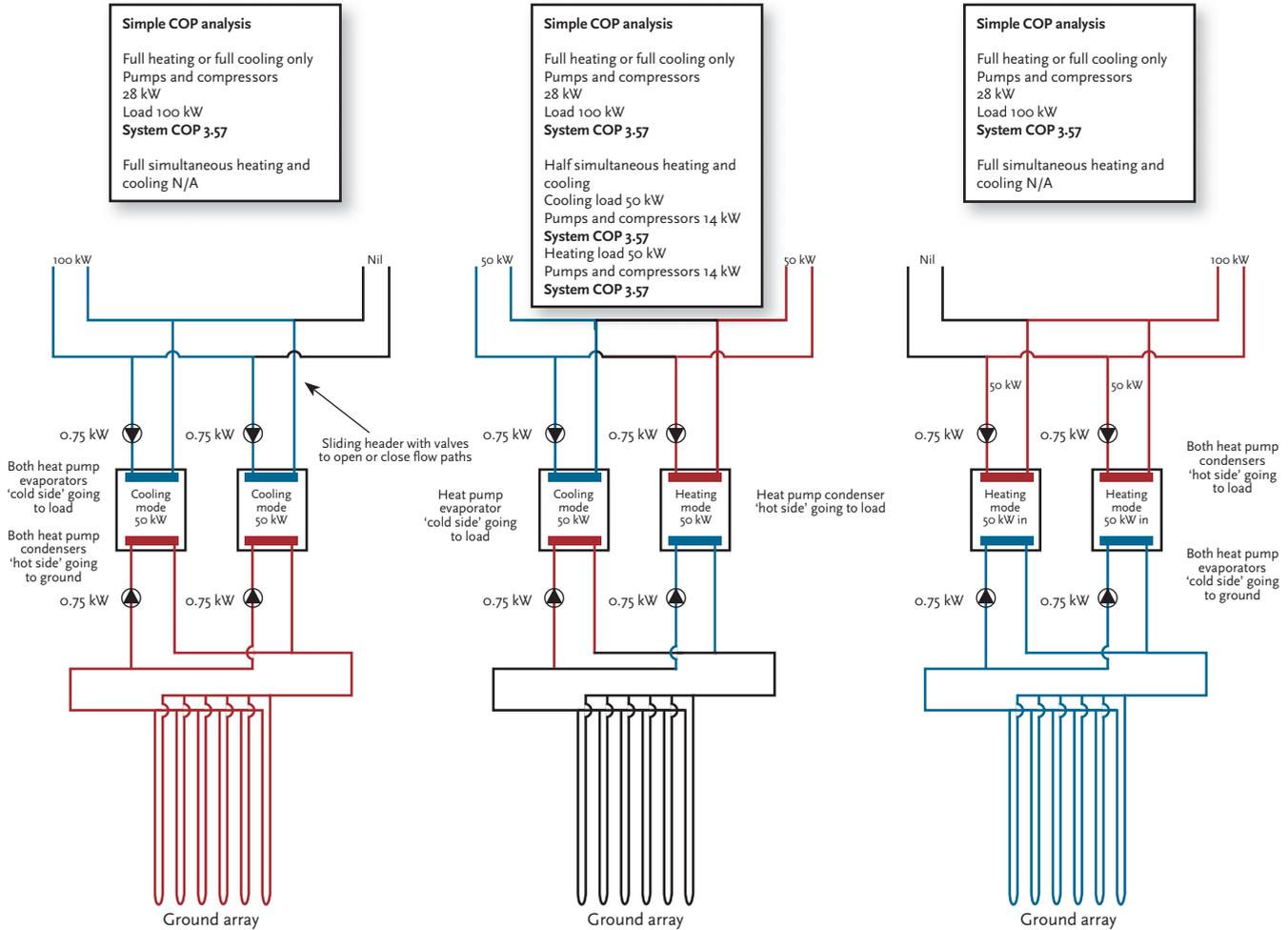


Figure 3: A simple refrigerant reversible heat pump system in heating and cooling

Figure 4: Complex refrigerant reversible system with sliding header



These inappropriate systems are not 'value engineered' for the operator. They are, however, a much easier and cheaper option for an inexperienced and unqualified installer

The main drawback with this system is that it must use one compressor to provide the heating and one to provide the cooling. As a result it is a comparably inefficient means of providing simultaneous heating and cooling. It also requires pumping to deliver fluid to both sides of all the heat pumps in operation, creating an increased 'parasitic' input pumping power. We have seen claims that the coefficient of performance (COP) of the heat pumps operating together can be added together for an overall system COP, but this is an incorrect methodology for calculating COPs, as can be seen in the COP calculation in Figure 4.

So, this system can provide simultaneous heating and cooling, but not efficiently in terms of input energy or pumping power. It is best suited to providing separate heating and cooling loads that do not occur simultaneously or, if there are some simultaneous loads, these are not regular throughout the year (as circled in figure 5) and the lower system efficiency is tolerable for these short durations in return for a relatively simple system.

Heat pumps – regardless of type and/

or operation – have a hot and a cold side by virtue of the evaporator and condenser operation. An efficient means of providing simultaneous heating and cooling is by the use of both sides of a heat pump, or multiple heat pumps.

Option 3: Simple refrigerant reversible system

Figure 6 is a simple schematic using three port valves to switch between the ground array and the load on both the evaporator and the condenser. This does truly provide simultaneous heating and cooling at 100% of the units' capacity.

A further advantage of this system is the ability to use thermal storage to increase the amount of load that can be generated simultaneously. With previous example systems, there is no point in providing thermal storage because there is no real increase in efficiency. However, with the evaporator/condenser both providing load, a morning heating load can be used to charge a thermal store with chilled water ready for the afternoon cooling, and the store is depleted or used as needed prior to, or in conjunction with, bringing on the

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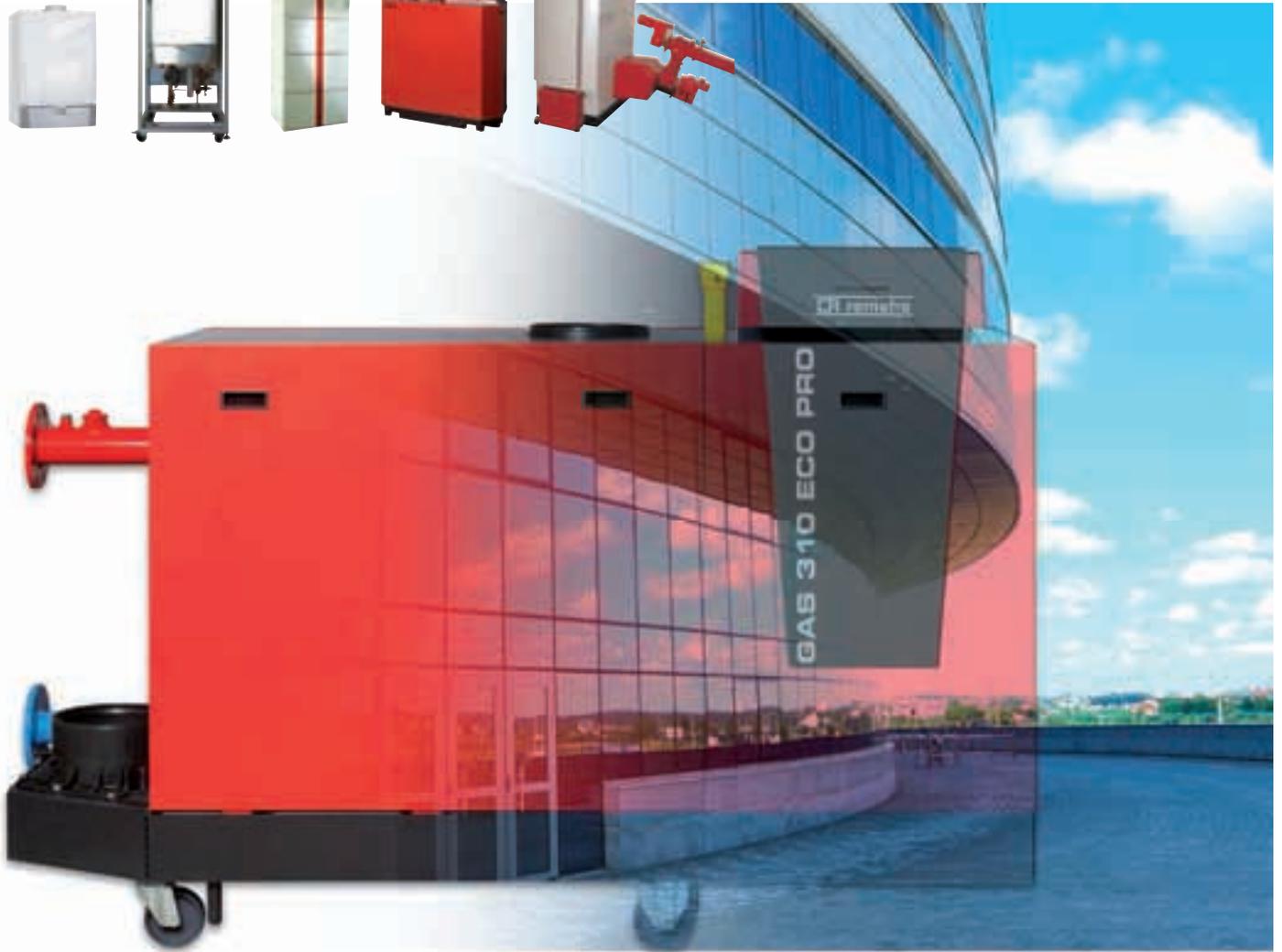
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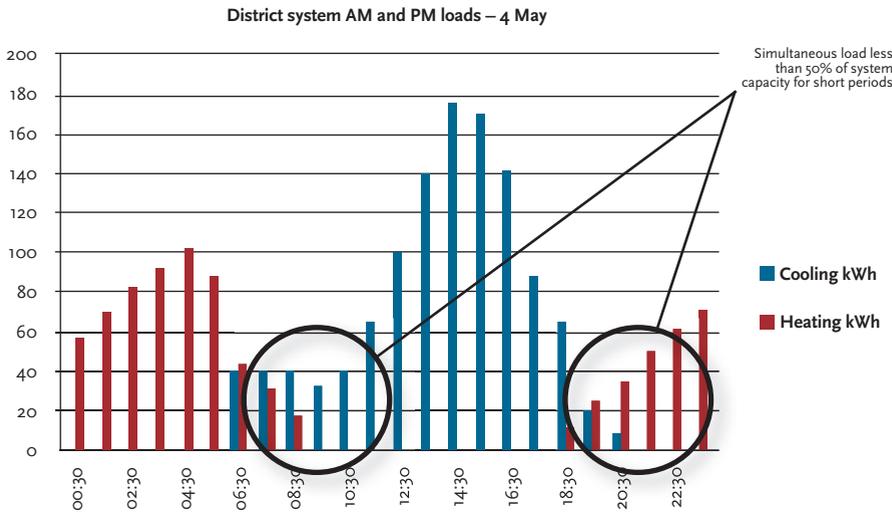


Figure 5: Morning and afternoon loads with small periods of simultaneous loads

heat pumps. The same then occurs during the cooling cycle in the afternoon, where the following morning's heating can be generated during the afternoon cooling process (see figure 7). Effectively, load shifting generates as much energy as possible simultaneously, thereby hugely increasing overall system efficiency. Use the morning heat load to

charge a thermal store and release this to augment or provide the afternoon cooling and vice versa.

The drawback of this system, however, is that the hydraulics of the heat pump may need to be separated from the LTHW and CHW systems as, by virtue of the three port valves, the fluids from the ground array will pass to the LTHW and CHW. If there is a thermal transfer fluid requiring antifreeze to protect the evaporator, this fluid will be present in both the LTHW and CHW systems. This is an added installation and maintenance cost.

A further drawback is the control strategy required to operate such a system. Generally, the heat pumps can only deliver one load to a controlled set point. For example, if the system is cooling dominant at a certain point in time, the heat pumps are programmed to deliver the load to a set point in cooling. The heating then provided by the condenser is effectively 'uncontrolled', in that the heat pump is not delivering this load to a particular set point. The building management system (BMS) must therefore identify how best to deliver this load and when, using the three port

Simple COP analysis
 Full heating or full cooling only
 Pumps and compressors 28 kW
 Load 100 kW
 System COP 3.57

Full simultaneous heating and cooling
 Pumps and compressors 28 kW
 Load 200 kW
 System COP 7.14

Simultaneous capabilities using three port valves

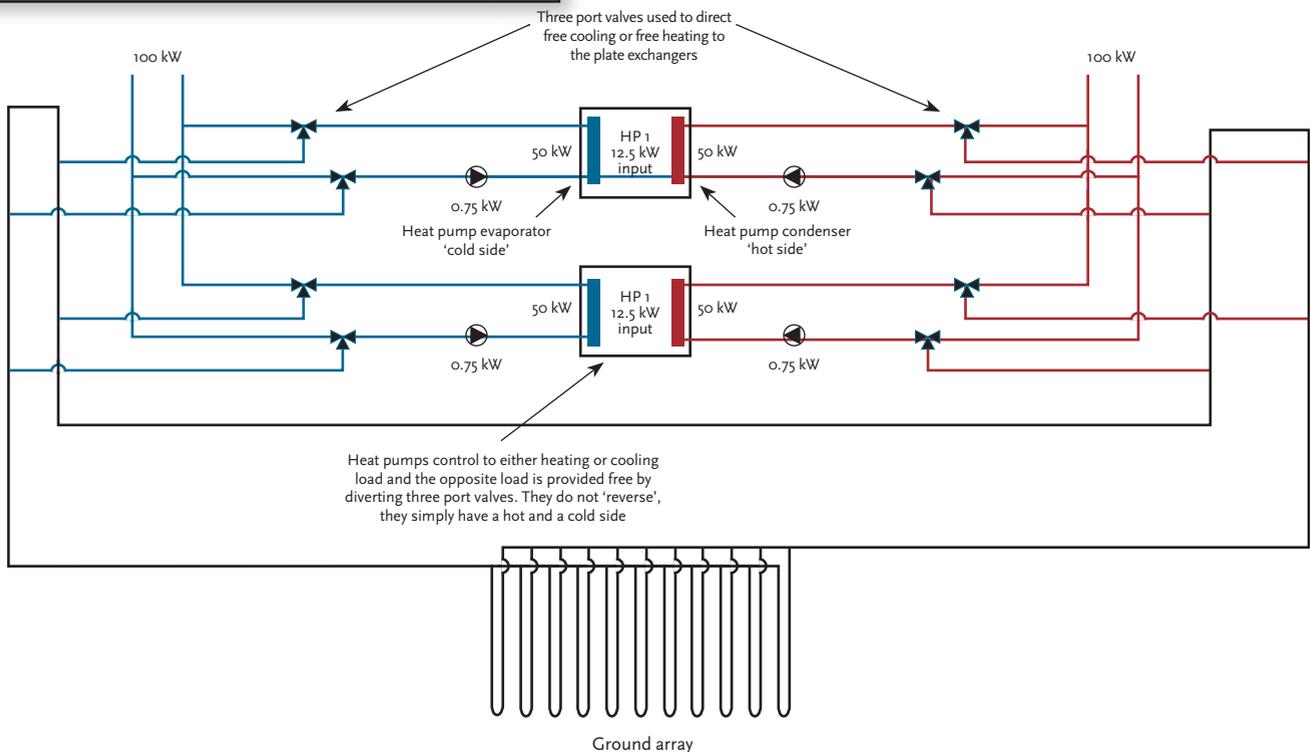


Figure 6: A simultaneous heating and cooling heat pump system with three port valves



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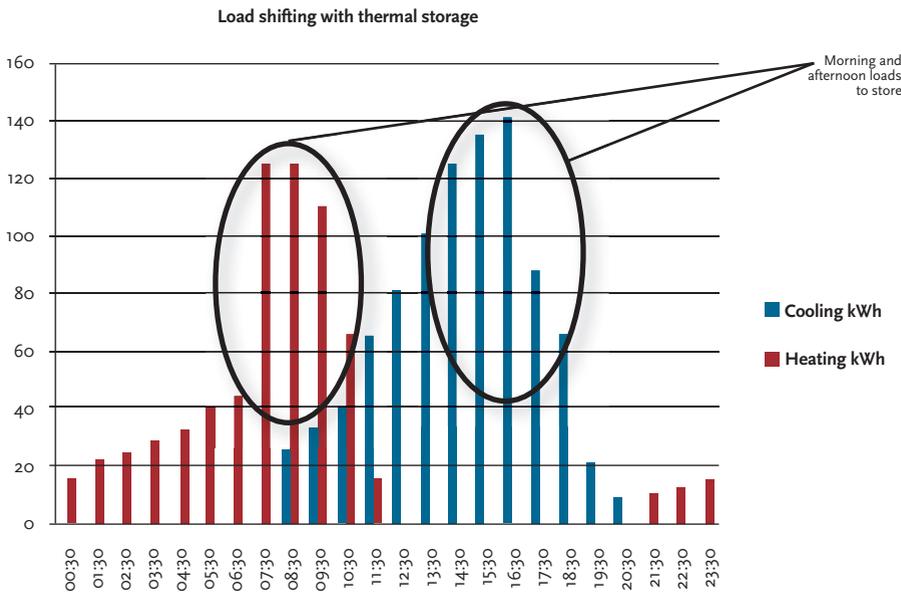


Figure 7: A load profile that warrants thermal storage to provide as much load simultaneously as possible

valves. Again, using a thermal store is a good way of using this uncontrolled load.

Option 4: Six-pipe heat pump with heat recovery

The final example is of a six-pipe heat pump with heat recovery (see figure 8).

Importantly, internal to the heat pump, the load is apportioned to either the CHW system, LTHW system or the ground array. The BMS merely calls for either the LTHW, CHW, or both loads and the heat pump delivers both loads to set points.

Simple COP analysis	
Full heating or full cooling only	Pumps and compressors 28 kW
Load 100 kW	System COP 3.57
Full simultaneous heating and cooling	Pumps and compressors 28 kW
Load 200 kW	System COP 7.14
Part simultaneous heating and cooling	Pumps and compressors 29.5 kW
Load 200 kW	System COP 6.78

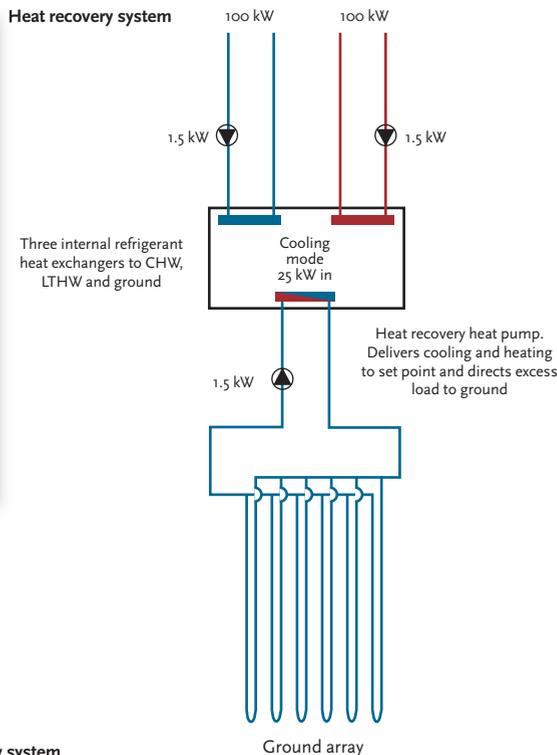


Figure 8: A six pipe heat recovery system

The thermal store option can still be used with this type of system to again load shift from one part of a day to another, to further enhance the efficiency of the overall system.

In true and simplistic efficiency terms, this may not quite reach the levels of a three-port valve system. However, the very simple pipe work – and controls – plus the ability to maintain two set points as opposed to one, provide compelling reasons to accept this slight drop in performance of the overall system over what is a very simple option.

Conclusions

The analysis carried out in this paper can only be done with hourly loads. Anything else is futile and merely a guess.

Hourly loads must be provided for even the most simple types of systems and this must quickly become commonplace.

Option one cannot provide the simultaneous loads.

Option two can only provide the simultaneous loads inefficiently; this system is cheap to install but expensive to run.

Option three can provide truly simultaneous heating and cooling with the efficiency of only using one compressor, or bank of compressors, to do it and thermal storage can further enhance the system efficiency.

Option four can do all of the same things as system three, but is less complex in terms of controls and piping, and isolates the LTHW and CHW from the ground array fluids. Options three and four present by far the most efficient systems for simultaneous heating and cooling, on both lifecycle and carbon savings, beat option two hands down. It's simple – the initial cost to the operator of these inferior systems appears low. However these inappropriate systems are not 'value engineered' for the operator. They are, however, a much easier and cheaper option for an inexperienced and unqualified installer.

The practice of installing cheap but inefficient and inappropriate systems must stop. Production of hourly loads for even relatively simple systems must become the norm and be carried out very early in the overall building concept and design process. It is our job to help clients understand that the cheapest to install may actually prove to be a very expensive on-going mistake. CJ

Andy Howley is a certified geo-exchange designer (CGD) and also is the technical director of Loopmaster Europe, www.loopmastereurope.co.uk



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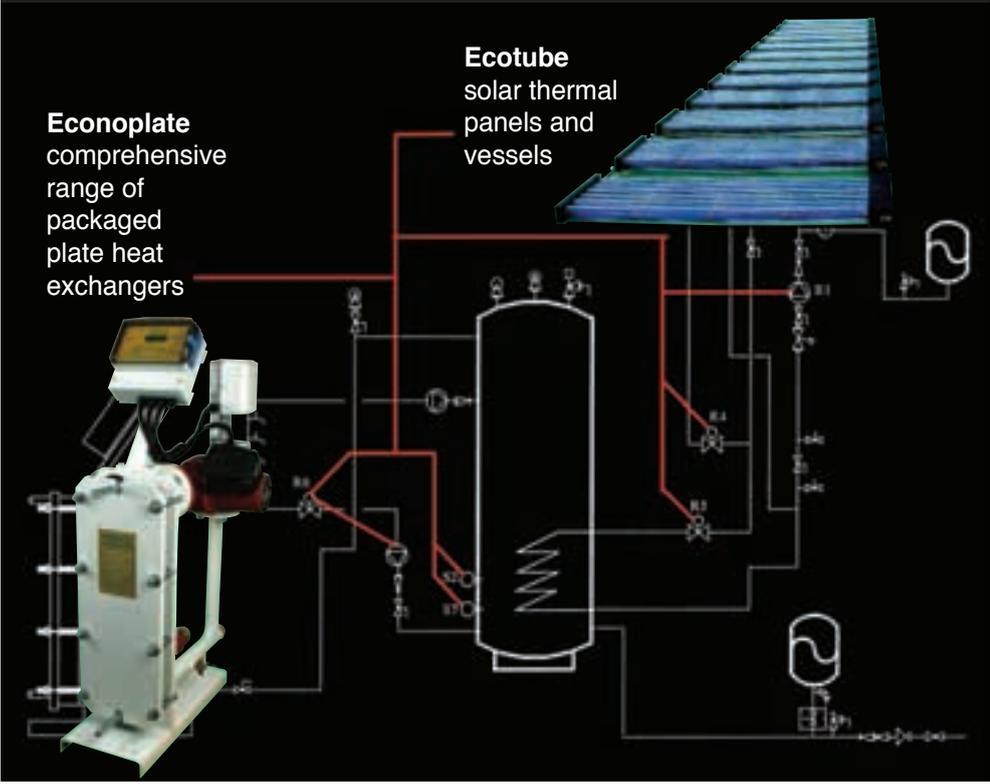


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EU LAW HOTS UP

The Ecodesign of Energy Related Products Directive and the EU Labelling Directive are set to have a significant impact on the specification of heating equipment, says **Jeff House**

It is likely that non-condensing, direct-fired water heaters and boilers in the affected output range will disappear

The Ecodesign of Energy Related Products (ErP) Directive (2009/125/EC) sets specific performance requirements for products that consume energy. Product groups are split into a series of 'lots'.

To many building services practitioners, the Ecodesign Directive will not be a new concept. For example, heating circulators (covered by ENER lot 11) face mandated efficiency limits from January 2013. Implementation of ENER lot 1 (space heaters and combination heaters) and ENER lot 2 (water heaters and hot water storage tanks) will also be of interest.

The scope of lot 1 encompasses hydronic space heat, producing appliances such as boilers, heat pumps and CHP, with a gross rated thermal output up to 400 kW, or 50 kWe for combined heat and power (CHP). Heaters of 70 kW rated output and below are subject to slightly different requirements than 70 kW to 400 kW-rated outputs, representing the different approaches to boiler efficiency declaration in the domestic and commercial markets.

Lot 2 covers water heaters and storage tanks with up to 400 kW input or 2,000 litres capacity, with requirements split by size profile, from '3XS' (single outlet heaters) to '4XL' (large communal systems).

Lots 1 and 2 will dictate minimum efficiency, NOx emissions and, for heat pumps, noise limits. They will introduce tiered mandatory requirements at two, four and five years after implementation of the Directive. Suppliers will be unable to sell products within the EU that fall short of these limits. To ensure compliance, the Directive enacts market surveillance checks and financial penalties for non-compliance.

The Directive's detail has changed several

times and this is one source of confusion – compounded by delays. However, there are now strong indications – subject to a regulatory vote in late 2012 – that lots 1 and 2 could become law in early 2013. The Directive would then enact a series of minimum product requirements.

Implemented alongside ErP is the complementary EU Labelling Directive (2010/30/EU), which requires ErP product groups to display an energy efficiency rating and 'grade', as now found on domestic white goods. This legislation has been passed, but the test requirements set out in ErP ENER lots 1 and 2 will form the basis of the label content, so the two measures will be aligned. The most likely timeline for implementation in relation to commercial water heaters is as follows, subject to the results of the vote:

- 2015: Efficiency limits set, SPL limit set for heat pumps, legal requirement for product label and fiche
- 2016: NOx limits set (gas and liquid fuelled products)
- 2017: Higher efficiency limits, maximum standing losses for stores set, lower efficiency ratings removed from label
- 2018: Higher efficiency limits (larger water heaters). NOx limit set (CHP, heat pump and solar products with fuel burners).

Lots 1 and 2 cover products 'placed on the market' or 'put into service', so apply to installations in new and existing buildings, unlike the split approach of Approved Document L of the Building Regulations.

It is clear the ErP will have a marked effect as many current products will not meet mandated efficiency or emissions limits. It is likely that non-condensing, direct-fired water heaters and boilers in the affected output range will disappear, and that many current designs of oil-fired appliances will struggle to meet NOx restrictions. So there are clearly implications for product replacement, such as flue system suitability and condensate disposal arrangements.

With this in mind, building operators and facilities management organisations would be advised to consider eventual replacement with condensing products.

Until we know the outcome of the regulatory vote we can only sit and wait. However, with the possibility of mandatory standards and labels by early 2015, it does no harm to plan for the future. **CJ**

● *The history, process and terminology used in the Ecodesign Directive is discussed in this month's CPD article on page 65.*

Jeff House is applications manager at Baxi Commercial Division and represents the ICOM Energy Association

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The development of requirements under the Ecodesign Directive

This module looks at the processes involved in the creation of the European Commission's Ecodesign Directive legislation

Reading the popular press, one might think that the Ecodesign Directive is there purely to frustrate the consumer by imposing bureaucratic legislation that had no purpose other than to keep Eurocrats in business and to line the pockets of interested parties. However, delving a little deeper uncovers that the development of this extensive set of regulations has truly worthy aspirations, and is underpinned by rigorous research and analysis that is itself under continuous review. This CPD article will provide background on how the legislation is created and why the legislators have particularly focused on many areas that impact building services.

The Ecodesign Directive¹ was evolved to ensure proper consideration of the total environmental impacts of products – from design, through manufacture, installation, use and disposal – by the integration of environmental aspects at a very early stage in product design. Moreover, the recent report by the environmental consultant Ecofys² indicated that every euro saved in energy consumption by implementing the measures would be matched by savings from reductions in utility costs as European energy demands reduce. This could potentially double the predicted €100bn reductions that would result from implementing predicted

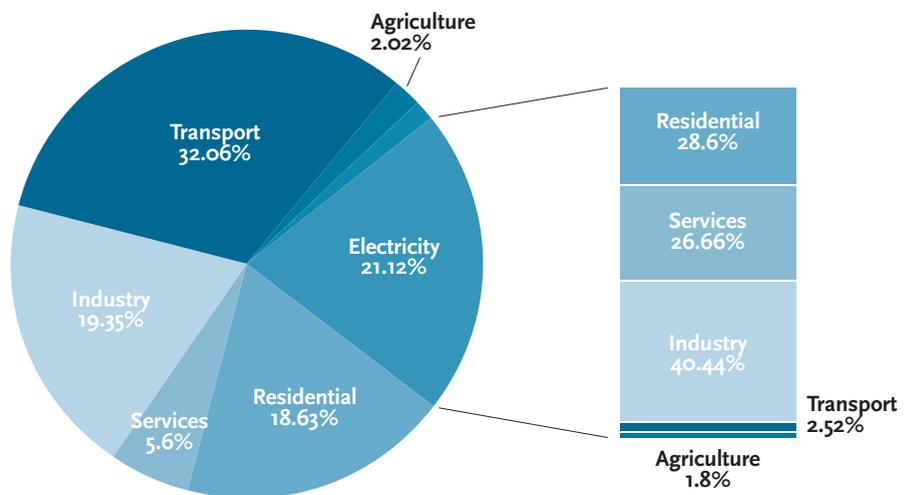


Figure 1: Breakdown of energy use across the 27 countries of the EU⁶

cost-effective energy-saving measures. This is speculative, of course, particularly as a recent monitored survey³ of UK homes indicated that the most 'energy conscious' consumers used 10% more energy than the average – possibly hinting that when 'low energy' products are used, there may be temptation to use them longer or more frequently.

An overarching concern is that the EU is currently highly dependent on external energy supplies – importing more than 80% of oil, 60% of gas and 40% of coal. Fuel security is a keen driver for change, and if no adjustments

are made, imports would account for 66% of EU energy requirements by 2020.⁴ The current final energy consumption across the 27 EU countries is around 13,500 TWh pa⁵, divided as shown in Figure 1. In the first phase of the Ecodesign development, originally aimed to complete at the end of this year, electrical products were the principal focus both in the residential and 'tertiary' sectors. (The 'tertiary' sector is the 'services' sector defined as public sector, education, healthcare, services and commerce.) These two sectors account for about one third of

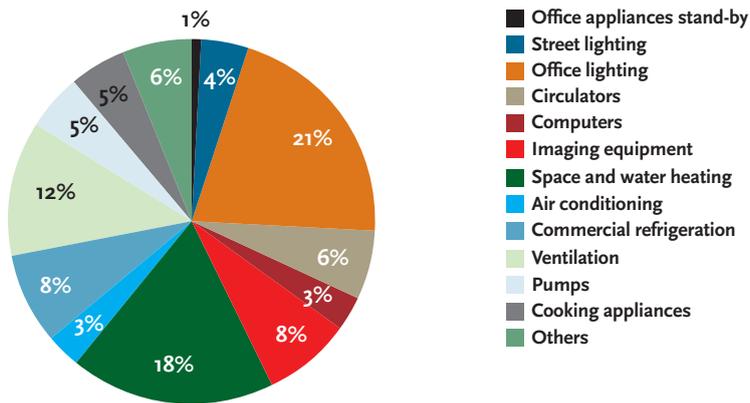


Figure 2: Breakdown of tertiary EU27 electricity use⁶

EU final energy, at around 4,900 TWh pa. By instituting a coherent set of requirements across a wide range of energy related products (ErP), the intent is to ensure a consistent set of mandatory benchmarks. The overriding consideration is that the functionality of a product must not be lowered as a result of its conformity to the requirements of the directive. So, practically, the requirement⁷ that has virtually banned the sale of incandescent lamps should also make proper provision that products that meet the regulation will provide the same light output and usability as the old style light bulb that it replaces. Unfortunately, the interpretation and application of this particular directive (although predicting savings of 39TWh pa by 2020⁸) has caused upset in some sectors of the media and the general public, and has coloured opinion about the whole Ecodesign Directive. So, to properly succeed, the directive should promote holistic practices that consider all aspects of a product's impact. The aim is to move the market away from poorly performing products and encourage the development and utilisation of improved technology. The creation of a consistent EU-

wide set of rules aims to prevent disparate national legislation on environmental performance and, in so doing, enable intra-EU trade. The Ecodesign Directive works closely with, but is separate from, the Energy Labelling Directive 2010/30.

There has been extensive research to establish the appropriate and proportionate measures to reduce total energy consumption across the EU. The overall goal is to reduce consumption by 15% through these measures by 2020. A product subject to Ecodesign requirements will only be allowed to carry a 'CE' ('European Conformity')⁹ mark if it has complied with the regulations. In 2009, the Energy Related Products Directive (2009/125) evolved from and replaced the original Energy Using Products (EuP) Directive (2005/32)¹⁰ – both are referred to as 'the Ecodesign Directive'. The original energy using products (EuP) were defined as those that use, generate, transfer, or measure energy, including items such as boilers, computers, light 'bulbs', pumps and fans. Energy related products (ErP) were initially those that had an impact on energy consumption but not necessarily those that use the energy,

and include such things as windows and insulation. The term 'ErP' is now used universally to cover all products. The process of establishing a regulation can be somewhat iterative, and may be prolonged, owing to individual states or interest groups having strongly-held opinions. The process starts with a **workplan** – the second workplan (for 2012-2014) is still being finalised, but it was fundamentally agreed earlier this year. The products identified for inclusion under the Ecodesign requirements have high-volume EU sales (typically above 200,000 units per annum)¹¹. As a result, the development of Ecodesign regulations relating to the tertiary sector has generally been determined by the relative magnitude of electrical energy use (as indicated in Figure 2).

With the workplan agreed, each product group (known as a 'lot') undergoes a preparatory study that examines relevant market data and the technological aspects that influence the design, manufacture, operation and disposal of the product. This work, which includes stakeholder meetings, is undertaken by consultants, who are awarded the project by tender. The resulting reports provide extensive and detailed information on the particular product group. These freely available reports are highly recommended as an information source (a recent example being the report for ENTR Lot 6 – *Air Conditioning and Ventilation Systems*).

This study provides the core information for the subsequent stages. A working document (WD) is produced that is shared with experts across the EU states and is used to inform a Commission impact assessment (IA). Groups of panel experts meeting in the Ecodesign consultation forums (CF) discuss the proposal, and the regulation is drafted.

The proposal is shared among relevant

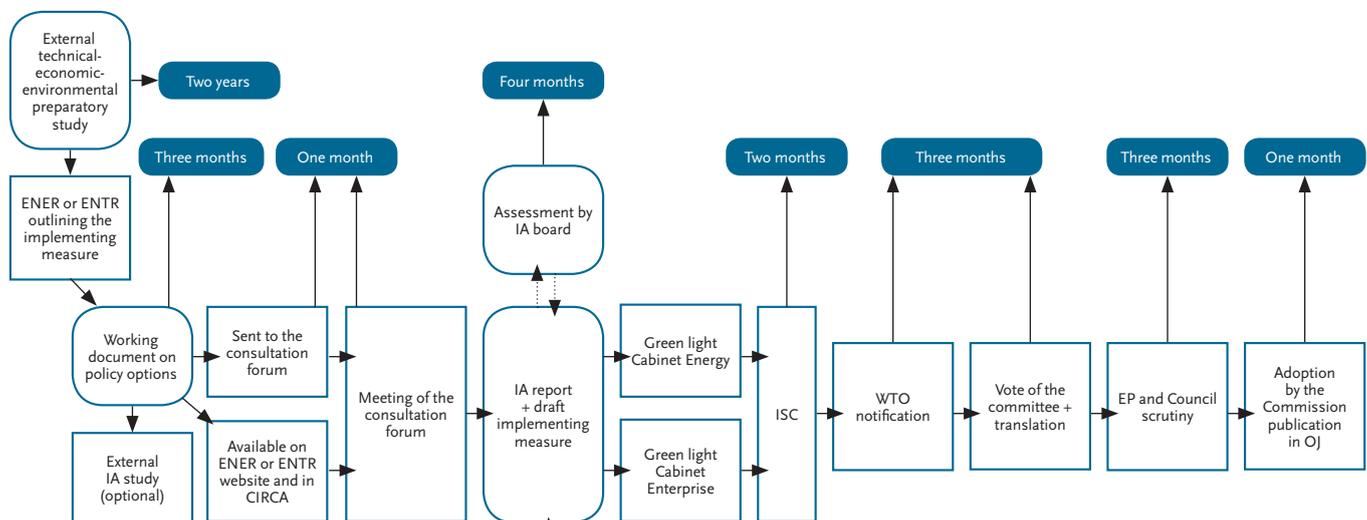


Figure 3: The process for implementing measures under the 2009 Ecodesign Directive³

EC directorates to ensure coherence (known as interservice consolidation (ISC)). Having been passed to the World Trade Organisation (WTO), the Ecodesign regulatory committee (RC) – made up from all the member states – votes on it. Subject to there being no objections from the European Parliament and Council, the measure is approved and published in the official journal (OJ).

The methodology to develop Ecodesign regulations legislation grew out of the original Ecodesign Directive (2005/32)¹², and has been updated over the last year to account for the experiences of the early regulatory development. The new *Methodology for the Ecodesign of Energy-related Products* (MEErP 2011) describes tasks, tools, data and deliverables for the preparatory study. It provides a framework to establish whether products are eligible for Ecodesign measures, whether they should have generic or specific requirements and, if specific requirements are appropriate, determine appropriate parameters and identify potential markets and timings (see www.meerp.eu for extensive information of the five tasks that are included in the process). Specific requirements set prescriptive limits, such as maximum energy consumption or percentage recycled content. Generic requirements infer conformance with performance standards, such as being 'energy efficient', that would be measured through a relevant European standard. For example, this could be evidence of the source of materials used in the production of the object, such as the proportion of recycled materials, or it may be a requirement to undertake lifecycle analysis so that different products can be compared. The priority is that, wherever possible, voluntary agreements should be applied in preference to mandatory requirements. Experience to date has shown that, practically, this is challenging to implement, and so far no voluntary agreement has been fully endorsed.

The Commission has recently consulted on the second workplan (to run from 2012 until 2014) to develop and review appropriate legislation. This evolved from a review of the effectiveness of the first workplan. Unfortunately, the review process was

hampered somewhat, as nine of the measures to be implemented had only come into force in late 2008 and 2009 and, as a result, had not yet impacted on the marketplace. The review¹³ recognised that measuring the true effectiveness of the legislation was not possible due to a number of factors, including recognition that consumers using 'greener' products may actually use them more frequently than they did their older, less environmentally friendly versions.

The indicative process in Figure 3 illustrates that the time taken to develop regulations has typically been between 32 and 56 months from the initial call for tender for the preparatory studies to the adoption of the final legislation by the Commission. In some cases, however (such as boilers and water heaters), this has extended to beyond six years, owing to extended consultation and evaluation. The legislation to date has linked in closely with the energy labelling directive (and in some cases, an energy label may be associated with the requirements). However, the first workplan review identified lost opportunity and inaction due to lack of connection to WEEE (directive 2002/96, on waste from electrical and electronic equipment) and ROHS (directive 2002/95, on restriction of hazardous substances). The new work programme aims to overcome these deficiencies but, significantly, the review report identifies that a lack of resources in the EC offices may hinder progress in the evolution of the methodology and application.

The review did, however, identify that the measures that had been put in place for lighting appeared to have had a positive and direct impact on energy efficiency, as had those for pumps, where it had particularly focused the attention of industry. And the implementation of measures to control electric motors is expected to strongly influence the marketplace. Although the initial Ecodesign regulations were forecast to save 385 TWh per annum by 2020, there was no reliable data to corroborate this, but the review notes that significant energy savings are possible in the majority of energy related products. Overall, the implementation of directives has shown

neither an increase in price to the consumer nor excessive additional cost to the manufacturer. However, it was considered that smaller enterprises shouldered a greater burden in implementing the requirements of the directive. And, although not an explicit intention of the directive, it is having a positive role in the adoption and promotion of innovation.

The second workplan recognises that industry needs certainty and clarity, and that for successful adoption of regulatory requirements, additional resources will be required from the European Commission. Future reviews are likely to include extended term benchmarking and improved metrics. By 2030, the aspiration is that combined energy savings of around 555 TWh per annum (in the residential and tertiary sectors) will result from the Ecodesign Directive.

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Further reading:

The presentation at <http://efficient-products.defra.gov.uk/cms/assets/SEUP-Presentation-050712-final.pdf> provides a snapshot of the developments from a UK perspective as at July 2012

The German Institute for Environmental Strategies has an excellent updated resource at www.eup-network.de/product-groups/overview-ecodesign/ that provides timelines and comprehensive links to the relevant EC documentation, including the excellent preparatory reports.

To source relevant documents on the EC website, go to <http://eur-lex.europa.eu> and use the search page.

References

- 1 Energy Related Products Directive 2009/125.
- 2 Molenbroek, E., *Saving energy: bringing down Europe's energy prices*. ECOFYS, 2012.
- 3 Donnelly, M., *Powering the nation – household electricity-using habits revealed*, EST, DECC, Defra, June 2012.
- 4 Ibid. 2.
- 5 Bertoldi, P. and Atanasiu, B., *Electricity Consumption and Efficiency Trends in European Union - Status Report 2009*, European Commission Joint Research Centre, 2009.
- 6 Ibid. 5.
- 7 Commission Regulation (EC) No 244/2009, 18 March 2009.
- 8 *Where next for Ecodesign? Fulfilling the potential of the Ecodesign Directive*, Directorate C, November 2010.
- 9 www.bis.gov.uk/policies/business-sectors/environmental-and-product-regulations/product-regulation/ce-marking-faqs
- 10 *Establishing a framework for the setting of eco-design requirements for energy using products...*, Directive 2005/32.
- 11 www.bis.gov.uk/policies/business-sectors/environmental-and-product-regulations/product-regulation/ce-marking-faqs
- 12 *Establishing a framework for the setting of eco-design requirements for energy using products...*, Directive 2005/32.
- 13 *Report evaluation of eco-design directive – Final Report*, CSES, March 2012.

Lots and lots

The 'lots' are rather confusingly numbered. Originally, they were all referred to simply as 'lots' so, for example, Lot 6 was 'Standby and off-mode losses'. But when the Commission reorganised itself a few years ago, it decided to start a new numbering system, previous products, and generally

residential products, being prefixed ENER (Directorate General Energy) and future 'business to business' products ENTR (Directorate General Enterprise and Industry). So, for example, ENTR Lot 6 is 'Air-conditioning and ventilation systems', whereas 'Standby and off-mode losses' is now more clearly known as ENER Lot 6.

Module 46

November 2012



Our Technologies, Your Tomorrow

1. According to predictions, what percentage of its energy will the EU need to import by 2020 if no changes are made?

- A 10%
- B 40%
- C 60%
- D 66%
- E 80%

2. What is the approximate percentage of total energy that is supplied for end use as electricity across the EU?

- A 21%
- B 26%
- C 28%
- D 32%
- E 40%

3. Approximately how much of the total electricity used in the tertiary sector is consumed by circulators across the EU?

- A 3%
- B 6%
- C 12%
- D 18%
- E 21%

4. How long would be expected for the 'interservice consolidation' element of implementing measures under the Ecodesign Directive?

- A One month
- B Two months
- C Three months
- D One year
- E Two year

5. What is the predicted saving that will result from the provisions of the Ecodesign Directive by 2030?

- A 39 TWh per annum
- B 385 TWh per annum
- C 555 TWh per annum
- D 4,900 TWh per annum
- E 1,3500 TWh per annum

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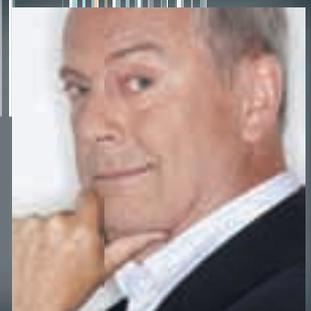
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Electric boilers provide solution at island Abbey

Atlantic Boilers has commissioned two electric boilers at Iona Abbey on the Isle of Iona off the West Coast of Scotland. It forms part of a programme of renewal of the engineering installations in historic buildings including Edinburgh Castle and Stirling Castle in order to reduce carbon emissions. Work on re-establishing the living accommodation began in 1938 and this year the boiler room has undergone refurbishment. Two Atlantic 90kW Multi-elec boilers are the first stage in replacing four old boilers. A sea or ground heat pump will be added later.

● Email nabeela@atlanticboilers.com or call 0161 621 5960

Vertical displacement from KE Fibertec

KE Fibertec offers a fully documented vertical displacement product. Low-impulse textile ducts diffuse using the negative buoyancy of cooled air, but are unable to heat from a high level. The Direjet active displacement diffusers address this with low level installation and the fitment of varying sized nozzles, these nozzles jet warm air into the lowest two metres of the room. Textile active displacement diffusers are impact resistant and have been fitted to a range of manufacturing facilities throughout the UK.

● Visit www.ke-fibertec.co.uk or call 02380 740751



Dimplex – a real power house

Dimplex was selected to help keep a south coast power station running, with industrial fan heaters, panel convectors and radiant heaters making workers comfortable year-round. At Southampton Water in the New Forest National Park, Fawley Power Station is an oil-fired facility, generating 1000MW of electricity. It's open 24 hours a day, and the Dimplex heaters make sure the whole site offers a pleasant environment.

● Visit www.dimplex.co.uk or call 0845 601 5111

Smartcool ESM saves energy with Trane Tracer Summit BMS

Smartcool's ESM was installed on the Trane Tracer Summit BMS in a Nedbank office building with a number of server rooms. The five chillers in the system now save 12% kWh on compressor operation, with annual energy savings of 350,000 kWh. The project provided the South African bank with a risk-free, elegant solution and a return on their investment in less than 24 months.

● Call 01420 544868 or visit www.smartcool.net

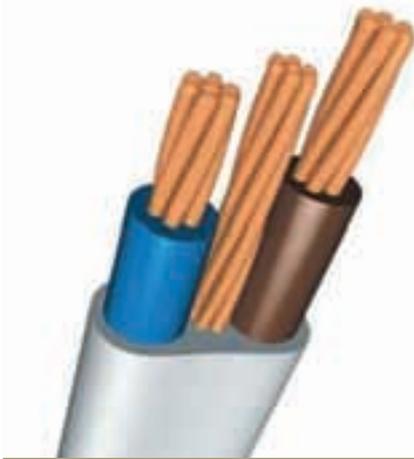


Marking two decades of CableCalc Level P with a free version of new twin and earth calculations

To mark 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 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



Holophane's 'Pole' joins the Denver Elite family

The new Denver Elite Pole exterior lighting luminaire from Holophane is the latest addition to the company's popular Denver Elite family. As such, it shares the same 'registered' design as other Denver Elite products, giving specifiers maximum flexibility. Further design flexibility is achieved by exploiting the performance and benefits of the latest LED or HID lighting technologies. As a result, Denver Elite Pole is available in 3,000, 5,000 and 8,000 lumen LED versions as well as 45-90W Cosmopolis and 70-150W metal halide options.

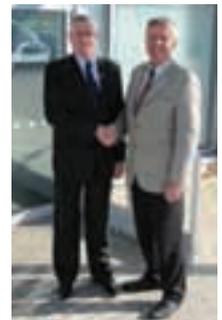
● Visit www.holophane.co.uk or call 01908 649292



Fläkt Woods in 'natural' partnership

Fläkt Woods has partnered with Vision Ventilation LLP to provide a complete range of natural ventilation products. The two companies will work together on the Free Flow range to enhance Fläkt Woods' position as the market leader in mechanical ventilation, AHU's and energy-related products. The Free Flow collection varies from simple, wall-mounted terminations to continuous louvre systems with integrated volume control dampers, all of which are individually designed and constructed to meet specific aesthetic and performance criteria.

● Visit www.flaktwoods.co.uk



Waxing lyrical over Panasonic deal

Panasonic has signed a distribution agreement for its Aquarea air source heat pump range with Waxman Renewables. Based in Elland, West Yorkshire, Waxman's showroom and training centre is an impressive 40,000ft². The company has more than 50 years' experience, and the group's chairman, Richard Waxman, is enthusiastic about this new relationship: 'The partnership between Waxman and Panasonic is a monumental one. We have worked hard to build the renewables division over the past 12 months and this agreement shows that we are developing a reputable name for ourselves.'

● Visit www.panasonic-heating.co.uk



New electro-dynamic voltage optimisation system launched

Following the success of its existing Star range of energy saving solutions, EMSc (UK) has launched a system into the Powerstar collection. Powerstar HV MAX is a low-loss amorphous core HV transformer with the award-winning Powerstar Voltage Optimisation combined that allows for 11,000V input and electronically regulated 380v (or user regulated) output. The product will allow companies to save costs and reduce carbon emissions in high voltage as well as low voltage areas.

● Visit www.powerstar.co.uk or call 01709 836200



Gas interlock with built-in fan

S&S Northern has this month launched its new Merlin 1400 gas interlock system. What makes the Merlin 1400 different from other gas interlock systems, including those manufactured by S&S Northern, is that it has an integral fan controller. S&S Northern says the product is of the highest quality and the most reliable in the market. For kitchen owners and managers, the benefits of the new Merlin 1400 include quick installation, less wiring, smaller wall-space use, and more reliability because of automatic monitoring of the electrical current.

● Visit www.snsnorthern.com or call 01257 470983

Olympic win for Urmet

Urmet was chosen to install Europe's biggest-ever residential IP door entry project – at the London 2012 Olympic Athletes' Village. The project involved installing 850 doors, which would be used by 17,000 people during the Olympics and Paralympics. All of the blocks at the complex are linked by a local area network (LAN) and each block is linked via a virtual LAN, or VLAN. The system proposed by Urmet was IPervice. All of the configuration details were taken from the installers before the IPervice equipment was delivered. This meant the system could be built and programmed, all off-site. The company says installation went smoothly and without a hitch in all 68 buildings. Meanwhile, no other providers were held up during the process, and the project never fell behind schedule. Now the Olympics and Paralympics are over, the Village will enter a second phase of its life in the form of individual residential housing.

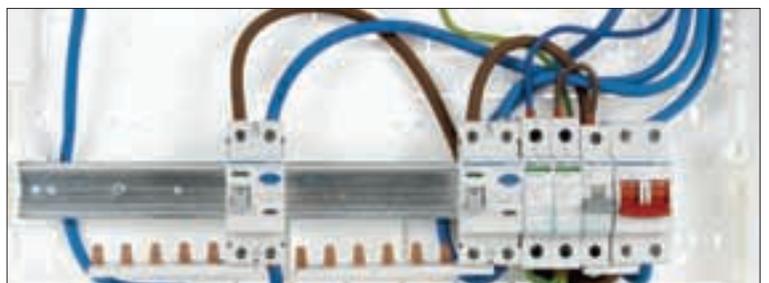
● Visit www.urmet.co.uk, email marketing@urmet.co.uk or call 01376 556010



Consumer unit surge protection from Hager

Hager can now provide consumer units with surge protection as standard to meet Amendment 1 of the 17th Edition. Installers can opt for a consumer unit with surge protection already fitted, or purchase kits to fit the device themselves. Says Chris Howells, product manager: 'When you consider that many homes have a lot of sensitive electronic equipment that would be adversely affected by a voltage surge, then the need for such devices will increase.'

● Visit www.hager.co.uk or call 0870 240 0400



Toshiba launches training initiative

Toshiba Air Conditioning has launched an initiative to improve skill levels across the industry. It includes a new Toshiba-backed training programme and a scheme to equip installers with state-of-the-art installation tools and commissioning equipment. David Dunn, commercial director, said: 'We recognise that, when business is tough, people tend to cut back on support activities such as training and investment in tools and equipment. We want to support contractors through the current economic challenges.'

● Email general.enquiries@toshiba-ac.com or call 0870 843 333



Culligan launches high-efficiency water softener

Culligan UK Ltd, a leading provider of advanced water treatment solutions, has introduced its innovative High Efficiency (HE) Water Softener.



The HE Softener forms part of the Culligan Matrix Solutions range, which provides greater flexibility and cost-savings to commercial and industrial users.

Culligan's HE Water Softener offers users many advanced features and options. Its unique design addresses common user concerns such as: operating, labour and maintenance costs and the impact of poor water quality on operational efficiency and customer service levels.

● Call 01494 441286 or visit www.culligan-high-efficiency-softener.co.uk

Hamworthy launches BIM components



Hamworthy Heating has become one of the first boiler manufacturers to offer 3D BIM (Building Information Modelling)

components to its customers, recognising the benefits these models bring to major projects. BIM offers 3D digital representations of buildings and infrastructure where, eventually, information covering every element of its lifecycle – including costs, carbon emissions and maintenance schedules – can be shared between clients, construction teams and facility managers. Hamworthy Heating is providing BIM components across its entire Fleet range.

● Visit www.hamworthy-heating.com or call 0845 450 2865

Vent-Axia celebrates four in a row

Vent-Axia, a leader in low-carbon technology, has been shortlisted in the prestigious Manufacturer of the Year Awards 2012. The company's Temptra single room heat recovery unit has beat tough competition to be selected as a finalist in the 'Innovation & Design' category. This announcement marks the fourth industry award the British manufacturer has been shortlisted for this month with Vent-Axia already a finalist in the Energy Awards, the Electrical Industry Awards and the HVR Awards.

● Call 0844 856 0590 or visit www.vent-axia.com



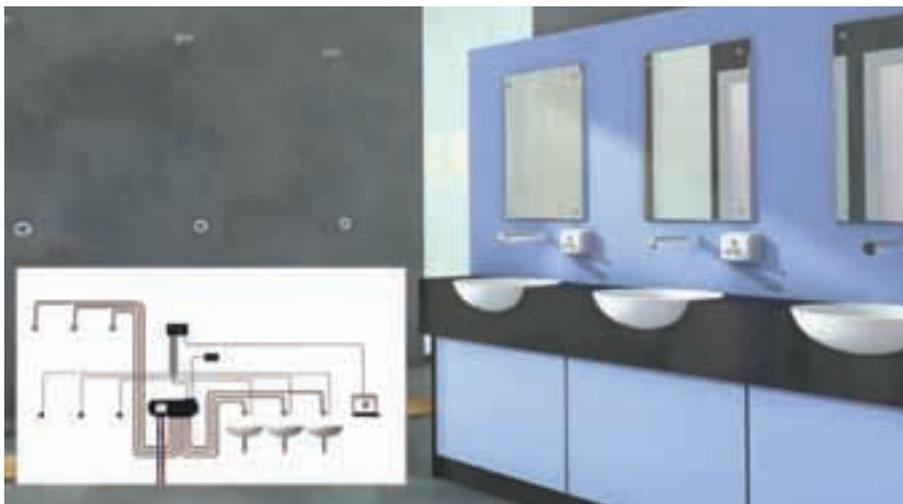
Havells' future-proof approach to power distribution



Havells, a specialist in low voltage switchgear, has launched Tri-Load, a ground-breaking new three-section MCB TPN distribution board for

commercial building applications. Offering a future-proof approach to the metering requirements of Part L2 of the UK Building Regulations, it is the only standard distribution board that conveniently separates small power circuits, lighting circuits and mechanical services loads and provides net energy values of each load type. It independently monitors lighting, small power and auxiliary service loads, ensuring analysis for building managers is meaningful and effective.

● Visit www.Havells.co.uk or call 020 7011 9752



Rada's Outlook raises the bar

Rada has taken commercial washroom management technology, safety and efficiency to new heights with the launch of its new Rada Outlook digital washroom solution. Developed from the ground-breaking Rada Sense technology, Rada has created a unique concealed digital thermostatic mixing valve and sensor box capable of providing precise temperature and flow duration across any configuration of six showers or washbasin spouts, with touch or non-touch sensor options.

● Visit www.radadigital.co.uk/radaoutlook or call 0844 571 1777



Swiss Cottage gets all fired up

Airtherm Engineering Limited has designed, supplied and installed a 500mm diameter stainless steel, twin-wall, fully welded, four-hour fire-rated, gas and water tight Dinak DW/hp flue system serving three high-efficiency Clyde condensing boilers, with a total 2.2MW output load. The system installed comprised of a 10m horizontal run and a 26m vertical, complete with the necessary drains incorporated to allow any unwanted condense to evacuate to the system. The flue system was installed back in April 2012 at the UCL Academy, in Swiss Cottage, London.

● Visit www.airtherm.co.uk or call 0844 809 2509



Fläkt Woods and Mercedes AMG Petronas graduate in aerodynamics

Fläkt Woods has worked closely alongside the engineers at Mercedes AMG PETRONAS on a wind tunnel project for the new building for the Faculty of Engineering and Computing at Coventry University. Fläkt Woods designed and supplied some of the key aerodynamic components, including a bespoke, specially sized, high-efficiency Axial Flow Fan to meet the specific requirements of the project. This was supported by extensive computational flow dynamics (CFD) models to ensure that demanding flow conditions and performance levels could be met.

● Visit www.flaktwoods.co.uk

Marco specification enhances Treloar Trust's £20m vision

Marco, the UK's largest manufacturer of steel wire cable tray, and leading uPVC cable management company, has supplied its Elite uPVC Trunking product to electrical contractor Baudelaire for works at a large extension at Treloar School and College. The Treloar Trust provides education, care, therapy, medical support and independent training to young people with special needs. This redevelopment forms part of Treloars' vision that will see an investment programme of up to £20m on new college facilities.

● Visit www.marco.com



GE launches high lumen Infusion M4500 Series to its range

GE Lighting has launched the high lumen Infusion M4500 Series as an addition to its range of Infusion LED modules. When combined with high-efficiency optics, it allows for a genuine replacement of 50W & 70W HID with a true replication of performance and light output. GE Lighting's range of Infusion LED modules has provided the lighting industry with a game-changing platform, opening up possibilities for the use of long-lasting controllable, low maintenance LED solutions where the quality of light is critical.

● Visit www.gelighting.co/eu



New transportable ATEX LED floodlight from Dialight

The Dialight SafeSite transportable LED high bay luminaire is a high-performance floodlight with ATEX/IECEX certification suitable for use both in Zone 1, 21 and Zone 2, 22. Delivering up to 12,500 lumens, the new luminaire is designed for temporary lighting applications and for maintenance tasks that require a robust light source, such as tank cleaning and sandblasting. With an operating voltage range of 110-277 VAC this LED floodlight is highly suited for use with remote generators.

● Email sales-europe@dialight.com or call 01638 665161



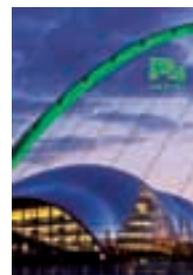
Henderson set for start of new term



Leading engineering consultancy Henderson Green has worked for an

array of south coast universities over the summer in readiness for the start of a new academic year. The Southampton-based consultancy undertook various projects at the University of Portsmouth, Southampton Solent University, Bournemouth University and the University of Southampton. The consultancy has designed M&E services for computer laboratories at Bournemouth and Portsmouth universities, the University of Southampton's Student Union Bridge Bar and Southampton Solent University's new media academy to name but a few.

● Visit www.hendersongreen.co.uk or call Robert Pratt on 02380 225900



P4 FASTEL – leading the way

Leading the Way in Self Testing Emergency Lighting is the first of a new suite of literature from P4 FASTEL, the UK's leading independent company dedicated solely to producing the most

highly regarded self-testing emergency lighting and exit signs in the industry. The corporate brochure traces the company's enviable track record over the past 23 years, showing how organisations in healthcare, education, sports and leisure, transport, retail and many other sectors have put their trust in the company's people, passion and products.

● Visit www.p4fastel.co.uk or visit 01328 850555



Happy 30th anniversary JS Humidifiers

JS Humidifiers is celebrating 30 years in business having started solving dry air problems for printers back in 1982. From manufacturing and selling the JetSpray humidifier to an individual industry, JS now distributes the UK's widest range of humidification equipment to over 50 industries in more than 80 countries. Rik Prowen, operations director, said: 'Taking JS from a one-product, one-industry business to the UK's leader in humidification, with exports all over the world, has been challenging but continues to be great fun.'

● Visit www.jshumidifiers.com or call 01903 850200

Bilco leads industry move towards freely available BIM models

Bilco UK, the specialist supplier of roof hatches, smoke vents, floor doors and fixed vertical and retractable ladders, has underlined its commitment to the use of business information modelling (BIM) in the construction industry by making BIM models for its roof hatches and smoke ventilators available for download from its website. BIM models and manages information as well as graphics for sharing information through construction and the whole building lifecycle.

● Visit www.bilcouk.com



Record week of sales for Airedale

Airedale International Air Conditioning, has announced a record week of sales, having receiving orders worth £1.7 million. Contributing to the latest orders are new, market-leading products from Airedale International's two main product lines – chillers and precision air conditioning – of which it is the UK leading provider. Says Airedale's UK sales director, Paul Oliver: 'Our excellent performance can be attributed to our growing enquiry level and the quality of those enquiries.'

● Visit www.airedale.com or call 0113 239 1000



Dorchester DR-TC – twin advantages of solar and gas

The high efficiencies and energy-saving benefits of solar water heating and a condensing gas burner have been combined in the latest evolution of Hamworthy's proven Dorchester range of water heaters. The hybrid design of the Dorchester DR-TC is the ideal solution to domestic hot water requirements where space is limited and a traditional boiler is not part of the solution. The Dorchester DR-TC brings lower gas bills by prioritising the use of free solar energy when available.

● Visit www.hamworthy-heating.com or call 0845 450 2865



New simplified controller answers customers' needs

Mitsubishi Electric has released details of a new, simplified controller specifically designed with hotel applications in mind. The PAC-YT52CRA is very simple to use and features a super-slim design that makes installation flexible and easy. The backlight function answers a need that many hoteliers have identified, and the wall-mounted unit is also available with a polished, stainless steel casing, in addition to the normal white version.

● Email air.conditioning@meuk.mee.com or call 01707 282880

Free recycling a click away

Mitsubishi Electric has extended its successful recycling programme to include waste heating products. In partnership with Overton Recycling, the company has developed an end-of-life scheme for customers wanting to dispose of heating equipment replaced by Ecodan heat pumps. The free service has been designed for use by housing associations, local authorities, house builders and contractors who need to recycle quantities in excess of 10 large items, such as domestic boilers, from a single location.

● Visit www.recycling.mitsubishielectric.co.uk



Siemens unveils extinguishing technology



Automatic extinguishing systems are brought in to

protect critical equipment, and yet these systems have been accused of harming the very assets they are installed to safeguard due to the high noise levels emitted when discharged. The Siemens Building Technologies division has therefore launched a new nozzle design, which emits significantly lower noise levels when activated. The Sinorix Silent Discharge Nozzle produces one hundredth of the sound pressure when compared to the market norm.

● Email firesales.sbt.gb@siemens.com or call 01276 690657

Potterton condensing boilers for school refurb

Potterton Commercial, part of Baxi Commercial Division, has supplied three wall-hung condensing boilers for a refurbishment at Tennyson Road Primary School in Luton. These replace the existing boiler plant, which was approximately 10 years old and no longer operating in a cost-effective manner. High-efficiency condensing boilers were selected as part of an investment programme to improve the energy efficiency of school buildings, under the auspices of the Energy Saving Trust's One to One support programme.

● Visit www.pottertoncommercial.co.uk or call 0845 070 1055

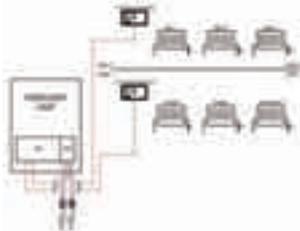




Titan Products launch TPZ-Net Zigbee Wireless Range

The TPZ-Net is a new range of wireless environmental products from Titan Products. Incorporating Zigbee wireless technology the range creates extremely stable, self-healing mesh networking capabilities. The TPZ-Net range is designed to wirelessly monitor temperature, CO₂, humidity, light and occupancy levels, and transfer this information back to the Titan Products co-ordinator where the information can be transferred on to a BACnet network or to other Titan Products controllers or IO Devices.

● Visit www.titanproducts.com or call 0161 406 6480



Evinox simplifies Part L1A Building Regulation compliance

Current Part L1A Building Regulations stipulate that all new heating systems in dwellings that are not open-plan must include at least two heating zones, each controlled by a thermostat and zone valve. The Evinox Modusat heat interface unit for communal heating systems not only makes it easier for the M&E consultant to achieve building regulation compliance, but also simplifies the installation process for the contractor.

● Visit www.evinox.co.uk or call 01372 722277

JS Air Curtains 'at home' in John Lewis

Leading retailer John Lewis has selected JS Air Curtains as its air curtain supplier for four new build 'at home' shops. The four recently opened shops all have Zen air curtains from JS helping to maintain a consistent and comfortable temperature for customers and staff. The air curtains also minimise the energy consumption of the stores' heating and cooling systems by preventing cold air entering during the winter and warm air during the summer.

● Visit www.jsaircurtains.com or call 01903 858565



Britain's top gas safety performer at Olympics and Paralympics

S&S Northern's world-class performance and reputation as a gas safety specialist secured the company a contract at the London 2012 Olympic and Paralympic Games. In total, 29 of S&S Northern's gas interlock systems (Merlin 1200) were installed within the Olympic Village's temporary marquee kitchens, ensuring the health and safety of the staff working in the kitchens and serving food to 18,000 Olympic and Paralympic athletes from across the globe, 24/7.

● Visit www.snsnorthern.com or call 01257 470983



New Loovent eco delivers low energy with multi-function ventilation

Complementing its existing range of 'ecoair' ventilation solutions, Airflow introduces the new Loovent eco fan. The fan is based on the million selling Loovent, and features an exceptionally quiet, two speed intermittent extraction up to 31 l/sec or, at the flick of a switch during installation, a choice of five speed, continuous (dMEV) ventilation. Versatile for portrait and landscape orientation, it can be either recessed or surface mounted and the compact design represents the smallest footprint in its class.

● Visit www.airflow.co.uk



Grundfos help achieve projects vision

The Centre for Scottish War Blinded – the Linburn Centre – was recently named Scottish Project of the Year 2012. The day-care centre for Scottish ex-service personnel provides a workshop, art space, training facilities, gym, a therapy centre and remembrance area within a distinctive shape designed to aid navigation around the building. Judges were not only impressed by the curving geometry of the structure but also by the energy efficient measures incorporated – including a range of Grundfos pumps.

● Email uk-sales@grundfos.com or call 01525 850000

Mitsubishi maidens enjoy sailing success

A team of plucky girls from Mitsubishi Electric spent last weekend competing in the 25th anniversary Little Britain Challenge Cup in the waters around the Isle of Wight. The Mitsubishi Maidens took part in the three-day event, which sees scores of amateur construction industry sailors take to the waters around Cowes. The Little Britain Challenge Cup is a huge fundraiser for a whole raft of charities and 68 corporate teams competed in this year's competition.

● Visit www.littlebritain.co.uk



PRODUCTS & SERVICES

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Innovative natural ventilation control solution by SE Controls

Maintaining precise control over indoor air quality, temperature and energy consumption are key considerations for buildings using natural ventilation (NV) systems and SE Controls' new compact NVLogiQ room controller provides an innovative solution to meet these requirements. Using new control and performance algorithms developed in conjunction with Loughborough University's Building Energy Research Group, NVLogiQ not only provides advanced monitoring and control of NV systems in individual rooms or zones, but also combines integrated data logging for detailed building performance and environmental analysis. NVLogiQ constantly monitors carbon dioxide, temperature and humidity, enabling it to automatically manage the operation of windows, louvres and vents within a building's natural ventilation system, as well as controlling the heating. Capable of being used as a stand-alone controller or as a networked solution, NVLogiQ is perfectly suited to classrooms, offices and other NV applications that demand a stimulating and comfortable environment. It also has a compact footprint of just 160 mm x 105 mm.

● Visit www.secontrols.com or call 01543 443060

AO Smith adds commercial boilers to range

AO Smith has launched five new commercial boilers to complement its existing range of high efficiency water heaters and solar systems. The Epsilon and Upsilon boilers are high-efficiency condensing models. The Epsilon comes in two models with a choice of 38 kW or 51 kW output. It is ideal for medium size commercial and large residential applications. The Upsilon is aimed at large commercial applications and comes in three models with outputs of 70 kW, 110 kW or 140 kW.

● Email cvdpol@aosmith.nl or call +31 (0)40 294 2517



EDP Consulting celebrates 30 years

Building services consultancy EDP, based in Leicester, has recently celebrated 30 years of trading. During this time, EDP, who provide services to all parts of the UK, have been involved in a number of innovative and iconic projects and have developed a reputation for expertise in the design of energy-efficient and sustainable buildings. EDP has won a number of awards including the CIBSE Commissioning Project of the Year 2011.

● Visit www.edp-engineers.co.uk or call 0116 281 2422

DIRECTORY Your guide to building services suppliers

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See: Taking Control - CIBSE Journal Dec 2011

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Electrical Design Engineer | Central London
£40,000 Plus Benefits & Bonus

A renowned building services consultancy are currently recruiting an electrical engineer to work predominantly in the retail and residential sectors. The ideal candidate will have at least 5 years' experience with a building services consultancy, where they have held client facing roles. This candidate will ideally be degree educated and have a passion for design for the built environment. This is a fantastic opportunity to get involved in an exciting workplace with real potential for career development with a prestigious consultancy.

Associate Mechanical Engineer | Leeds
£50,000 - £55,000 Plus Benefits

An ambitious multi-discipline consultancy is currently seeking an enthusiastic, talented and experienced individual to join them at Associate level. The main purpose of the role is to assist the Associate Director/Director in controlling and developing the activities of the Practice, ensuring that quality, output and service targets are met within the agreed business and commercial objectives. The ideal candidate will also have experience in business development within a building service consultancy. Candidates will hold a Degree, HND or HNC in Mechanical Engineering or similar. The candidate should preferably be a member of CIBSE.

Senior Mechanical Engineer | Central London
£40,000 to £45,000 Plus Benefits

An expanding building services consultancy are currently looking to recruit a Senior Mechanical Engineer, to work on predominately commercial and healthcare sector. The ideal candidate will have at least 5 years' experience with a building services consultancy where they have held client facing roles. This candidate will ideally be degree educated and be a chartered engineer. This is a fantastic opportunity to get involved in an exciting workplace, with excellent potential for career development.

Contact: george@conradconsulting.co.uk | 0203 159 5387
Find more jobs online at www.conradconsulting.co.uk



Senior/Principal Mechanical Engineer
Senior/Principal Electrical Engineer

Maleon require an experienced mechanical engineer and an experienced electrical engineer to join a rapidly growing team.

Contract and permanent positions are currently available.

The ideal candidate must be chartered and with at least 5 years experience in the building services design industry. You must be capable of managing several projects simultaneously and be able to survey and intelligently report on projects and then see through the detailed design. You must be able to appreciate the electrical/mechanical side of the service and have the ability to communicate across disciplines within the team.

The successful candidate will be exposed to a wide variety of blue chip clients where they will have to demonstrate their experience in front of the client and professional team. The role is based in our office in Sawbridgeworth, Hertfordshire.

Apply to: jamescotee@maleon.com

www.maleon.com

Agencies need not apply, contract/permanent staff will be directly employed only.

SLL Secretary
£40-50k pa, pro rata



The Society of Light and Lighting is the leading Chartered body for all those interested in the art, science and engineering of light and lighting and its applications across the built environment. The Society produces authoritative publications, offers professional recognition and organises a wide range of learned society activities.

The Society is currently seeking a recognised and respected lighting practitioner, with experience in the industry and of working with industry associations, to fill the role of Secretary to the Society.

The Secretary is responsible for developing the work of the Society and for maintaining the SLL brand and its profile in the lighting sector and beyond. They will play a key role in developing individual membership of the Society and in maintaining and developing the relationships between the Society, key corporate supporters and the wider lighting industry.

The role is flexible, approximately 3 to 4 days per week, with a requirement to spend at least one day a week, at SLL offices in Balham. The Secretary should be available for evening meetings and travel throughout the UK and, occasionally, in Europe.

CIBSE is committed to equality and diversity.

For a full job description or to apply please contact Adissa Mahama at recruit@cibse.org. To apply please send a copy of your CV and cover letter together with details of your current remuneration package.

Closing date: 19th November 2012



Electrical Building Services Engineer
London, £30k - £35k + benefits

Brilliant opportunity to join an expanding building services consultancy. During their twenty five year history the company have developed a commanding presence in residential, estate regeneration, and mixed use development sectors working on projects valued in excess of £15 million. Successful candidates will have the ability to demonstrate a passion for building services engineering and be interested in joining a company that can offer unrivalled career progression, training and development, and greater exposure to leading projects and client interaction.
944/JA

Mechanical Associate Director
Abu Dhabi, 42,000AED (PCM)

Our client has a truly global reach with 300+ offices and is arguably one of the market leaders in the Building Services industry. Their Abu Dhabi office currently has a requirement for a Mechanical AD to join their established expat team. You will be responsible for leading and managing design teams, contributing towards and preparing bids, business development, and overseeing the co-ordination of design projects. Successful candidates should be able to demonstrate a commitment to low energy design, be degree qualified, and possess substantial post graduate experience having worked at a similar level.
944/PA

For further information and to apply, please
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P.T. Morimura and Associates, Ltd. (PTM) is a long-established independent building services consultancy based in Tokyo Japan. Our International Group delivers best-practice mission critical designs for international clients who have facilities in Tokyo and throughout Japan. This role requires a Mechanical Engineering Consultant with solid electrical engineering capabilities and excellent customer presentation skills.

Candidates must have

- A degree (or equivalent) in the Mechanical Engineering
- At least 5 years' work experience post degree
- Some experience with mission critical systems

It is preferable for Candidates to have:

- A "quality plan" approach to projects, from concept plan to commissioning
- A qualitative appreciation of other areas of design (i.e. electrical services)
- A natural interest in and familiarity with all aspects of a project (interior design, space planning, architecture)
- Succession planning – shape and grow this role with your own development needs, and then actively train others in that role

Financial package will depend on experience with special attention given to:

- Experience of the latest mission critical facilities
- Experience of data centre and trading floor design including cooling system and CRAC selections
- Experience in preparation of fee proposals, giving presentations and other marketing activities
- Experience of Testing and Commissioning work
- Experience of fire suppression system including sprinkler and gas fire suppression system design
- Experience of BMS system design
- Familiarity with LEED certification or having LEED qualification

Tokyo is a diverse, multicultural and exciting place to live and work. The city offers a large English language based professional and social community. The position will allow you to work on range of cutting edge building projects and technologies located within Tokyo and Japans other major cities giving you an opportunity to develop your skill sets as well as the potential to learn Japanese and work in a foreign environment. Tokyo offers an excellent standard of living and is regarded as one of the safest and most desirable places to live in the world.

For more information and to apply contact: Simon, s-forrest@ptmtokyo.co.jp



Specialists in Building Services Recruitment

Snr/Prin Mechanical Design Engineer | London | to £50K ++ | ref: 2944

A bluechip international consultancy is looking for an experienced Chartered Mechanical Engineer. Ideal candidates will have experience in mission critical projects and be comfortable managing a small team and dealing with clients on a daily basis. Excellent opportunity to join a vibrant and busy London team.

Int/Snr Elec & Mech Design Engineers | Hampshire | £30-40K | ref: 2768

We have a number of clients in the Hampshire area looking for Intermediate and Senior Engineers on a permanent basis. Projects vary from new schools and colleges to large office refurbishments and small maintenance schemes. Please call for more details.

Principal Mechanical Design Engineer | Berkshire | to 60K | ref: 2923

A large multi disciplined consultancy requires a Chartered Mechanical Design Engineer who is looking to progress and run the mechanical team within a 6-12 month period. Candidates will have a solid design background and have had exposure to running projects and a small team.

Lead Mechanical/Electrical Engineer | Doha | to £55K ++ | ref: 2927

Our client is looking for two lead engineers for a major project based in Doha. Ideal candidates will have a mix of design and site based experience and be comfortable client facing. Long term opportunities.

Intermediate Electrical Design Engineer | London | to £33K | ref: 2576

A medium size M&E consultancy currently requires 3 Intermediate Electrical Engineers to join the team in London. Preferably candidates will be degree qualified and be fully proficient using Dialux and Amtech.

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Contact: darren.warmington@bsvrecruitment.co.uk

Senior Electrical Design Engineer

Reading | from £40-45k | Ref: 13040

Berkshire's foremost multi-disc consultancy. They grew throughout recession so have an urgent need for a Senior Electrical Design engineer. Degree qualified with consulting engineering of schools, offices, healthcare and residential. Sectors such as data centre design is highly desirable.

Contact: darren.warmington@bsvrecruitment.co.uk

Intermediate/Senior M&E Design Engineers

North Surrey | £28/48k | Refs: 13020 / 27

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Contact paul.bartlett@bsvrecruitment.co.uk

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Ideally a degree educated Engineer or similar, you will possess a strong track record of leading and coaching a team of direct reports. You will be a prominent figure in your industry and will demonstrate capability in balancing this with good business sense and financial awareness. Retail sector experience is an advantage but not essential, ideally you will have experience within a fast-paced, customer-focused, commercial environment and understand the challenges this brings.

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We are recruiting engineers/graduate engineers in the following disciplines to join our team:

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The work will be varied depending upon the nature of the projects, however the candidates should possess a knowledge of all elements of Building Services. Key areas you will be involved in are Site Surveys, Concept Designs, Detailed Designs, Coordination of Services, Commissioning and Validation.

The successful candidates will be enthusiastic, hardworking engineers, keen to develop and advance within a dynamic and expanding company.

If you are interested in this opportunity, please forward your CV and an introductory letter to Stefanie.bridges@tslprojects.com



Events & training

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LuxLive

6-7 November, London
Dedicated lighting event. Visit the Society of Light and Lighting at their stand. The SLL Young Lighter of the Year will also be announced.
www.sll.org.uk

CIBSE Annual Lecture
7 November, London

How secure is Britain's energy supply over the next decade? Speaker Alistair Buchanan (Ofgem) focuses on the challenges facing Britain. Free to attend, but registration essential.
www.cibse.org/events

Lighting Masterclass
29 November, Birmingham

The Masterclass provides lighting professionals with up-to-date and topical information needed to stay abreast of lighting technology and application.
www.sll.org.uk

Fire Risk Solutions for Timber Structures
3-4 December, London

An international conference looking at the findings of timber frame fire testing.
www.frts2012.com

National Insulation Association annual conference and exhibition
4 December, Birmingham

An in-depth look at the issues in the sector.
www.nationalinsulationassociation.org.uk

CIBSE Building Performance Awards
5 February, London

Find out who the 2013 winners are at this prestigious industry event.
www.cibseawards.org

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6 November, London

With a speaker from Alumasc Extension

Building Products – drainage division.
steve.vaughan@aecom.com

Presidential Address
8 November, Bristol

CIBSE president David Fisk delivers his presidential address to the South West region.
millham.orchard@fiscali.co.uk

Domestic hot water loading principle
14 November, Birmingham

A CIBSE West Midlands region evening seminar.
chياهوaylau@hoarelea.com

Pumps (correct sizing, installation issues, dos and don'ts)
14 November, Bristol

A Young Engineers Network South West region event.
millham.orchard@fiscali.co.uk

17th Edition update and surge protection techniques
14 November, Northampton

Joint East Midlands region event with the Electrical Contractors' Association.
www.cibse.org/events

LED: An Office Solution?
15 November, High Wycombe

A Home Counties North West region event.
www.cibse.org/events

Sanitary pipework design and material options
21 November, Manchester

With speakers from Marley Products.
m.atherton@dssr.co.uk

Public Health
27 November, London

Joint HCNE Region and SOPHE seminar, with speaker Chris Northey.
James.Bourne@atkinsglobal.com

Membership Evening
28 November, Birmingham

A CIBSE West Midlands region event.
Chياهوaylau@hoarelea.com

EMESP Prestige Lecture
28 November, Nottingham

An evening presentation on the Galileo satellite navigation system.
www.cibse.org/events

External Lighting Workshop
29 November, Bristol

A presentation on external lighting concepts followed by a practical hands-on workshop and team competition to light up the external architecture of Royal Fort Lodge and the Old Physics Building at the University of Bristol.
millham.orchard@fiscali.co.uk

Direct gas-fired water heaters – sizing and applications
4 December, London

Presentation by Lochinvar.
Steve.vaughan@aecom.com

LED lighting: advantages and pitfalls
4 December, Derbyshire

An East Midlands region event based on the 'one building a minute' presentations.
www.cibse.org/events

West Midlands Annual Dinner
7 December, Birmingham

Annual dinner for CIBSE West Midlands region.
chياهوaylau@hoarelea.com

CPD TRAINING

For more information visit www.cibsetraining.co.uk or call the events team on 020 8772 3660

Cooling and Refrigeration
1 November, London

Overview of current fire legislation and guidance
2 November, London

EPC Training (two days)
5-6 November, London

Energy Efficient Façade Design
6 November, London

Standby Diesel Generator
7 November, London

CIBSE Building Performance Awards 2013

5 February, London

Industry will find out which projects will be crowned the performance winners at next year's CIBSE Building Performance Awards.

The event, set to take place on 5 February at the Grosvenor House Hotel in London, will have 13 categories, from Building Operation, Building Consultancy of the Year, and Energy-Using Product awards, to New Build Project of the Year and Contractor of the Year. (For full details of the categories, see page 9 of the July issue of the *Journal*.)

The awards are open to any organisation responsible for the design, commissioning, construction, installation and operation of low energy buildings, and the



Guests enjoying this year's event

manufacturers whose products enable efficient energy consumption. The awards focus on actual, measured performance, not design intent or performance specifications. Judged by a panel of distinguished industry leaders, winners of the awards know that their work is best in class.

To book a table at the event, visit www.cibseawards.org

Energy Monitoring and Targeting
7 November, Manchester

Low carbon buildings for local authorities
8 November, London

EPC Conventions
12 November, London

Mechanical Services Explained (three days)
13 November, London

Part L Building Regulations
13 November, Newcastle

Air-conditioning inspection for buildings
14 November, Leeds

Introduction to 11 kV distribution and protection
14 November, London

Successful Design Management
15 November, London

Practical air distribution system design
15 November, London

Effective Maintenance Management
20 November, London

Energy-efficient heating – upgrading and operating heating systems in buildings
20 November, London

Fire-resisting and smoke-control doorsets
21 November, London

Lighting Legislation (including daylight)
22 November, London

Introduction to Energy Efficiency
22 November, London

Practical approach to LV fault level analysis
27 November, London

Fire safety engineering design: module two (two-day course)
27 November, London

Rainwater harvesting and greywater recycling in the sustainable environment
27 November, London

Introduction to combined heat and power (CHP)
28 November, London

Heat Pumps
3 December, London

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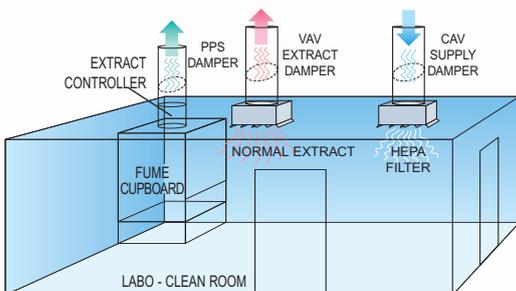


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