

# CIBSE

JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

June 2010

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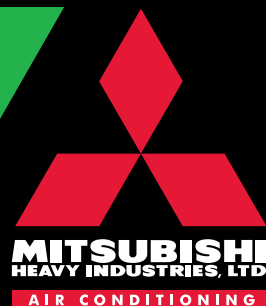
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# From the editor



## This isn't the 1980s – green is good

**N**ews that the construction industry is picking up economically is very welcome. But the optimism is likely to be short lived as, by the time you read this, the UK government will have announced more details of its plans to cut public expenditure – and school and hospital building programmes undoubtedly will be hit (see our news pages).

Ministers' plans to slash £6bn of spending will be seen by many in the industry as a necessary evil to cut the national debt. But it would be foolhardy to take an axe to existing programmes

under the Building Schools for the Future scheme, for example. The previous government's pledge to improve school premises across the nation may not be sustainable in the current climate but severing a crucial lifeline to many in the industry – from consultants to contractors

to manufacturers – could kill off any green shoots that are beginning to emerge.

Gordon Brown, both as Chancellor and then Prime Minister, had an iron grip on the nation's purse strings. So it would be a testament to this coalition government's claims to greater inclusiveness if health and education ministers stood up to the Treasury and demanded protection at least for existing capital expenditure programmes. The popular argument in government and the media is that we can only afford to 'ring-fence' frontline medical and teaching services. But the facilities in which these professionals operate are also for the benefit of patients and pupils, and good and appropriate environments are crucial to their well-being.

Another test of the new government is whether

Energy and Climate Change Secretary Chris Huhne, a Liberal Democrat, will propel the low carbon and energy efficiency agendas forward in the face of overwhelming pressures to cut spending. This is where the new government also needs to turn over a new leaf – in ensuring that the green thinking and policymaking pursued by different departments are joined up so that they produce a coherent and effective package of measures.

This is where the case for protecting hospital and school capital budgets can be reinforced.

**Progressive government would mean not allowing public sector building and refurbishment to fizzle out**



The importance of energy efficient and low carbon public buildings to meeting the government's 2050 target for an 80 per cent emissions cut cannot be overstated.

Prime Minister Cameron's announcement that all government departments must cut emissions by 10 per cent is

a step forward, but only a small one. A progressive green government would recognise that sustainable construction, refurbishment and retrofitting in the public sector cannot be allowed to fizzle out. This means continuing with the school and hospital improvement and building programmes. And it also means requiring public sector construction procurement to meet sustainability requirements.

So let us batten down the hatches as we prepare for the bonfire of the public sector contracts. But let's also keep up the pressure on ministers and MPs from both sides of the coalition to recognise that, in this post-Thatcherite world, green is good, and this means green investment too.

**Bob Cervi, Editor**

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## News in Brief

### Plea for UCAS credit

The government should make the Competent Persons Scheme UCAS accredited, according to CIBSE. A single accreditation provider would ensure appropriate and consistent checking, both in initial application and ongoing monitoring, said the institution in its response to a consultation on the scheme, which closed recently.

### Two year wind farm wait

It takes more than two years, on average, to get consent to build wind farms in the UK, making it the eighth best place in Europe to gain planning permission. *Wind Barriers*, a report co-ordinated by the European Wind Energy Association, found it took 26 months to gain planning permission in the UK, compared to eight months in Finland (first) and 53 in Portugal (last).

### 'Passive' performance

AECOM has been appointed as the BREEAM assessor for a new development in the TEDA Modern Service District of the Tianjin city in north-eastern China – the first BREEAM to be registered with BRE. The design will incorporate a number of renewables and low carbon solutions, including passive design features, a high performance building envelope, light tubes and ground source heat pumps.

### Asda-Langdon deal

Multidisciplinary consultant Davis Langdon has been appointed to Asda's project management and employers agent framework for new stores and extensions over the next three years. The first project under the framework is a new eco-store being constructed in Sheffield.

### New office Down Under

Multidisciplinary consultancy, hurleypalmerflatt, has opened a new office in Sydney, Australia. The operation will focus on building projects in sectors such as commercial offices, financial services, technology and healthcare.

# School and hospital cuts could spell 'disaster' for the industry

A reduction in spending on school projects and the health sector would be a disaster for the building services industry, according to CIBSE.

Media reports suggest that the new Conservative-Liberal coalition will freeze spending on all schools projects that have not yet reached preferred bidder status, while it has also postponed the appointment of contractors to the Procure 21+ health framework, which is being used to deliver community hospitals, primary care centres and other units.

As the *Journal* went to press, the Chancellor, George Osborne, announced that he would reveal how the government would make its promised £6bn worth of cuts, and said an emergency Budget would be held on 22 June.



Andy Ford... concern over spending.

Andy Ford, CIBSE's president-elect, believes a slowdown in spending could have drastic implications for the industry – even if a full spending review is sensible, given the country's circumstances.

He told the *Journal*: 'I shrink from considering the impact such a step would have on jobs in this already damaged construction sector.'

'I know many people were laid off in design when the Learning and Skills Council messed up and they put everything on hold, yet this was small compared to the school and health programmes.'

But he added: 'Giving a greater emphasis to building refurbishment would reduce running costs and give more people work. It would also reduce our carbon impact as a society more quickly, and match the austere mood of the day.'

He said that more focus should be given to good-quality waste-to-energy combined heat and power schemes for existing school and hospital buildings. 'Using these energy/waste centres in the community for education could create a much wider understanding of, and involvement in, our energy supply and waste disposal processes.'



## Award for indoor garden

The Cityscape Awards – Real Estate 2010 have now been announced, with King Abdullah International Gardens (KAIG) winning the Best Sustainable Development category. The awards target developments in the Middle East and north Africa. The KAIG design includes a 10-hectare building which will house the world's largest indoor garden. It will be set within a 160-hectare site in the arid desert of the Saudi central region. For the full list of winners visit [www.cityscapebudhabi.com](http://www.cityscapebudhabi.com)

## Passivhaus certification grows

Three buildings have received Passivhaus status in the UK.

WARM: Low Energy Building Practice, an independent consultancy and registered Passivhaus certifier, has approved a £1.4m centre for disability studies in Essex, a £141,000 detached house in West Yorkshire, and a private detached house in Camden.

The centre for disability was built using an externally insulated

masonry frame, using AECB Gold standard detailing, and now has projected annual heating bills of £300 (for a 550 sq m building).

The house in Camden is a timber frame [circa 120 sq m], two-bedroom home with predicted annual heating bills of well below £100. This is achieved by 380mm of insulation, negative psi values throughout (no cold bridging), triple glazing, Passivhaus sliding windows,

draught free construction, and 92 per cent efficient heat recovery ventilation consuming only 15 Watts of power in extract and supply.

The Denby Dale Passivhaus is a three-bed detached home. It is the first cavity wall Passivhaus in the UK and has projected heating costs of well below £100 a year. The Green Building Store's Ecopassiv windows, heat recovery ventilation and air tightness products were used.

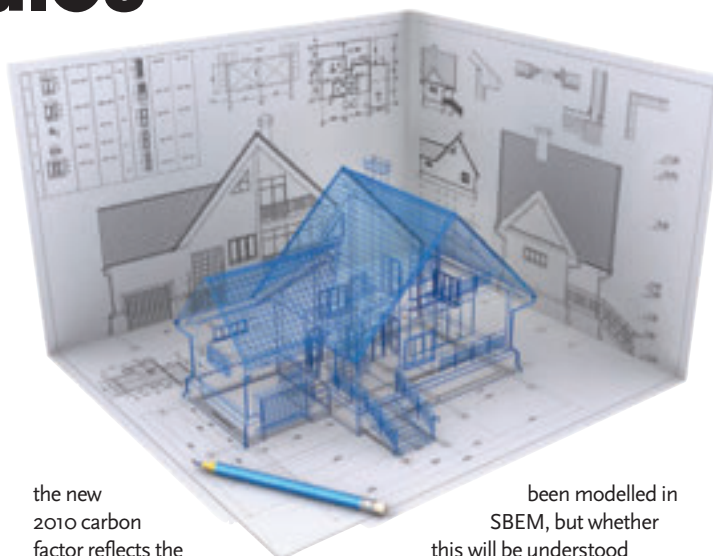
# Concern over carbon factor change in new Part L rules

The UK government has failed to fully explain why a fundamental technical change to Part L 2010 of the Building Regulations has been made, according to CIBSE.

A change to the carbon factors in the recently released Approved Documents (ADs) for Part L 2010 will mean that, from October, some fuels will be judged to emit more carbon compared with the 2006 standard. In particular, electricity and waste heat have increased significantly in the 2010 revisions – prompting fears that this could have serious implications for certain technologies, such as air source heat pumps.

But a spokeswoman for the Department for Energy and Climate Change told the *Journal* that, because the Building Regulations take account of the 'changing nature of the carbon emission factors in setting the performance minima, technologies that use electricity as a fuel are not penalised because of the changing nature of the emission factor for electricity'.

She added that other issues also affect the value of carbon factors, such as the different fuels used to generate electricity. For example,



the new 2010 carbon factor reflects the increased use of coal following unexpected rises in gas prices.

However, CIBSE's technical director Hywel Davies, was sceptical. He said: 'I don't understand how they can say that those technologies that use electricity as a fuel will not be penalised. If the factors don't penalise things that use electricity, then why do you bother with the emissions factors at all?'

Davies said it may only become clear once the National Calculation Methodology has been released and the data have

been modelled in SBEM, but whether this will be understood in time for the October launch all depends on how quickly the government makes its revisions to SBEM available. (It had not been published as the *Journal* went to press.)

'The whole problem depends on what you want to know,' added Davies. 'Do you want a number now or for five years time? Or do you try and make a view for the life of an installation? When these things last 15 or 20 years, getting the right factors really does become a bit more of a challenge.'

See News Analysis, page 16

## Construction starts moving in March

Construction growth has increased for the first time since February 2008, according to a survey. The CIPS/Markit Purchasing Managers' Index (PMI) showed growth in March as purchasing managers revealed increases in new orders, and construction companies remained positive about the future. House-building showed the strongest activity in the subsectors, while civil engineering contracted.

However, David Noble, CIPS chief executive, said: 'Dwindling head counts, as firms laid off staff at a quicker pace, coupled with weakened confidence about future business performance, suggests that the construction industry still has some concerns over the stability of the recovery.'

Meanwhile the Glenigan Index showed a rise of 37 per cent in private and social housing starts, while civil engineering was down 44 per cent. Glenigan predicts that social housing, education and health projects are expected to dry up as the new government acts to curb the deficit, but it expects to see a continuing recovery in the retail sector.

In the longer term, civil engineering projects should benefit from new renewable energy projects into the third quarter of 2010.

## Oases in the sky

New images of the Khan Shatry entertainment centre in Kazakhstan have been released. Standing at 150m, the tower, due to be completed this summer, is set to become the tallest structure in Astana, the republic's capital. It will include a tropical park that will step up in terraces to the highest part of the 100,000 sq m building, providing public spaces and green oases. Roof lights will illuminate wave pools, a river and waterfall. It will host events and house retail space, cafes and restaurants.





## News in Brief

### BREEAM Data Centres

A new BREEAM scheme for data centres has been launched by BRE. Data centres – facilities used to house computer systems and associated components – are very different to most other buildings and are generally unoccupied. The BREEAM 2010 Data Centres scheme has three categories to accommodate these variations.

[www.breem.org/datacentres](http://www.breem.org/datacentres)

### BASEC suspends firm's cable licence in Turkey

The British Approvals Service for Cables, BASEC, has suspended the product certification licence of Atlas Kablo Sanayi Ticaret Anonim Sirketi, of Denezli, Turkey, due to an unexpected sudden decline in product quality across their range of cables. The manufacturer is now fully co-operating with BASEC. Additional audits and products testing will now begin.

### USGBC LEED launch

The US Green Building Council (US GBC) and co have launched the LEED Neighborhood Development rating system. According to the US GBC, this will integrate the principles of smart growth, new urbanism and green building. [www.usgbc.org](http://www.usgbc.org)

### BSF win for AECOM

AECOM's programme management team has won three contracts to provide technical advisory services on the Building Schools for the Future (BSF) framework. The team will now become the technical advisor on the Enfield, Darlington and Havering BSF projects. Work is expected to begin on all three schemes in the next few months.

### Pushing standards

The Electrical Contractors' Association and the National Federation of Property Professionals have signed a formal 'Partners in Building Services Excellence' agreement to help the groups influence policy makers and drive industry standards. By becoming partners, both parties are committing to develop and promote excellence in building services engineering.

# Industry 'must embrace' embodied carbon issue

The building services industry needs to embrace embodied carbon as a tool for measuring the performance of buildings – but the concept is not yet workable.

That is the view of Sean Lockie, director of sustainability at Atkins, in response to the publication of the latest RICS Research report, *Redefining Zero: Carbon Profiling as a Solution to Whole Life Carbon Emission Measurement in Buildings*.

At present, UK legislation only calls for the partial inclusion of the sources of CO<sub>2</sub> generated by buildings' specific operational carbon use – the amounts of carbon used to build and maintain the building are ignored.

The RICS paper argues that there is no common way of measuring embodied carbon – something that is essential for the industry – and goes on to propose the industry uses carbon profiling to measure all emissions associated with buildings. Lockie explained: 'Mitigating embodied carbon is often put in the "too hard" basket – it is not, for example, included in any of the major policy triggers, such as Energy Performance Certificates, Display Energy Certificates, the Building Regulations (Part L) or the definition of zero carbon buildings.'

'The BREEAM system, which awards points for environmental compliance, gives embodied carbon mitigation very low numbers of points so it's a low priority for



Sean Lockie... industry needs a workable methodology for embodied carbon.

most users. There are good reasons for this, which include a focus on reducing the operational energy (such as building fabric measures, lighting, heating, air-conditioning avoidance) because these aspects are easier to measure and gains and costs easier to apportion.'

But Lockie said the RICS report, along with advice from

other bodies, could lead to big changes within the industry – if not immediately.

He said: 'This report goes some way towards making the case for embodied carbon, but there is still some way to go before we get a workable methodology and a tool that the industry can use.'

[www.rics.org](http://www.rics.org)



## Extreme design

The second construction season of the new scientific research station in Antarctica, Halley VI, is complete. The design of the first re-locatable and modular facility includes high-efficiency combined heat and power generators fuelled with AVTUR diesel, and exceptional levels of insulation. It will use 26 per cent less fuel per square metre than Halley V. The facility was designed by AECOM and Hugh Broughton Architects for the British Antarctic Survey.



# Plant closures delayed – but CBI warns it's not enough

The business group, CBI, has welcomed plans to delay green requirements for power plants – but warned that the proposals do not go far enough.

Following a vote on the Industrial Emissions Directive in the European Parliament in May, it is proposed that energy generators be given until June 2019 to upgrade power plants to comply with air pollution targets – or face closure. The CBI argues that energy generators need until 2021 to comply with the directive, to give them enough time to build other low carbon energy sources to replace lost capacity.

The group also rejects the proposal to replace the current flexible risk-based approach to monitoring industrial emissions with a one-size-fits-all 'European Safety Net'. It argues this will undermine the flexibility of member



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states to decide how best to meet air pollution targets.

Sean McGuire, director of CBI Brussels, said: 'The committee's proposal to extend the timescale for power plants to comply with the Industrial Emissions Directive from 2016 to 2019 is helpful, but it still does not go far enough.'

'There is a risk that the UK will not be able to build other low carbon energy sources in time to replace

lost capacity. A phased introduction for this directive would allow the UK to make a smoother transition to a more balanced energy mix. This also has the backing of the majority of EU member states.'

Negotiations will take place between the Council and European Parliament, before the directive is due to be voted on in a plenary session in Strasbourg in July.

In the UK, the new government has pledged to increase the target for energy from renewable sources, subject to the advice of the Climate Change Committee. The Lib Dem manifesto promised to cut UK carbon emissions by 40 per cent by 2020, while the Tories are committed to a 34 per cent reduction.

● See page 18 for coverage of the CIBSE national conference, including discussions on energy.

## Lighters have a duty to reduce energy

The new president of the Society of Light and Lighting (SLL) told members during his inauguration that it is their duty to minimise the environmental and energy impact of lighting.

Alan Tulla made his speech, 'Lighting is (still) exciting', at the Royal College of Physicians in London in May. During his presidential address, Tulla reflected on what the SLL has already achieved in its first 100 years, and where the society is now.

He said: 'Whether or not one

believes that mankind causes global warming, there is no disputing that there is only one Earth and, hence, an ever-dwindling amount of carbon-based fuel. It is our duty, therefore, to minimise the environmental and energy impact of lighting.'

He also paid particular attention to the success of the Young Lighter of the Year and the Lighting Design Awards. 'Yet again, Young Lighter of the Year had more entries than ever before, three quarters of whom were from overseas.'



Alan Tulla addresses SLL members.

## Call for more help on solar thermal

A micro-generation group has told the UK government that solar thermal heating should be incentivised as much, or even more so, than other technologies in the Renewable Heat Incentive (RHI).

YouGen, a company that describes itself as a social enterprise, made the assertion in its response to the recent RHI consultation. It said: 'Solar thermal, the only truly zero carbon technology, appears to be treated as the poor relation, and is in danger of being overlooked in favour of alternatives that offer a better financial return but lower carbon savings as a result.'

The social enterprise also said that energy efficiency measures should be made mandatory for installations of technologies intended to deliver heating, and that technologies delivering greater carbon reductions should be favoured over those that don't.

Meanwhile, trade body RenewableUK has published a report stating that the UK small wind-power market could grow by more than 180 per cent in 2010.

It also revealed that in 2009, annual small wind installations surpassed previous records by almost 20 per cent, up from 7.24MW in 2008 to 8.64MW in 2009. The total installed UK capacity reached 28.7MW at the end of last year.

The report, *Small Wind Systems – UK Market Report*, is the third of its kind and can be accessed at [www.bwea.com](http://www.bwea.com)





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## Destination Las Vegas

The 2009 award winner Emma Marshall, of RPS, receives a special plaque from ASHRAE president Gordon Holness during her visit to the ASHRAE winter conference in Orlando, Florida.



The annual CIBSE/ASHRAE Graduate of the Year award, sponsored by Baxi Commercial, is now open for entries.

The award recognises the achievements and potential of young engineers across the country who have graduated within the last two years.

Every year five finalists are selected to give a presentation in

front of an audience and judging panel. For the first time, reigning Graduate of the Year Emma Marshall, of RPS, will be among the judges. The winner will go to Las Vegas for ASHRAE's winter conference. Judging will take place on 7 October. The closing date for entries is 30 July.

For more information visit [www.cibseashrae.org](http://www.cibseashrae.org)

## Red tape leaves PV in the shade

Bureaucracy is preventing photovoltaics (PV) from growing to their full potential in Europe, according to new research.

The PV LEGAL project, run by a consortium of renewable energy bodies investigating the barriers to PV in Europe, took six months to research administrative and legal requirements for PV in 12 EU countries. And according to one of the consortium members, the UK's Renewable Energy Association, the programme has found that the PV market is not yet expected to grow to its full potential due to 'bureaucratic hurdles'.

The consortium has now published its results on the internet, creating the largest and most comprehensive online database for PV.

The study examined the necessary procedures to be complied with for the three

main market segments: small-scale installations on residential buildings; small to medium-scale installations on commercial buildings and medium to large-scale ground-mounted installations on open lands. For each segment the project development processes have been identified and described in detail, with information on duration, waiting time and legal-administrative costs of each process.

The database should provide both market actors and policy makers with a detailed analysis of the situation, and highlight the best practices and existing bottlenecks.

Project partners will now make recommendations to policy makers and grid operators in the main European PV markets through advisory papers, national conferences and ad-hoc workshops. [www.pvlegal.eu/database](http://www.pvlegal.eu/database)

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# Groups line up to join CIBSE non-compliance campaign



CIBSE's Non-Compliance Costs Campaign is gathering pace with three industry organisations lending their weight to the push on air conditioning inspections.

The campaign was launched last month after it was revealed the rate of compliance for air conditioning inspections hovered at just five per cent nationally. The institution believes the current enforcement of air conditioning inspections is not adequate, with trading standards officers finding it difficult to keep on top of their duty to enforce them.

Now the Heating and Ventilating Contractors' Association (HVCA) has officially backed the campaign, along with the British Institute of Facilities Management, BRE Global Ltd and the UK Green Building Council.

The HVCA said: 'Non-compliance with legislation designed to address the twin challenges of sustainability and carbon reduction is becoming a culture – jeopardising the nation's ability to meet its long-term environmental targets.'

BRE Global, the research and green standards body in the built environment, stressed that compliance is a key issue in the sector: 'Increasing the levels of compliance is a key industry issue and we are committed to working with trading standards organisations and supporting our scheme members.'

**BIFM**  
ADVANCING OUR PROFESSION

**HVCA**

**breglobal**



The BIFM said it is pleased to support CIBSE's campaign to ensure organisations meet their environmental obligations.

To find out how you can help, visit [www.cibse.org/noncompliancecosts](http://www.cibse.org/noncompliancecosts)

## Departments pledge to cut own emissions

The Combined Heat and Power Association (CHPA) has welcomed the government's commitment to start cutting carbon emissions 'at home' in Whitehall.

Prime Minister David Cameron has pledged to reduce carbon emissions from central government by 10 per cent over the next 12 months.

Graham Meeks, CHPA director, said: 'The Prime Minister is absolutely right to start 'at home', securing carbon savings across the government estate. The target he has set is readily achievable, with technologies already capable of delivering primary energy reductions of at least 10 per cent.'

'This is a positive start, but in truth the government should be prepared to set even more aggressive targets.'

# for LZC solutions



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President: Rob Manning BSc (Hons) ENg FCIBSE Chief executive and secretary: Stephen Matthews

## Giving students a head start



Benjamin Darko was one of the lucky recipients.

Sponsors are being sought for CIBSE university bursaries to support outstanding students of engineering.

Each year, CIBSE facilitates a number of bursaries for students studying building services. The bursaries, worth £1,650 each, not only offer students financial assistance, but also provide an important link to industry from the start of their study.



Lyndsey Barrett... Patrons bursary.

Margaret Manly, from the AG Manly Charitable Trust, which has been sponsoring CIBSE bursaries since 2004, explained: 'One of the trust's primary objectives is to advance education in engineering, and it is with this aim in mind that we support projects that encourage students to engage with the principles of engineering.'

'The bursaries at London South Bank University, facilitated by CIBSE and funded by the trust, provide an ideal opportunity to promote the BEng (Hons) courses in building services engineering to talented young people.'

Each student is chosen through an internal selection process at their university.

One of the 2009/2010 recipients, Lyndsey Barrett, who is now finishing her first year of study at Nottingham University, says she found the bursary a great assistance: 'Being a bursary recipient has greatly increased my career aspirations in building

services. I really enjoy the lectures and debates by industry experts and I am looking forward to a gratifying future career helping to tackle the challenges of improving building design, construction and, ultimately, the environment.

'I am very grateful to CIBSE and the CIBSE Patrons for their supporting bursary.'

● For more about how your firm can get involved, email Marie Dignan, director of membership, at [mdignan@cibse.org](mailto:mdignan@cibse.org)



Ehsan Sattar was one of the talented students to receive a bursary.



Juliana Owusu is a student at LSBU.

The following CIBSE Bursaries were awarded for the 2009/2010 academic year:

### CIBSE – AG Manly Charitable Trust Bursary

**Benjamin Darko** – Building Services Engineering BEng (Hons), London South Bank University (LSBU)

**Ehsan Sattar** – Building Services Engineering BEng (Hons), LSBU

**Juliana Owusu** – Building Services Engineering BEng (Hons), LSBU

### CIBSE – Modern Building Services Engineering Bursary

**Alpha Soire** – Building Services Engineering BEng (Hons), LSBU

### CIBSE – The Worshipful Company of Fan Makers Bursary

**Andrew Thomas** – Building Services Engineering BEng (Hons), LSBU

### CIBSE Patrons Bursary

**Lyndsey Barrett** – Architectural Environment Engineering BEng (Hons), Nottingham University

## News in brief

### Bursary winner announced

Rebecca Warren from SKM, Manchester, has been announced as the winner for CIBSE's 2010 Ken Dale Travel Bursary. Warren plans to use the bursary to research 'Energy Solutions in Low Carbon Communities' in Germany, Denmark and the Netherlands, and will report her findings to the CIBSE Council in October 2010. The bursary enables CIBSE members to travel and research areas of particular interest and application to the challenges facing the institution.

### Lighting awards open

Entries are now open for the Irish Lighter and Irish Young Lighter awards, sponsored by Enlighten. The awards are open to all building services professionals, with Society of Light and Lighting and the Institution of Lighting Engineers' members particularly encouraged to participate. Projects must be located in Ireland, while submissions based on lighting research will also be accepted. Winners will be announced in September and will receive €1,000. Each runner-up will be presented with €500. For details on how to enter, visit [www.cibseireland.org](http://www.cibseireland.org). Preliminary extracts need to be received by 14 June.

### Undergraduate Award 2010

Entries are now open for this year's CIBSE Undergraduate Award 2010, sponsored by Hays Building Services. The award, with a first prize of £500, and runner-up prize of £100, is open to all in their final year of BSc, BEng, MEng or MSc training and provides a great opportunity to get recognised at a national level. Visit [www.cibseyoungmembers.co.uk/news/awards](http://www.cibseyoungmembers.co.uk/news/awards) for more. Closing date: 31 July 2010.

### Low Carbon Yacht Rally

The Southern Region Low Carbon Yacht Rally will take place on 26 June in Portsmouth. Those working in building services are challenged to round the Nab Tower using only renewable energy. Dinner to follow. [d.pope@popeconsulting.co.uk](mailto:d.pope@popeconsulting.co.uk)

# Low carbon heroes and the BBC's 'Big Bang'

CIBSE, together with SummitSkills, the building services Sector Skills Council, attended the Big Bang: UK Young Scientist and Engineers Fair, in March.

The CIBSE-SummitSkills stand was themed around Low Carbon Heroes, with visitors being able to play the online Summit Holiday Village game, meet and talk to practising CIBSE members, and pick up the coveted 'I'm a Low Carbon Hero' stickers.

The three-day educational fair, organised by Engineering UK, was aimed at nine- to 19-year-olds and had more than 22,500 visitors. The event also hosted the National Science and Engineering Competition, as well as including shows from Sky television's *Brainiac*, BBC's *Bang Goes the Theory* and the *Royal Institution Christmas Lectures*.

CIBSE YEN (Young Engineers



The CIBSE stand attracted the attention of many youngsters on the day.

Network) member Louis Fifield, a student at Loughborough University who helped on the stand, said she enjoyed the experience: 'It was fun talking to the younger kids and interesting to talk to the older ones about building services.'

'I found that a lot of the older

students were not aware of the opportunities they have open to them in building services. It was great to be able to share with them some ideas of what they could do with their future career.'

The 2011 event will be held at the Docklands Excel arena. For more, contact [aringguth@cibse.org](mailto:aringguth@cibse.org)

## First person joins new Energy Management register

Christopher Evans has become the first person to join the CIBSE Low Carbon Consultant Energy Management register after passing the exam at the end of the new BSEN 16001 training course.

The register is for those professionals who wish to demonstrate their competency in implementing a fully compliant and certifiable energy management

system, meeting the requirements of EN 16001, in either their own workplace or for others.

BSEN 16001 provides a framework for an organisation to improve its energy efficiency and ultimately reduce its greenhouse gas emissions.

To find out more visit [www.cibseenergycentre.co.uk](http://www.cibseenergycentre.co.uk) or [www.cibsetraining.co.uk/energyassessor](http://www.cibsetraining.co.uk/energyassessor)



Christopher Evans... number one.

## Training and development

### Submissions

The closing dates for annual submissions to be considered at the July and September 2010 Training and Development Panel meetings are 8 June and 7 September respectively.

Training submissions, queries and employers' enquiries and applications for approved training schemes should be made to Parvin Begum, training and development administrator, on 020 8772 3612 or email [pbegum@cibse.org](mailto:pbegum@cibse.org)

### CPD Directory update

To be added to the Directory of CPD Course Providers, contact Parvin Begum on 020 8772 3612 or email [pbegum@cibse.org](mailto:pbegum@cibse.org)

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

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

- Academic institutions;
- Not-for-profit organisations

offering free or non-profit training courses;

- Sole traders who are members of CIBSE and offering free or non profit training courses; and
- Sole traders who are members of CIBSE and the training business amounts to less than five per cent of their annual turnover.

For more information on training and development, visit the IPD CPD section of the CIBSE website, which can be found at [www.cibse.org](http://www.cibse.org)





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# Sucking the SAP from new Part L

The full details to Part L of the regulations are now out – or are they?  
Carina Bailey reports on a crucial missing link

In the run-up to the general election last month, the building services sector was waiting with bated breath for the key guidance to support the recent changes to Part L: the Approved Documents (ADs), compliance guides and the calculation methodology.

Her Majesty's Government had issued statutory instruments to give legal force to these revisions – which take effect this October – but there was concern in the industry that the all-important ADs, which spell out the guidance, might not be published before a new government was elected.

However, the Department for Communities and Local Government did manage to publish the ADs before the election – and their arrival prompted a new set of concerns. The ADs were not accompanied by the national calculation methodology (NCM) – which is essential for designers to work out the emissions calculations to ensure their buildings meet the new standards demanded by Part L 2010 in terms of fuel and power.

As the *Journal* went to press, the NCM had still not been issued. David Kingstone, associate at engineering consultancy Buro Happold, says: 'The most important document, the calculation

methodology, is still in draft form and subject to change. This needs to be finalised and published so that the software can be updated and approved, and assessors are able to study the new software prior to the October launch.'

Kingstone is also critical of the complexity of the methodology: 'Some elements of the methodology are complex, and it may have been better to introduce an "energy consumption target", as well as an emissions target, to deal with this.'

CIBSE member Peter Harris believes the most fundamental change to Part L, though, is the difference in carbon factors (CF) between the 2006 and 2010 standard. Roughly speaking, a carbon (or emissions) factor is a relative figure that shows how much pollution is associated with a given activity. In the 2010 standard the CF for main gas, heating oil, wood pellets, consumed/grid electricity, and waste heat for district heating schemes per kgCO<sub>2</sub>/kWh have all increased – some significantly.

For example, the CF of consumed grid/electricity has gone from being 0.422 in Part L 2006 to 0.517 in Part L 2010 – making it 23 per cent worse in terms of carbon emissions. This has serious implications for some technologies, such as air source heat pumps (ASHP), making them



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**“The calculation methodology is still subject to change, but it needs to be finalised in time for the October launch” – David Kingstone**

less attractive to designers because, from October, they will be deemed to emit more carbon. The same will also be true for waste heat for district heating schemes, which has jumped from 0.018 per kgCO<sub>2</sub>/kWh to 0.058 per kgCO<sub>2</sub>/kWh – a threefold rise in carbon emissions.

Harris explains: 'The significant shift in the grid electricity from 0.422 to 0.517 will raise a lot of eyebrows. Does this mean that the national grid is getting worse? If so, is it right that developers are having to spend tens of millions of pounds improving the energy efficiency of buildings by 25 per cent, or to provide a 20 per cent on-site renewables contribution, when the national grid cancels this out by getting worse by 23 per cent?'

'It will be interesting to see, now, whether more schemes promote the use of on-site combined heat and power (CHP) for cooling as well as heating.'

He adds that the same will be true for ASHPs: 'With only a two

per cent increase in the CF for gas and a massive leap of 23 per cent for electricity, does this now begs the question whether ASHPs can provide significant carbon savings?'

Kingstone adds that the change in the way fan and pump emissions are calculated will mean that energy performance assessors will have to reconsider how the emissions will influence system design selection. 'Although the definition for the Energy Performance Certificate (EPC) reference building has not changed, the way emissions are calculated for an actual building have. This will mean that the resulting EPC rating, assessed from October, will be different to that calculated now.'

'This may result in a change in the EPC rating band, the number of BREEAM energy credits and even the BREEAM rating. However, only by assessing this in detail, and on a range of building types, will the result be known.'

But what does this mean for

## Proposed changes to carbon emissions in Part L 2010 against Part L 2006

Fuel	2006 kgCO <sub>2</sub> /kWh	2010 kgCO <sub>2</sub> /kWh	Change
Mains gas	0.194	0.198	+2%
Heating oil	0.265	0.274	+3%
Wood pellets	0.025	0.028	+12%
Consumed electricity	0.422	0.517	+23%
Displaced electricity	0.568	0.529	-7%
Waste heat for district heating systems	0.018	0.058	+322%

Plus sign indicates a worse factor, minus sign a better one

Source: Department for Communities and Local Government/BRE



the future, asks Harris. 'What is stopping the carbon factors from being significantly different again in another four years time? How can we be confident that what we are recommending now will provide significantly long term carbon savings?'

He says: 'A one to two per cent shift is possibly acceptable, but publication of a 23 per cent change is, surely, a major concern for the future.'

CIBSE's technical director Hywel Davies agrees that this change will pose significant challenges, making certain technologies less attractive to developers and designers. But a spokeswoman for the Department for Energy and Climate Change stresses that for most fuels – other than electricity – the carbon factors remain fairly constant: 'Electricity is generated using a mix of different fuels, and this mix can have a significant impact on the factor that is derived for electricity. Market forces have a significant influence on the mix of fuels used to generate electricity. The factors also take account of the forecast for decarbonisation of electricity supply.'

Stuart Pocock, technical director at the Renewable Energy Association, sees both the omission of consequential improvements (for existing buildings less than 1,000 sq m), and no requirement for a mandatory assessment for a building's renewable energy potential, as 'missed opportunities'.

He also describes the reduction of emissions in the modelling software, SAP, for displaced electricity (down from 0.568 CF to 0.529 CF) as 'disappointing'. 'However, the increase in emissions of grid electricity from 0.422 to 0.517 will impact the take-up of heat pumps. We welcome the government's intention to revisit this issue as a

## Key changes in the four Approved Documents

### New dwellings:

- The annual CO<sub>2</sub> emission rate of the completed dwelling is now calculated using SAP 2009 and must not exceed the target set by reference to a notional dwelling with an additional overall improvement of 25 per cent relative to 2006 standards
- Secondary heating is counted as part of the annual CO<sub>2</sub> emission rate of the completed dwelling only when actually provided for, and credit is allowed wherever low-energy lighting is installed
- Some of the reasonable limits for building fabric and services performance specifications are strengthened
- Revised guidance is provided for avoiding thermal bridging at construction joints including

### Existing dwellings:

- A general strengthening of energy efficiency standards that are considered reasonable for work on thermal elements, controlled fittings and controlled services in

existing dwellings

- Amended guidance is given for historical and traditional buildings which may have an exemption from the energy efficiency requirements or where special considerations apply
- Amended guidance is now given where an extension is a conservatory or porch that is not exempt from the energy efficiency requirements

### Existing commercial/public buildings:

- A general strengthening of the energy efficiency standards that are considered reasonable for work on thermal elements, controlled fittings and controlled services in existing buildings
- Amended guidance for historic and traditional buildings which may have an exemption from the energy efficiency requirements or where special considerations apply
- Amended guidance is now given where an extension is a conservatory or porch that is

not exempt from the energy efficiency requirements

### New commercial/public buildings:

- The notional building used to determine the TER (target emissions rate) is the same size and shape as the actual building, constructed to a concurrent specification and no improvement factor. Developers are still given the freedom to vary the specification, provided the same overall level of CO<sub>2</sub> emissions is achieved or bettered
  - Amended guidance is provided on shell and core developments and first fit-out work
  - A revised procedure is provided for demonstrating that reasonable provision has been made to limit the effects of solar gain in summer
  - Revised guidance is provided for avoiding thermal bridging at construction joints, including the option of adopting a quality-assured accredited construction details scheme approach
- Source: Government departments.

part of RHI policy development,' adds Pocock.

Bernard Pratley, the Lighting Industry Federation's (LIF) technical manager, believes the ADs for Part L are a positive step for lighting in non-domestic buildings. 'The government aim has been to further increase the energy efficiency of lighting in buildings, and as a result, the luminaire efficiency has been lifted from 45 to 55 luminaire lumens/Watt. However, we now have the controls factors available for both new and existing buildings where they were only available for existing buildings in the 2006 edition.

'LIF believe that this is a good step forward, in that the same design criteria are now used for both building types, and it also recognises the increased role that lighting controls now play in reducing the operating costs and energy usage of lighting in buildings.'

Ventilation manufacturer Vent-Axia believes the new ADs for Part F (ventilation) and Part L will help to drive the adoption of low carbon ventilation as an industry standard. According to the company, the ADs set out, for the first time, a specific fan power requirement of less than 0.5 Watt/sec for intermittent fans used in both refurbishment and new

build developments.

The industry clearly believes that the new Part L 2010 will raise some challenges for specifiers and manufacturers, as well as bringing in much needed revisions and clarifications to the regulations.

As the *Journal* went to press, the Department for Communities and Local Government said the national calculation methodology was still being 'road tested', but anticipated that it would be ready for release by the end of May.

Once published, the methodology should be available to view at [www.bre.co.uk](http://www.bre.co.uk)  
See Legal column, page 24

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# Challenging the status quo

The security of energy supply and making engineers the world leaders on low carbon were just some of the cutting-edge issues debated at the CIBSE national conference 2010. Reports by **Bob Cervi** and **Carina Bailey**

*Photography by Simon Weir and Theo Wood*

## The party years are over

### TRENDS

The party years of the noughties may be over, but this time, engineers are really needed, said Professor David Fisk of Imperial College, London.



**David Fisk... refits and refurbishes offer opportunities.**

Although he highlighted some of the problems that have been hampering building services in recent months, such as the 'truck loads' of consultations driven out by government, he did point out one true success story – domestic lighting.

He also suggested new opportunities in the refit and refurbishment arena, and with smarter facades, pervasive monitoring, and embedded generation and smart grids.

Richard Ward of construction group Eversheds, saw robust contracts as key to survival during uncertain times. 'People treat a contract like going to the dentist – they just get it out of the way. That's a huge mistake and expense and is why so many things do go wrong,' he said.

'The contracts should represent the key players setting out what this project is about and what it's meant to achieve.'

While Terry Dix, a director at Arup, told delegates that to avoid disappointments, the industry needs to make sure that buildings 'do what it says on the tin'.

## Engineers must seize the green agenda

### LOW CARBON

Engineers should act now on pushing forward with the low-carbon agenda rather than waiting for new legislation or societal change, a construction industry leader told delegates.

Keith Clarke, chief executive of Atkins and chairman of the Construction Industry Council, said that the industry would end up being 'massively too late' if it failed to move forward in research and development (R&D) in green technologies.

'We are a world-leading profession, and it's engineering's time in history – to anticipate where society will be and invest,' he insisted. 'This is our time, and if we leave it to the financiers, to traders, to the market, we are in trouble [on cutting carbon].'

'We have the legislative framework; we're brilliant at policy [in the UK] but absolutely appalling at implementation. The gap between the civil service and industry here is wider than in any other country. Financiers and management consultants have filled the gap, but it's time for engineers to do so with R&D and technologies.'

This would inevitably mean taking risks and getting some of the R&D and new technology wrong. However, Clarke added that industry would need government backing in the form of sponsorship



**Keith Clarke... don't leave the carbon agenda to financiers and the market.**

and financial 'leverage'. 'But now is the best time to be in the built environment,' he added. 'And decarbonisation is more pressing than sustainability, and it's starting now – you are world leaders today, but [with events moving so fast] will you be in 10 minutes' time?'

Clarke, who was part of the government-backed independent IGT body whose report on tackling climate change was published recently, said professional bodies in the sector now had an opportunity to work together to take the report's

findings and recommendations forward. But he conceded that this would be difficult without extra funding being made available to the bodies.

Clarke insisted that clients were aware of the need for more sustainability and, even with a recession, were now very much 'asking about this carbon stuff'. He said the challenge for the engineering industry and its R&D priorities is, 'can I answer the question the client is not asking but should be?'



# Concern over clients adopting 'minimum compliance'

## ENFORCEMENT

Commercial buildings have ended up with lower energy performance ratings than they deserve because owners were not prepared for their introduction.

That's the view of John Field of consultancy Power Efficiency, who told delegates that he was aware of buildings that could have had a B-rating but instead received a D because the owners simply did not have all the required information available.

Field also pointed to figures from Landmark, the body which compiles the database of energy-performance and display-energy certificates (EPCs and DEC)s. The data shows that there had not been the expected upsurge in renewals of DEC)s since last October, the month



John Field... too little enforcement.

which marked the first anniversary of the scheme.

Monthly registrations of DEC)s have steadily declined – from 3,636 in October 2009 to 1,495 in April this year, according to the figures.

Field criticised the lack of

enforcement of DEC)s in public buildings by the authorities, and said that corporate and commercial property owners were showing only moderate to low levels of compliance with the EPC regime. Examples of this attitude included the use of 'drive-by' EPC services that provided 'unlikely' ratings.

There was also a problem of office blocks receiving inadequate DEC ratings because the benchmarks do not reflect of the level occupancy density in the buildings. However, there is a 'huge opportunity' for the energy performance sector to engage with top management of companies about the compliance, Field added. 'However, we also need active enforcement of the energy certificates, including fines for non-compliance.'

## Give children the knowledge

### BIG IDEA

CIBSE is to lobby the new government to introduce a policy chosen by CIBSE members.

A number of 'big ideas' on tackling Britain's energy problems were proposed and voted on by members, and the winning policy was announced at the conference.

This demands that government 'make education for building energy efficiency and sustainability a compulsory topic for children at both primary and secondary school'. CIBSE will now take this forward.



CIBSE members chose the winning idea.

## Young professionals lead debate on collaboration

The conference dinner debate, organised by the CIBSE Young Engineers' Network, discussed the statement: *CIBSE believes that a sustainable built environment can only be achieved if the supply chain approaches all its projects in a holistic way and building services engineers work in integrated teams with other professions.*

A panel of four young professionals from different parts of the construction industry posited their views on the issue, which was then opened up to the audience for discussion.

One of the four, Holly Porter, an architect, argued that the procurement process is key to ensuring greater integration between members of project



Panel member Richard Meier.

teams. 'This needs mutual respect by all team members.'

Paul Kalls, a quantity surveyor, said professionals such as himself should be challenging the design put forward by building services consultancies: 'We need to approach projects in a holistic way.'

Building services engineer Emma Marshall, the CIBSE/ASHRAE Graduate of the Year, stressed that 'each member of the design team must be accommodating of the others – responsibility must be shared across the professions'.

The client representative on the panel, Richard Meier of developer Argent, agreed the collaboration is a good idea. But, he asked, what place is there for the architect or planner in such a collaborative process? 'And the problem with collaboration is that it's not in everyone interests,' he said, adding that central government could give more incentives to clients to encourage them on sustainability.

One audience member pointed out that manufacturers can feel they are 'at the bottom of the food chain' among the various players in the industry. Meier agreed that it would be valuable to have more



Panel members, from left: Emma Marshall, Paul Kells and Holly Porter.

input from product makers.

Porter said she felt it was better to have manufacturers involved at an early stage: 'We spend a lot of time writing specifications for products but have no role in choosing them.'

She also lamented the 'erosion' of the role of the architect in the building services industry in the past two decades. 'We need to take some of the role back,' she said.

Marshall argued that: 'Instead of

fitting services around the building works, we need to work on the early stages of the design to make the works as sustainable as possible.'

An audience member questioned whether manufacturers offered too many solutions – why could they not provide more standardised services and prefabricated off-site solutions? Another member asserted: 'Why is the industry still discussing collaboration. CIBSE needs to lead it. Let's just do it!'

## Better buildings – but for whom?

### DESIGN

In order to create better buildings we have to ask ourselves 'better for whom?', Barry Walker, an associate at Arup, argued.

During conference sessions on sustainability and facilities management, Walker told delegates that a growing area of business is the creation of access areas in buildings to ensure that maintenance of complex technologies can be carried out.

He explained: 'We have a constant battle with architects, but in the last few years they've realised there is a consequence to not maintaining a building properly.'

He also stressed the importance of educating the client on how the building should operate – from the chief executive down to the cleaner.

Another important factor is testing the building in real conditions to see how it performs. 'It's all quite simple stuff, so the only question I'd ask is, why don't we do it?'

Meanwhile Paul Edwards, head of sustainability at property group Hammerson, explained how the carbon agenda is driving his company.

He explained how main contractors now have to fill in a sustainability questionnaire to work with Hammerson. If they fail to meet the benchmark they will be given three years to respond. If they still fail after that period, they will be unable to work with the company.

'It's just about driving people to change,' Edwards added.

The group is opening a laboratory to test the design of retail shops, such as air conditioning and different types of lighting and materials, and it is about to embark on a review of natural ventilation at all of its assets, said Hammerson.

It has also now introduced nearly 700 green leases – a formal legal agreement for increasing environmental accountability that commits both property owner and occupier to achieve greater energy, water and waste efficiency.

# CIBSE must now grasp collaboration nettle

### MANAGING RISK

If cars can be routinely tested after production to test fuel consumption for different forms of usage, why can't buildings similarly be checked after construction, asked Rob Manning of global consultancy AECOM.

In a presentation on managing risks associated with the delivery of low-carbon buildings, Manning warned that the trend to create a contractual requirement for predicting energy usage in buildings could lead to legal disputes.

More significantly, this trend could impact upon the delivery of the industry's environmental targets: 'Under threat we fail to conduct the real post-occupancy

evaluation of a building, which is so essential to delivering best value [to the client]. How might CIBSE help the industry to reduce this risk, asked Manning, who took over as president of the institution soon after the conference.

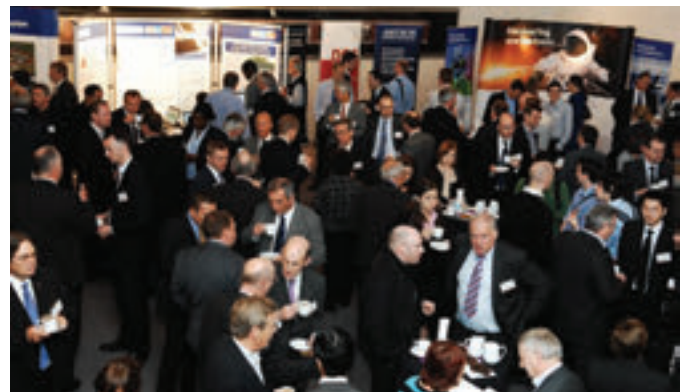
He offered an answer: 'CIBSE [might in the future be able to] assist all parties to a contract by providing a policy statement on the intended use, the accuracy and the purpose of energy predictions.'

Arguing the case for collaborative working across the building services supply chain to foster sustainable building, Manning said CIBSE has a role to help overcome the barriers to such cooperation: 'CIBSE now has to grasp the nettle and get out to talk to people. It has to



Incoming CIBSE president Rob Manning.

stop complaining about what's wrong, because it does now have the technical answers. It's a people problem, not a technical problem.' See the interview with Rob Manning in last month's *Journal*, page 34



Speakers and delegates at the event, held at the British Museum in London, chew over the day's presentations.

## Nuclear and renewables are no quick fix

### ENERGY

The idea of replacing our old coal-fired power stations with nuclear is 'unhelpful', asserted Simon Harrison, director of Mott MacDonald Fulcrum.

During sessions discussing energy, carbon and smart grids, Harrison told delegates that coal-fired power stations in the UK are set to close as soon as 2015. 'It's not all that helpful to think about building nuclear power stations to replace them because the develop-and-build time is too long to get a meaningful fleet.'

If, on the other hand, the grid was run on renewables it could mean

gas-fired power stations would be needed to run as a back-up to ensure that supply and demand are matched. Harrison added that rolling out renewables would still be too long a process to provide the 'quick fix' needed to meet the UK's energy security problems.

However, Harrison did point out that the need to recharge electric cars would one day create a huge amount of business for the building services sector.

Meanwhile Brian Mark, technical director at Mott MacDonald Fulcrum, described the fact that industry had been waiting two years for a full definition of 'allowable solutions' as extraordinary: 'We

can't advise our clients because we don't know. It's basically frozen the detailed engineering development of sustainable masterplanning.'

He also accused the industry of 'incredible arrogance' in assuming that it could develop low carbon solutions better than its European neighbours, who have been using them for at least 30 years.

Clive Earp, director of Earp Consulting, told delegates that a smart grid is on its way: 'Building services engineers are pretty poor at the way we commission buildings, and we won't be allowed to carry that standard through into connecting onto the grid. We are going to have to pick up our game.'





Delegates took part in a number of panel-led question-and-answer sessions over the two days.

## Make performance details visible

### POST-OCCUPANCY

Bill Bordass of the Useable Buildings Trust offered delegates a simple checklist of how to design, develop and maintain reliably sustainable buildings: 'Keep it simple, do it well, follow it through, and tune it up.'

Reviews of recent buildings show that they often perform much less well than anticipated, for both energy use and occupant satisfaction. Good environmental performance and occupant satisfaction can go hand in hand, but only where good, committed people have made it happen, Bordass insisted.

One key problem is that the requirements being set for new buildings are overly complex, often with the addition of 'bling'



Bill Bordass... keep it simple.

technology. 'Buildings are seldom tuned up properly, and controls are a mess,' Bordass said.

One underlying cause of poor performance is that the initial 'design estimate' of a building can be overly optimistic about energy loads, for example by ignoring night-time usage. Nor does the design take note of enough detail in relation to a building's services and operations.

'The design intent is simply not managed through the development process and into building usage,' Bordass said.

'We have to make building performance visible. We must take action now.'

'We need to build upon what works and improve what doesn't. And all the players involved need to be motivated.'

CIBSE's TM22 document begins to show the way on how to provide more transparency for buildings' performance, but it needs to be updated to include more on design intent, Bordass argued.

'But a universal framework can become too complicated,' he warned. 'We must have performance details visible at different levels, and communicate these clearly.'

## Industry is its own worst enemy

### FUTURE TRENDS

Building services engineers are the sector's own worst enemy, said Paddy Conaghan, partner at Hoare Lea. He stressed that other sectors are seeing opportunities that building services has missed during the recent 'party years' in construction, such as carbon management.

He was also critical of the UK's failure to invest in research and development, which would see a changing market bypassing UK industry: 'In the design community we are far ahead of most other members of a design team, but

often we have to drag them and our clients to the right place.

'Plainly if everyone else is in such dire need of training, people are not listening to us. One senses a spiral of decline accelerated, probably, by the economy, but also by our own hand.'

Referring to the recent interim report by the Innovation and Growth Team that highlighted the barriers to achieving 'quantum change' in the construction sector, he said building services was implicated in a lack of inspiration in the supply chain and between the institutions – something the IGT identified as a 'systemic failure'.

David Gann, group innovation executive at Laing O'Rourke, echoed some of Conaghan's assertions: 'Investment is the answer. We have to find a way of systematically putting innovation into our organisations.'



David Gann... investment is key.

### IN THEIR WORDS

'It's engineering's time in history to anticipate where society will be and invest'

**Keith Clarke**

'Buildings are seldom tuned up properly, and controls are a mess'

**Bill Bordass**

'Under threat we fail to conduct the real post-occupancy evaluation of a building'

**Rob Manning**

'Plainly if everyone else is in such dire need of training people are not listening to us'

**Paddy Conaghan**

'People treat a contract like going to the dentist – they just get it out of the way'

**Richard Ward**

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# Letters

## Our industry's Part L calculations are let down by poor data

In his article, 'Fabric of success', in the April issue of the *Journal* (page 22), Hywel Davies states that buildings are using more energy than suggested by Part L calculations and, suggests this is because the buildings are not built as they are specified. One reason for this may be that the software used to produce the Part L carbon emissions calculations is flawed.

For example, in the NCM (national calculation methodology) database, a bedroom in a residential nursing home is shown as being unoccupied for 10 hours a day. But in my experience of such homes, the residents remain in their rooms, generally with lights and televisions on, for most of the day. Libraries, museums and galleries are included in the database as being closed at weekends and holidays, but surely these are their busiest times, when air conditioning, heating and lighting systems are working the hardest?

The same can be said of most of the data sets used by the SBEM software, and surely any other software package that uses iSBEM for its calculation engine will produce inaccurate results and low carbon emission figures. Until the information used by the software to calculate the carbon emissions better reflects the way buildings are used, the energy consumed will always be higher than predicted, even if a building is constructed exactly as designed and specified and operated to its most energy efficient.

Phil Dodd

## Collaboration? Let's just do it!

Having attended the CIBSE annual general meeting last month and applauded Rob Manning's presidential address (see May *Journal*, page 34), I am convinced the collaboration theme needs to be adopted widely, and extended across many of the boundaries which currently fragment our industry, if we are to deliver low carbon buildings.

However, it may mean a radical overhaul, or even replacement, of our current competitive tendering process, as clients who can ill-afford it are keeping down their operating costs at the expense of those in the supply chain – consultants, contractors and manufacturers. I cannot help thinking clients would be much

more discerning if they had to face the real cost of securing a price for planned work. But, as Rob Manning says: 'don't wait – find a way and just do it.'

Andrew Saville, CEng, FCIBSE, MSL

## We need a better class of ductwork

Mention of the huge waste of energy created by air leakage from ductwork in your air movement feature (May, page 55) has sparked a good deal of interest among our consultant

a class C one represents a nine-fold reduction in permitted losses. What other affordable and easily achievable measures could offer this magnitude of improvement in energy efficiency?

Iain Robertson

Joint managing director, Lindab Ventilation

## Burning pellets? It's back to the 1900s

In the 1960s I designed many domestic central heating systems in Hampshire, UK, to bring alive the vision of the 1970s housewife standing proudly alongside a clean, quiet and automatic piped fuel boiler in a modern kitchen. We removed cast iron coal burners from kitchens and coal cellar boiler rooms from houses to crypts, to the great relief of many a person and parson.

Today we blanket our entire planet with artificial daylight all night, and air-condition excessively glazed buildings in a UK climate that barely needs it. We burn solid fuels in hand-stoked boilers. How long will that fad last? About as long as it takes the home, school and fire station operators to find carrying bags of fuel and emptying ash cans tiresome and dirty.

If we are to turn the energy clock back to the early 1900s, why not bring back coal stoves, have no central heating, have operable windows and natural ventilation, low-rise buildings, small windows, draught excluders, no air conditioning, vastly reduced lighting, bicycles, trams, cheap train travel and walk a lot.

Not convinced? Well, we are not serious then, and just love to talk about it and write massive documents – oh, maybe that is the point.

David Chadderton, Australia

dchadder@ncable.net.au



and contracting colleagues. We at Lindab are frustrated by the lack of attention paid to ductwork in terms of its potential contribution to energy conservation. While inefficiencies in other types of building services equipment are analysed in minute detail, high leakage rates from ducting go largely ignored.

Sophisticated and expensive solutions, such as fans and controls, are selected to reduce the energy consumed in generating air supply, but little or no attention is paid to the efficiency of the system that will transfer that air to where it's needed. At current ductwork leakage rates, much of the energy saved by the fan will simply be blown out of the building.

There is a solution. Moving up from the current ubiquitous class A ductwork system to

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## Integrated reward

We must not put cost before value in the procurement process, particularly if we want to foster collaborative working in project teams, says **Matthew Barrett**



It is interesting to see, in the *Journal's* interview with Rob Manning in the May issue (see page 34), that CIBSE's new president is arguing for a collaborative procurement and contracting process as a key way of keeping close to a building's original design intentions. This is, of course, particularly important when it comes to achieving sustainability goals and targets in the built environment.

Indeed, much of today's construction and engineering technology is product and supply chain driven, and the best solutions are therefore achieved by integrated team working between design consultants, contractors and the rest of the supply chain. Building performance is dependent upon the whole building solution, and cannot be achieved by developing designs without specific products and solutions in mind.

So-called 'value engineering' by contractors and suppliers appointed late in the process causes design havoc and in reality adds little value. When projects are based on the lowest cost option, the complexity of the solutions required is often ignored. With this comes a potentially negative impact on building and end-user business performance.

I would argue, moreover, that taking this lowest-cost approach in today's construction arena is extremely risky and is likely to lead to an array of issues, such as design flaws, delays, disputes and (more often than not) a defective and badly performing building.

The key to successfully integrating building services into a project is to take an approach based upon collaboration and inclusion – from the first opportunity through to design, project delivery and completion. The result will be a better performing building that is more durable, cheaper to run and more conducive to occupier well-being and productivity. To approach the procurement process as a battle or a contest (possibly by exploiting the current market conditions) will lay the foundations for conflict and poor performance, both during and after construction.

So, in practical terms, where should the collaboration start? Well, a sophisticated planner would consider this at the very beginning. A clear and well thought out procurement strategy that engages the designers,

contractors and other key elements of the supply chain from day one will ultimately have more chance of success than the traditional approach. A two-stage tender process is a good way of achieving this, and has proven successful in generating a better alignment of all main stakeholders' objectives from the outset.

Unfortunately, these proven methods have fallen away in the recession. It would seem that the increased level of competition in the market and consequent focus on lowest price is a key cause. The complexity and constraints of the procurement process and choice of contract form can also play a part. Certain frameworks and contracts can help encourage a greater sharing of interests.

I believe that project managers involved in the procurement of building services should consider value, too. We need to think beyond construction and consider the life-cycle, energy performance and durability of the systems. Use a framework

or two-stage tender process to engage a core team that can collectively work to improve design and building performance. By engaging and integrating the project team from the earliest possible opportunity, the rewards can be step-change improvements, as opposed to marginally reduced capital costs.

It would be a vast underestimation to describe the recent recession as a detour, but we mustn't forget the road we were travelling before the credit crunch struck; legislation, climate change targets, energy concerns and corporate responsibility are here to stay – and it is worth considering that when we emerge from the current crisis the pressure will still be on to deliver measurable reductions in environmental impact and enhanced long-term building performance for our clients. ●

**Matthew Garrett** is commercial director at building services provider, NG Bailey.

 **The key to successfully integrating building services into a project is to take an approach based upon collaboration and inclusion** 

## Measured approval

The new Approved Documents for the revised Building Regulations have been published, but they don't all take effect at once. Hywel Davies explains the timetable for change



**T**he March 2010 changes to the Building Regulations are the first since the adoption of triennial reviews. Under this policy, the regulations can only be amended every three years, and, apart from Parts F and L, no Part can be amended in consecutive reviews. So building professionals now have a bumper bundle of changes to come to terms with.

### Approved Documents (ADs): main changes

**Part L:** The exemption from the energy efficiency provisions for extensions consisting of a conservatory or porch has been amended. There are also changes to the exemptions for new buildings and for work on existing buildings. The exemption for historic buildings has been restricted, requiring more attention to Part L in listed buildings or those located in conservation areas.

There is also a requirement to carry out and submit to Building Control the CO<sub>2</sub> emission rate calculations before work starts on a new building, along with a list of the specifications used in the calculations. A commissioning plan should be presented with the calculations.

**Part G:** The draft AD, issued in May 2009, has been further changed. The final version has the term 'non-wholesome water' replaced by 'alternative sources of water', and provides for the use of softened water. The changes are comprehensively detailed in a document available on the planning portal – see 'web links', right.

**Part J:** There is a new requirement to fit carbon monoxide alarms in appropriate circumstances, where a solid fuel burning combustion appliance is installed.

**Part F:** The key changes are: for testing the air flow rate of mechanical ventilation systems in new dwellings; commissioning of mechanical ventilation systems in all buildings where testing and adjustment of the systems is possible; and giving the building's

owner sufficient information about the ventilation systems so that they can be properly operated and maintained.

### Transitional arrangements

**Part L:** The 2010 amendments to the 2006 edition of the Part L Approved Documents (ADs) were formally introduced on 6 April, but the rules don't take effect until this October. Until then there are transitional arrangements, which mean that, where building works start before 1 October 2010, they may continue using Part L 2006. This is highly significant to services engineers, and may require some explanation to clients

and others not familiar with the details of Part L and the regulations.

### Parts G, J and F:

The amendments to Part G (sanitation, hot water safety and water efficiency), Schedule 2A (competent-person schemes) and Schedule 2B (non-notifiable work) also came into effect on 6 April 2010. Transitional arrangements for Part G

mean that, where work commenced prior to 6 April 2010, the previous version of Part G applied. For all work commencing after that date, the new regulations now apply.

However, any work carried out under 2A and 2B that starts before 6 April 2011 may be carried out using Part L 2006. Amendments to Part F (ventilation) and J (heat-producing appliances) do not come into effect until this October. Approved Documents B Volumes 1 and 2 (2006), which cover fire safety, have also been amended. These incorporate changes to the standards issued under the Lifts Directive and the Construction Products Directive.

Full details of the transitional arrangements are contained in the CLG circular referred to on the right. ●

Hywel Davies is technical director of CIBSE.

**The Part L transitional arrangements may require some explanation to clients and others not familiar with the changes**

### WEB LINKS

**Building and Approved Inspectors (Amendment) Regulations 2010 (S.I. 2010/719):** [www.opsi.gov.uk/si/si2010/uksi\\_20100719\\_en\\_1#l1g11](http://www.opsi.gov.uk/si/si2010/uksi_20100719_en_1#l1g11)

**For the amendments to the 2006 Part L Approved Documents:** [www.planningportal.gov.uk/uploads/br/ad\\_l\\_revisions-corrections\\_march2010.pdf](http://www.planningportal.gov.uk/uploads/br/ad_l_revisions-corrections_march2010.pdf)

**For comprehensive details of the changes to AD G (2010) from the 2009 draft AD:** [www.planningportal.gov.uk/uploads/br/100312\\_app\\_doc\\_G\\_2010.pdf](http://www.planningportal.gov.uk/uploads/br/100312_app_doc_G_2010.pdf)

**DLG Circular 03/2010 sets out the amendments and transitional provisions (other than for Part G) in full:** [www.communities.gov.uk/publications/planningandbuilding/circular032010](http://www.communities.gov.uk/publications/planningandbuilding/circular032010)



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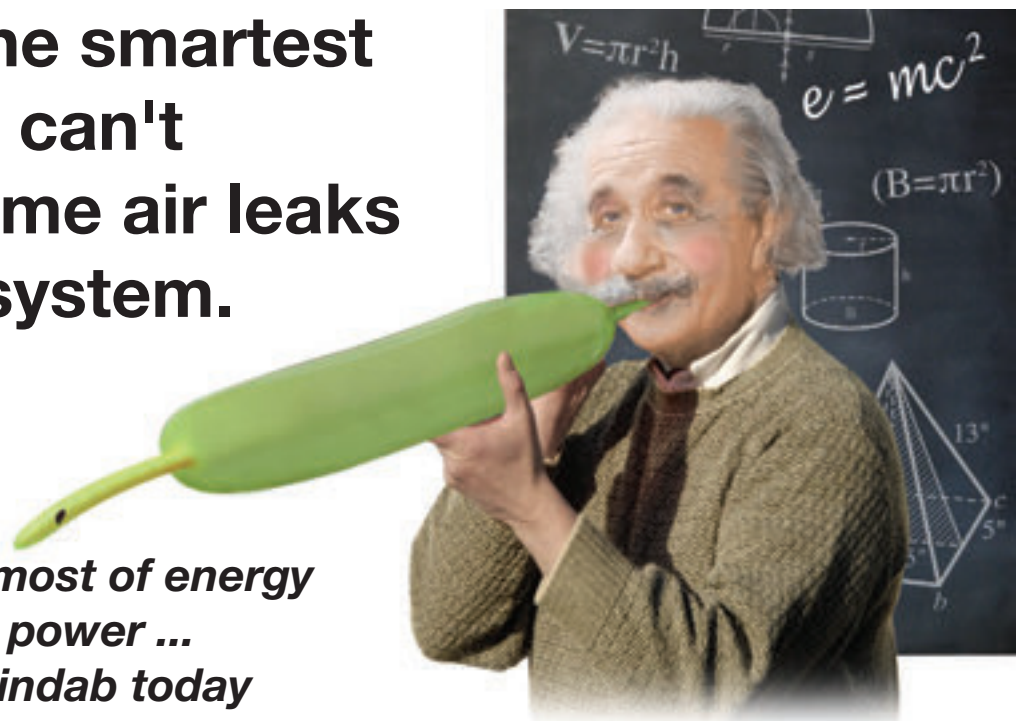
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# Green pastures

When a highly experienced building services engineer decided to construct his own house to high 'passive' standards, he took on more than he bargained for. But the results were worth the pain, as **Ewen Rose** discovers

**H**aving decided to build a house from scratch, Mike Murray believed he should practice what he preached about reducing his personal carbon footprint. He also wanted to apply the principles of 'open book' contracting, laid down by Latham and Egan in their seminal reports. These principles had been adopted at multidisciplinary practice AMEC Design and Management in Stratford when Murray was head of design there.

Murray admits that he is a classic case of a senior professional with masses of expertise on domestic projects. He therefore had a clear vision of what he wanted to achieve with the 4.5 acres of land in Banbury, Oxfordshire, that he planned to build upon. But he had little doubt that he would need a range of practical support to turn that vision into reality.

His wife Ann had already sketched out a design for a traditional Cotswold stone farmhouse, but Murray eventually persuaded her to tuck those away for another day. What they have ended up with is something much more unusual – a visually arresting home featuring three integrated blocks, each with its own curved copper roof.

When the Murrays bought the site, it came with a 1970s Colt bungalow and planning permission to demolish and rebuild. Murray was looking to develop a 300 sq m, four-bedroom home, constructed using locally sourced materials and local firms where possible.

## Thermal inertia

The outside of the building is a combination of local Hornton stone ('softer and more mellow than Cotswold stone') and oak cladding which, along with the heavyweight concrete block shell and the beam and block floor, has created a thermally massive structure – a key part of Murray's low-energy approach.

'My PhD included computer simulation of the thermal envelope, so I was able to look at this intuitively,' he says. 'We couldn't afford computer modelling in any case, but I was confident that this structure would give me the thermal inertia I needed to create an efficient

house with minimal heat losses.' The walls and vaulted ceilings are all heavily insulated. The foil-backed insulation in the walls, and the multi-layered foil insulation in the roof, unexpectedly turned the building into a Faraday cage so that no mobile phone signals can penetrate.

However, the Murrays would not be without the unusually shaped copper roofs, which they say make them feel happy when they wake up in the morning. They certainly enhance the sense of space. A thatched roof had been considered, but Murray applied a clear life-cycle planning approach to all aspects of the project and the thatching would need replacing in 30 years' time (when he 'wouldn't really be up to it').

Life-cycle planning was done at the conceptual stage when Murray adopted the 'Six S' plan pioneered by the architect Frank Duffy: Stuff (family possessions), Space plan, Services, Structure, Skin, Site – the principle being that the stuff drives the design rather than façade architecture.

“ We took our brief to 12 different architectural practices – four of whom immediately walked away ”

'We created a cracking brief from all of that information, which included listing absolutely everything we would need in the new house,' says Murray. 'Then we took it to 12 different architectural practices – four of whom immediately walked away citing their concerns about responding to such a challenging brief!'

One architect, Simon Carter, a former AMEC colleague, was up for the challenge – including a robust environmental site analysis reflecting the sustainable design approach. However, the first lesson he learned was that architects find it hard to get good building services advice on small-scale projects – particularly when seeking to design a low-energy home from



Above and facing page: Mike Murray looked to develop a home with minimal heat losses.



Mike Murray and his architect developed an overall services brief that allowed some experimentation with the shapes and form of the building fabric.

scratch. 'There is definitely a hole in the market because most residential clients will rely on the plumber to select equipment and so on, and that's not going to work on something a bit more novel,' says Murray.

Murray and Carter developed an overall services brief employing 'good engineering principles' that established basic U-values for the structure and allowed some experimentation with the shapes and form of the building fabric. All this was in the context of Murray's vision of a dwelling that closely matched the environmental standards set by the German Passivhaus approach, although not in every respect.

### Glazing

For example, they designed in plenty of south-facing glazing to allow for solar gain in the winter, but included large bi-folding doors that could be opened up in summer to allow the occupied space to cool down. A large rooflight was also fitted to allow for stack-effect ventilation.

Murray drew the line at the imported triple-glazing, which he considered out of keeping with the overall look of the house, but Argon-filled low E double-glazing is more than adequate, he says.

He also struggled with the 'lazy use' of trickle vents in standard windows as they threatened to compromise his target air tightness. Eventually, Murray instructed the manufacturer to omit them from the windows he specified.

He also wrapped the whole of the blockwork and oak structure in an airtight membrane – with some

challenging details at interfaces to windows and doors.

High air-tightness criteria and low energy targets inevitably lead to Mechanical Ventilation with Heat Recovery (MVHR) as another aspect of the design, but so far Murray is experimenting with only using it seasonally, preferring natural ventilation for all but the coldest months. A plate heat exchanger will recover heat from bathroom and utility areas in the main section to heat fresh air input to the living area and the master bedroom; and a separate thermal wheel will extract latent heat from the family bathroom and re-use that in the children's bedrooms.

“When I discussed low-energy design with planners they thought I was just talking about glazing”

The planners originally wanted him to demolish the bungalow before starting work on the new house, but the family needed somewhere to live during construction. The new build is very close to the old house, to convince the planners that it would eventually be demolished – and that is now under way with the materials being sent for recycling. He also had a cross-purposes discussion about attitudes to low energy design: 'They assumed I was just talking about glazing!' He set about appointing the project team – again using the Egan principles that the contractor



should be employed on an 'open book' basis, with Murray retaining the risk on the innovative elements, including the curved glulam oak beams, copper roof and heat pump. The contractor was to compete on the basis of mark-up, attitude to value-based decisions and demonstrable supply chain capability.

### Rising cost

According to the RICS guide at the time, reconstruction costs can vary between £110 and £125 per sq ft – and Murray aimed to finish the project for around £350,000. However, the initial cost plan was based on a traditional build, and this was pushed to almost £500,000 by value-based decisions such as the curved copper roofs and the low and zero carbon technologies adopted. The out-turn costs were pushed even higher, mainly due to latent defects in the original contractor's work, says Murray, although he declines to say by how much.

Murray found a CIBSE low carbon consultant running a small consulting practice in the next village and employed him to provide SAP analysis before putting the services out to tender. According to John Grazebrook and his team at Good Design Practice, the forecast energy usage was 13,354 kWh/year yielding 44.5kWh/sq m, but 102kWh/sq m in primary energy terms.

This compares with a 15kWh/sq m target for Passivehaus and shows 'we have a long way to go to get to zero carbon homes', according to Murray.

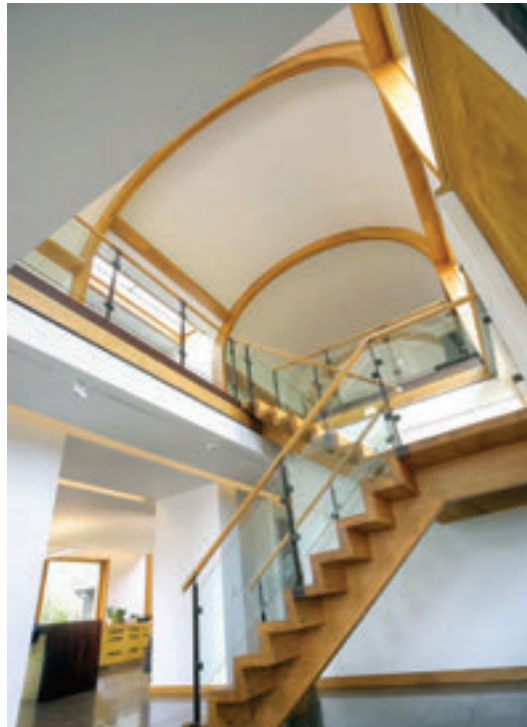
## “ If we are going to achieve zero carbon homes, we need to apply sound engineering principles in smaller-scale projects ”

He appointed a local contractor to work alongside the architect to develop the design and cost plan, but a good way into the project the contractor went bust. Around the same time, Murray also lost his ground source heat pump expert, whose company also went into liquidation through no fault of its own.

However, he was able to take over much of the project management himself, including working directly with ground source heat pump (GSHP) manufacturer Ecovision and the system now supplies underfloor heating as well as domestic hot water.

'The building services design was all about what was feasible for a home without access to natural gas,' says Murray. 'We looked at biomass because we have a good local source of fuel, but ruled that out due to the amount of manual interface you simply can't avoid with biomass boilers.'

The heavy thermal mass of the home meant it was ideal for a GSHP, particularly as a greater proportion of the load is for hot water rather than space heating in a thermally designed home. There was plenty of land surrounding the house, so six pipe loops were sunk



Vaulted roofs add to the sense of interior space.

to a depth of 1.2m in the nearby paddock, benefiting from a relatively high winter-time water table and slight warming from the septic tank soakaway.

Murray also runs his domestic hot water at a low 45C to minimise energy use, but the system has an automatic cycling function to guard against legionella bacteria growth. The cylinder has also been optimised to allow him to add solar thermal at a later stage if it is likely to be of benefit.

### Outcome

Technically, Murray has been more than satisfied with the outcome, although his wife is less than impressed with her utility room resembling a centralised plant room, due to the need to accommodate rainwater controls, head pump, MVHR, and a 500-litre capacity hot water storage cylinder.

The real problems were contractual, Murray says. Even before the contractor went bust, Murray had been having problems with them. 'I always insisted that I did not want a quantity surveyor on my project as they add no value, but I had one even though he pretended to be a project manager.'

At one stage, the contractor packaged up the entire mechanical and electrical services in an attempt to make their lives easier, but that instantly made it too large for any local firm to handle. 'When they went bust, I was able to take that back in hand again,' says Murray.

So what were the key lessons learned? 'The industry is a shambles,' says Murray. 'We are very good at technical solutions and there are some fantastic engineers out there. But if we are going to achieve zero carbon homes, we need to plug the hole in the market for well-trained, excellent conceptual engineers able to apply sound engineering principles in smaller-scale projects.' ●

### Services

#### Floor to ceiling

**Walls/floors:** Made from a combination of local Hornton stone and oak cladding; heavyweight concrete block shell; beam and block floor; galvanised wind posts in some locations

**Target U-values:**  
Windows – 1.59;  
Wall – 0.15; Roof – 0.2

**Insulation:** Multi-layered Try-iso-super bubble wrap and foil insulation in vaulted copper roof; foil-backed insulation also in cavity walls

**Windows:** Argon-filled low E double-glazing

**Ground source heat pump:** Dimplex Heat Pump – 11kW nominal capacity; 2.34kW motor input

**Hot water storage:** Dimplex 500-litre hot water storage, set at 45C, but sanitised weekly at 60C; able to increase heat pump temperature to 55C for high occupancy

**Mechanical ventilation with heat recovery:** MVHR thermal wheel ventilation to family bathroom and children's bedrooms; MVHR heat exchanger to master suite, guest suite and utility room

**Rainwater recovery:** 6,000 litre storage tank; pump in tank and in-house controls; non-potable water serves WCs and washing machine

**SAP assessment:** Energy usage – 13,354 kWh/yr yielding 44.5kWh/sq m;

**Actual performance:** Still being assessed

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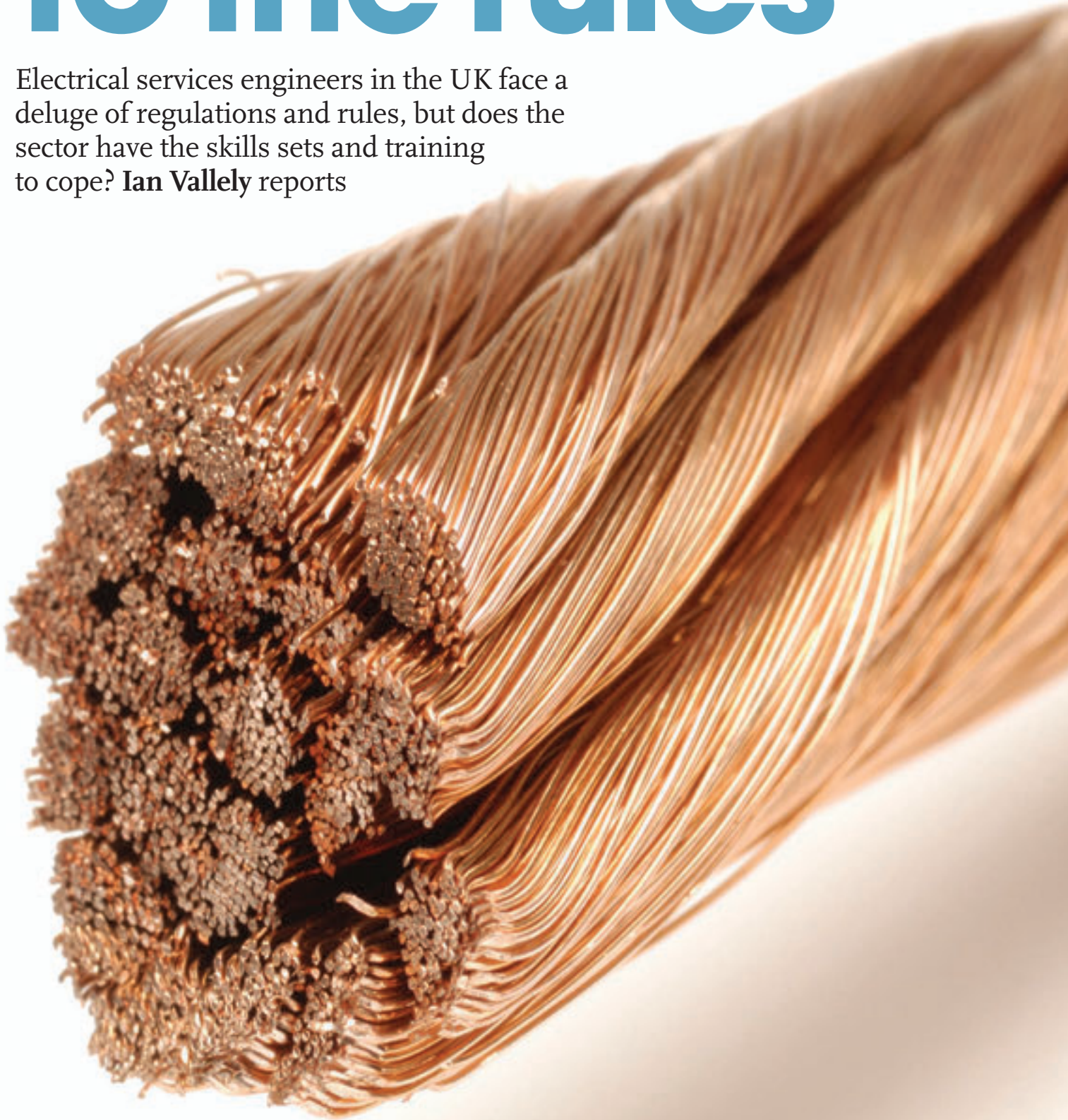
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# Wired up to the rules

Electrical services engineers in the UK face a deluge of regulations and rules, but does the sector have the skills sets and training to cope? **Ian Vallely** reports





**S**afety is of paramount importance in the electrical services sector. It overrides every other consideration, and that is one of the reasons the sector is so heavily regulated. Today's consultants and contractors working in the building services and built environment sectors are required to know a wide range of regulatory developments.

These include the new IEE Wiring Regulations (BS7671:2011), construction product directives, Building Regulations and how they affect energy modelling – which can have a bearing on electrical design, metering requirements, and design for safety and facilities management.

Tony Sung, chairman of CIBSE Electrical Services Group (ESG), says: 'Since energy and carbon go together, electrical professionals must also know how to apply low carbon and sustainable energy technologies, as well as how to provide clients with whole-lifetime costs of the proposed systems to ensure the investment in electrical services has a good return in investment value too.'

However, this strong emphasis on regulation does throw up problems for electrical services consultants and

contractors, according to Leon Markwell, chief engineer of Icel Group and secretary of CIBSE's ESG and Facilities Management Group.

He says: 'Engineers need to know a fantastic amount now about regulations and statutory issues, and I feel that it's getting to the stage where it's no longer possible to keep up to date and absorb it all and still do a meaningful and profitable day's work.'

The flood of new regulations and standards in the UK may also have other effects, says Lindsay Moody, technical manager at NG Bailey, a member of CIBSE ESG: '[Large organisations like NG Bailey] can afford to pay for directories and web-based databases that store all the latest standards. So, for people in my organisation for example, it is easy to access all the latest standards. Some of the big consultancies can probably also afford that.'

'The difficulty comes with small design consultancies or electricians. They have to buy each individual standard because to subscribe to one of [the web-based standards databases] might cost £30,000 to £40,000 a year, which takes it out of reach for many smaller companies. They have to buy the standards one at a time as and when they need them. The result is that it restricts the work they can do.'

### Training squeeze

However, legislation is not the only issue impacting on the electrical services sector. Another is training, says Sung: 'Companies cut training to deal with recessions, but put themselves at a disadvantage because they are >

- > no longer up to speed with regulatory requirements and best practice.

‘As they fall back to a defensive position, the clients are not getting value for money, but a standard “budget type” of design and construction [which may have to be stripped out and replaced in order to meet tough new legislative requirements].’

Three big issues concern Moody – de-skilling of the workforce, a lack of qualified people, and a lack of understanding of legislation.

On de-skilling, he says: ‘I don’t believe that the young people who come out of the GCSE level now are skilled to the level that they were 10 or 15 years ago. There has definitely been a dumbing down – the level of people coming into the industry has dropped and, as a consequence, all the upstream qualifications are being deskilled.’

When Moody did his apprenticeship 12 years ago, he was required to pass City and Guilds Levels 1, 2, and 3 – which took four years. He says this qualification has now been replaced by the Electro-Technical Certificate, a two-year course.

‘An electrician who gets qualified now won’t know as much as I did when I qualified, and I didn’t know as much as my boss did 10 years before me. I think that illustrates the problem – the qualifications are deskilling and it stems from the fact that GCSEs are easier.’

Sung has seen good specifications for electrical services systems from many leading consultants and contractors in the UK and overseas. However, he adds: ‘The weaknesses and gaps that people perceive are due to an acute shortage of well-qualified electrical services graduates.’

‘There is just too much work for too few of these specialists in many of the professional practices and, sometimes, the design and specifications have to be released in a hurry. As a result the design might need

fine tuning and adjustments on site.’ But there is also a lack of national engineering specifications in electrical services – probably due to the wide range of systems that is encompassed by the electrical services title, says Sung: ‘This is certainly one of the gaps in new and retrofit projects. The other gap is the lack of further learning opportunities in electrical services engineering. At present there is no postgraduate degree on offer to cater for such further learning needs crying out loud from the industry.’

## Brain drain

This brings us to Moody’s second big issue – a lack of qualified people. He says: ‘What happened a few years ago and, to a certain extent, is still happening, was that as soon as somebody got qualified up to chartered engineer status, they would leave the country because they could earn more money elsewhere; a lot of our workforce went to the Middle East.’

However, he adds, money is not the only reason for this brain drain – part of the reason is the perceived low value placed on engineers in the UK: ‘In this country, you can call yourself an electrical engineer, but there could easily be a perception that this means you go around fixing fridges; the trouble is that people don’t differentiate between different grades of engineer.’

Paul Harris, an electrical engineer and CIBSE ESG member, agrees that engineers tend to suffer from a poor image: ‘There is, in my view, not enough respect for engineers. I don’t know whether the industry has done this to itself. It’s not about attracting bright people, it is more about protecting the title “engineer”. That would be a step towards better recognition for the industry.’

Moody’s third main concern is, in his view, the lack of understanding of legislation. He says: ‘For example, I might become an expert in the Wiring Regulations, earthing systems and so on, but I won’t necessarily

The image of electrical engineers has suffered, according to some – the public associate them with fixing fridges rather than designing services.





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New wiring regulations are among a plethora of rules affecting the electricals sector.

> know the construction, design and management (CDM) requirements inside out.

‘That means I could design something that is perfectly in line with BS7671 [Wiring Regulations] and BS7430 [the earthing standard]. However, I won’t have taken account of maintenance issues under the CDM regulations, working at height regulations, dangerous substances regulations, and so on.

‘Knowing that you are complying with all the necessary legislation is very difficult and you end up with just the big organisations being competent for doing that because they have the breadth of skills.’

For Markwell, the two biggest issues in the electrical sector are the relentless drive for energy conservation

and the continual flow of new products that are released onto the market. He says: ‘In these difficult times, the manufacturers are touting their products with wonderful performance proposals and we, as facilities managers who may have a 30-year involvement with a Private Finance Initiative building, need to be able to choose what will be the best for our clients in the long term – we don’t just design and build a building and walk away.’

While acknowledging that energy conservation is important, Markwell says: ‘We can have so much new technology, such as wind turbines, photovoltaics, combined heat and power, and so on, but how do we know they are actually going to work?’

‘The only way to find out is either to conduct field trials, which take a long time – or put them on the building and find, after a couple of years, that they don’t work or don’t produce what you were expecting.’

He agrees that new research and development is worthwhile, but calls for a more responsible attitude to identifying and discussing performance by independent test bodies: ‘There are independent tests, but there isn’t really any independent verification that you could rely on.

‘[With the introduction of new energy conservation and emissions reduction initiatives, such as the CRC Energy Efficiency Scheme] you have to invest in energy-saving ideas and procedures and you have to know that what you are investing in is actually going to work.’ ●

**For more information on CIBSE ESG, or to join, visit: [www.cibse-electricalservicesgroup.co.uk](http://www.cibse-electricalservicesgroup.co.uk)**

## Ireland Regulatory pressures hit republic, too

It is not just the UK that is suffering a deluge of regulations. Keith Sunderland of Dublin Institute of Technology, who is also a member of CIBSE’s Republic of Ireland committee and of the Electro-Technical Council of Ireland’s TC2 committee, says regulation has an enormous impact in the Republic of Ireland too.

‘We are heading into a new era of regulation. The legal hierarchy in Ireland is the Commission for Energy Regulation [the independent body responsible for overseeing the liberalisation of Ireland’s energy sector].

‘There is a brand new system of regulation coming in that has major implications for how electrical services can be implemented because it is going to be a legal-based approach. That is being backed up by a new set of standards – ET101 2008 [the National Rules for Electrical Installations].

‘There has always been regulation but, until now, it has been voluntary. Although primarily aimed at the contracting side, this will have a knock-on effect on the consultancy side because you now have to have relevantly qualified people working in the area. This is a good thing, but it will be a very abrupt change in approach.’

Under the new legislation, electrical contractors will be subject to a points-based scheme. Sunderland explains: ‘If installations aren’t at a certain level, the contractor will incur penalty points. If he gets too many, he will be taken off the register of contractors and if he is off the register he can’t work.’

Sunderland believes that this could impact on consultants ‘because it means the pool from which they draw the installation workforce from is much more regulated.

‘It won’t have a direct effect on consultants, but there are going to be indirect costs incurred [through the cost of assessment and loss of earnings among contractors, which could be passed on].’

Brendan Dervan, managing director of Dublin-based Dervan Engineering Consultants, says: ‘[In Ireland], there needs to be a greater awareness of three new standards in particular – IS3217: Code of Practice for Emergency Lighting (NSAI), IS3218: Code of Practice for Fire Detection and Alarm Systems (NSAI) and ET 101: National Wiring Rules for Electrical Installations (ETCI).’ Dervan identifies the root of the problem as people moving away from the industry because of the dramatic economic downturn that the republic has experienced.



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# Generating change

In the first in a series of CIBSE-sponsored building-performance case studies, **John Field** and **Alexandros Balaskas** show how energy saving measures at a luxury London hotel can provide a return on investment

**M**arriott Hotels International gives energy and carbon management a high priority, and the group has committed itself to reducing fuel and water use by a further 25 per cent over 10 years. One recent practical example of how it is attempting to achieve this target is the group's refurbishment and then review of a property in central London.

The Marriott Hotel Marble Arch was built in 1970 and refurbished in 2000. Earlier this year CIBSE commissioned energy management consultancy, Power Efficiency, to assess the hotel's energy efficiency

operations and standards. The aim was to provide clear and detailed technical information to CIBSE low carbon energy assessors on actual building performance. The full report, available online, aims to give assessors a better understanding of what works and what results can be expected from different systems – thereby helping them to give appropriate recommendations for energy improvement measures to clients. Further projects will be conducted and published later this year.

The Marriott is a 240-room, air conditioned luxury facility with swimming pool, leisure facilities, conference rooms, a restaurant, a kitchen and meetings rooms. The overall floor area of the hotel is some 16,050 sq m (gross internal area).

The review looked at installed building services systems, energy consumed, and energy improvement measures. A detailed analysis of the overall energy use and performance of heating, ventilation and other systems was undertaken using the CIBSE TM22 procedure. Overall energy performance standards can be assessed by comparing energy use against appropriate hotel benchmarks.

The hotel has a substantial combined heat and power plant which reduces energy use and carbon emissions, and a heat pump that allows the heat removed for cooling of rooms to be used for heating of other areas or the swimming pool (see 'Services' box on page 42).

The energy efficiency performance of the Marriott Hotel Marble Arch, central London, built in 1970, was thoroughly assessed earlier this year.







Jim Carver, head of engineering for the hotel, examines its combined heat and power control panel.

Figure 1: Annual energy performance compared with benchmarks

	Metered energy		Benchmarks	
	Actual	Adjusted	Good practice	Typical
Electricity kWh/sq m	145	206	140	240
Non-electricity kWh/sq m	273	228	360	550
Carbon emissions kgCO <sub>2</sub> /sq m	129	153	142	231
Cost £/sq m	£21.18	£26.03	£22.83	£37.45

### > Metering and recording

The hotel has two half-hourly electricity meters, one half-hourly gas meter, plus a non-half-hourly gas meter for the kitchen area. Half-hourly meter data are uploaded to the energy supplier's web portal and can be checked remotely by hotel staff. The non-half hourly gas meter is billed by manual reading of the meter.

The hotel's CHP system, which is operated by a third party, is metered remotely. Energy data are transferred to the operator monthly. The CHP system's gas consumption, which is not metered separately, is calculated on the system's operating hours and design consumption. Total CHP energy consumption and generation is recorded on a spreadsheet each month.

### Energy consumption

When looking at energy supplied to the hotel, the unadjusted emissions figure of 129 kg/sq m is used (see Table 1). This is eight per cent better (lower) than the 'good practice' benchmark (142 kg/sq m) and includes the effect of a 16 per cent reduction in emissions from the CHP system.

However, removing the impact of the CHP so as to show how the building performs, we find that overall carbon emissions, at 153 kg/sq m, are eight per cent



The combined heat and power unit links to three gas boilers.

worse (higher) than 'good practice' but 34 per cent better than 'typical'. This result arises from electricity being 14 per cent and gas 59 per cent better than typical – reflecting the use of electricity for heating (via the heat pumps) with an underlying good electrical performance.

Energy costs for the hotel in 2009 were £340,000 (£230,000 for electricity and £110,000 for natural gas). Energy supplies were 2,335,000 kWh of electricity and 4,379,000 kWh of gas.

### Energy saving solutions

Power Efficiency's review of the hotel's operations produced the following list of recommended actions, each of which would provide on the cost of the respective improvement proposed.

**Building management system (BMS):** to review the schedules and settings of the BMS and update these to provide lean operation without reduction in service levels when the building is occupied. Information on customer and staff requirement and feedback would be

Figure 2: Systems' energy usage

	Electricity		Annual energy use			Annual cost		System indices		
	Unit cost 9p/kWh 9.849	kWh/year	kWh/sq m	% of total	£/sq m	£	Full load	Full load	System	Utilisation
							W/sq m	hrs/yr	hrs/yr	%
Heating		0	0.0	0%	0.00	£0	0.00	-	0	-
Hot water		0	0.0	0%	0.00	£0	0.00	-	0	-
Refrigeration		1,005,383	62.6	31%	0.00	£0	16.14	3,881	7,454	52%
Fans		739,532	46.1	22%	0.00	£0	5.87	7,847	6,993	112%
Pumps		521,974	32.5	16%	0.00	£0	4.71	6,910	6,909	100%
Control systems		0	0.0	0%	0.00	£0	0.00	-	0	-
Humidification		0	0.0	0%	0.00	£0	0.00	-	0	-
Lighting		758,577	47.3	23%	0.00	£0	8.99	5,255	7,224	73%
Office equipment		0	0.0	0%	0.00	£0	0.00	-	0	-
Other normal e.g. vending lifts		48,048	3.0	1%	0.00	£0	0.34		8,736	0%
Catering		137,592	8.6	4%	0.00	£0	2.80		6,552	0%
Pool, leisure		20,966	1.3	1%	0.00	£0	0.19		6,552	0%
Process		0	0.0	0%	0.00	£0	0.00		0	-
Other special		63,773	4.0	2%	0.00	£0	0.59		6,552	0%
<b>TOTAL</b>		<b>3,295,844</b>	<b>205.3</b>	<b>100%</b>	<b>0.00</b>	<b>£0</b>	<b>39.64</b>	<b>5,181</b>	<b>7,169</b>	<b>72%</b>



Figure 3: Summary of CO<sub>2</sub> emissions and effect of improvements

Effect of improvement measures on energy use, cost, carbon emissions and assessed Rating and Grade

Guide ratings / Grades

	Electricity (kWh/yr)	Gas (kWh/yr)	CO <sub>2</sub> (te CO <sub>2</sub> /yr)	Cost (£/yr)	Emissions (kg CO <sub>2</sub> /sq m)	DEC	EPC
<b>Energy consumption 2009</b>	<b>2,335,206</b>	<b>4,379,283</b>	<b>2,064</b>	<b>338,300</b>	<b>128.6</b>	<b>95/D</b>	<b>78/D</b>
Total effect of shorter-term measures	303,000	450,000	246	40,900	15.3		
Consumption following shorter-term measures	<b>2,032,206</b>	<b>3,929,283</b>	<b>1,818</b>	<b>297,400</b>	<b>113.3</b>	<b>82/D</b>	<b>74/C</b>
Improvement from shorter-term measures	-13%	-10%	-12%	-12%	-12%		
Total effect medium-term measures	155,000	0	83	15,200	5.2		
Consumption as improved after all measures in Table 1	<b>1,877,206</b>	<b>3,929,283</b>	<b>1,735</b>	<b>282,200</b>	<b>108.1</b>	<b>78/D</b>	<b>70/C</b>
Improvement from all measures in Table 1	-20%	-10%	-16%	-17%	-16%		
<b>Effect of longer-term measures (Table 2):</b>							
Review of power factor correction	20,000		11	2,000	0.7		
Voltage optimisation	30,000		16	2,900	1.0		
Consumption as improved including longer-term measures	<b>1,827,206</b>	<b>3,929,283</b>	<b>1,708</b>	<b>277,300</b>	<b>106.4</b>	<b>76/D</b>	<b>67/C</b>
Improvement from all measures including longer-term	-22%	-10%	-17%	-18%	-17%		
<b>Supporting data</b>							
Floor area for DEC calculation				16,050 sq m			
Benchmarks as published (kWh/ sq m)	105	330			122.1		
Unit cost (p/kWh)	9.80	2.50					
Annual standing charges excluded from costs above	£640	£640					
CO <sub>2</sub> intensities (kg/kWh) for this report generally	0.537	0.185					
CO <sub>2</sub> intensities (kg/kWh) for DEC certification only	0.550	0.195					

available from the staff engagement initiative, and there would be an opportunity to get agreement on updated time scheduling which allows a review of time schedules and set points. The energy savings assessed for the BMS review measures alone is eight per cent of electricity and gas, providing 186,000 kWh of electricity savings and 350,000 kWh of gas. Payback period: 1.3 years.

**Meter-reading management:** this measure supports the above by providing managed evidence of electricity and gas savings. A half-hourly meter is to be installed with associated data reporting and analysis for the kitchen gas supply. Energy performance objectives can be set for the kitchen operation and monitored on a regular basis for adherence to energy performance

objectives. Any fluctuations above expected performance can be checked to determine any relevant reasons such as failure of controls, longer operating hours.

Costs for automated meter reading (AMR) installation are assessed at £1,000 for the kitchen gas meter. A cost of £1,500 is allowed for set-up and software costs, to give a total budget cost of £2,500. Payback period: one year.

**Variable speed drives:** operating a fan at 50 per cent volume flow at times of low occupancy saves virtually nothing with conventional drives, but typically 75 per cent of energy use with variable speed drives. On this basis, and with low occupancy for six hours out of 24, the average energy use of the fans would reduce by 25 per cent. Variable speed drives are proposed for the foyer, >

Figure 4: Cost savings and payback from measures

Measure	Electricity savings estimate (kWh/yr)	Gas savings estimate (kWh/yr)	Carbon dioxide saving (te CO <sub>2</sub> /yr)	Cost saving (£/yr)	Guide price (£)	Simple payback period (yrs)
<b>Shorter term payback measures:</b>						
Staff engagement initiative	47,000		25	4,600	2,500	0.5
Building Management System scheduling and control review	186,000	350,000	165	27,000	35,000	1.3
Set up half-hourly meter based management procedures	70,000	100,000	56	9,400	2,000	2.0
<b>Sub Total</b>	<b>303,000</b>	<b>450,000</b>	<b>246</b>	<b>41,000</b>	<b>39,500</b>	<b>1.0</b>
<b>Medium term payback measures:</b>						
Install variable speed drives on selected fans	51,000		27	5,000	21,000	4.2
Lighting control upgrade	104,000		56	10,200	40,000	3.9
<b>Sub Total</b>	<b>155,000</b>	<b>0</b>	<b>83</b>	<b>15,200</b>	<b>61,000</b>	<b>4.0</b>
<b>Total</b>	<b>458,000</b>	<b>450,000</b>	<b>329</b>	<b>56,200</b>	<b>100,500</b>	<b>1.8</b>



Top: The chiller system.  
Bottom: Variable speed pump control panel.

> bar and restaurant ventilation systems. The three air handling units each have supply and extract fans with a consumption of 202,000 kWh. Achieving 25 per cent saving results in a saving of 51,000 kWh a year.

Installation of variable speed drives on the three supply and three extract fans has budget costs at £3,500 per fan of £21,000. Payback: 4.2 years.

**Lighting:** the hotel has already put in place an programme to replace the existing lighting in areas such as corridors and toilets with LEDs. Installation of a lighting control system would enable effective control by hotel staff including presence detection and time scheduling. Energy use by lighting was assessed at 52,000 kWh, with average operating hours of 6,800 hours a year. With presence detection and time scheduling as above a saving of 20 per cent is assessed giving annual savings of 104,000 kWh. Budget costs for these selected areas, excluding the main en-suite rooms which comprise half the floor area, are assessed at £40,000. The simple payback period is 3.9 years.

**Staff engagement:** this is an exercise to engage occupants with the objective of operating efficiently and hence saving running costs and reducing CO2 emissions. Payback: Six months. The key changes include:

- Introducing a series of presentations to staff on energy awareness matters.
- Obtaining posters and stickers (for example from the Carbon Trust) and displaying them in appropriate and prominent positions around the site;

## Services Installations in the hotel

### CHP

A combined heat and power (CHP) unit provides low temperature hot water (LTHW) heating water from engine cooling water and waste gas flue heat exchangers. The CHP system is connected in series with three gas-fired boilers acting as lead boiler followed by the gas fired boilers when heating duty demands. The CHP system has an excess heat exchanger which rejects heat when the CHP system is running and thermal demand load of the building is less than the CHP system thermal output.

### Chilled water

A central chilled water system is served by a dry-cooled chiller with two independent circuits comprising integral compressor, evaporator, and condenser. Chilled water pumps circulate primary chilled water to various circuits in the building. The chiller has a dedicated dry air cooler for heat rejection together with condenser water pumps.

### Air conditioning

Air-conditioning is provided by a water loop heat pump system of the Versatemp type, comprising heat exchangers, circulating pumps, dry air coolers and Versatemp terminal units located throughout

the building. Versatemp units incorporate a hermetically sealed reverse cycle heat pump which either provides heating or cooling as necessary to the space in which they are installed. The Versatemp units are connected to common flow and return pipe work circuit; each unit will either reject hot water to the circuit or take cooling water from the circuit depending on the load requirement of the space in which they are installed.

### Ventilation

Ventilation is provided by air-handling units serving several areas of the hotel. The building management system (BMS) enables the ventilation plant to operate at various times. The foyer air-handling system has free cooling recirculation and is typical of systems in the conference facility, restaurant and bar. Staff dining has a once-through system without recirculation. The swimming pool ventilation system includes recirculation and detects the return air humidity and also carbon dioxide concentration which indicates occupancy levels.

### Domestic hot water

Domestic HW is provided by a plate heat exchangers served by primary LTHW from the heating system.





Alexandros Balaskas checks the combined heat and power unit.

- Allocating responsibility to a single manager;
- Forming an energy working group ('green team');
- Making further use of installed AMR supply meters, subsequently assisted by sub-meters, to enable performance monitoring of individual floors and to identify potential new areas for savings;
- Developing and implementing energy monitoring and targeting procedures;
- Starting to publicise energy efficiency actions and their achievements; and
- Regularly reviewing and updating the action plan as appropriate.

**Savings assessment:** the three operational measures – the staff engagement initiative, BMS schedule and operation review, and metering and half-hourly data review procedures – are assessed to save 12 per cent of energy consumption. The energy to be achieved by all three measures together and the occupant engagement alone (without BMS scheduling or metering feedback) is expected to save two per cent of electricity use, providing 47,000 kWh of electricity savings. No gas savings are attributed to this measure because these are associated with improved boiler control and scheduling, which is not in the control of the occupant.

### Longer-term measures

As well as the above improvements, some extra changes are suggested that would have a longer-term impact:

**Voltage optimisation:** This can achieve savings of five to 15 per cent depending on a number of features including the type of load connected within the building, how far away it is from the point of generation, and so on. A detailed feasibility study would need to be carried out to ensure voltage optimisation is cost effective.

**Review of power factor correction:** Power factor correction equipment is installed but is reportedly not always achieving better than 91 per cent. This needs to be reviewed along with the supply tariff implications of poor power factor/high reactive power at present and in the foreseeable future. The Marriott Hotel Energy Group is working actively towards its main objective to become 'greener'. Measures that Power Efficiency proposed refer to the time of the survey; however, the group had already progressed measures including:

## Key conclusions of the study

Combined heat and power (CHP) unit can generate electricity on site and subsequently reduce the imported grid electricity and therefore the carbon emissions; this has been achieved with 972,000 kWh of electricity from the CHP.

The CHP system includes a heat dump to the atmosphere but it is unlikely that CHP operation is cost-effective when heat is being dumped. The CHP can operate at part load but it seems to be operated at full load. The heat dump is not effective and elevated return temperatures to the CHP can cause lock-out.

Adjustment of night operation strategy (fans and pumps) can lead to energy savings of 186,000 kWh of electricity and 350,000 kWh of gas, which represents 10 per cent of energy consumption.

Lighting average use in the hotel, currently 47.3 kWh/sq m, is close to the Good Practice Benchmarks (40 kWh/sq m) for hotels; however it can be lowered by replacing the existing lighting in bedrooms (33 W tubes) with a more efficient type.

Versatemp system operation is quite efficient as the gas consumption is relatively low due to the simultaneous heating and cooling around the building. The energy consumed by the versatemp units represent a 60 per cent fraction of the total refrigeration consumption, which can break down into 365,000 kWh/year for heating and 243,000 kWh for cooling respectively.

The hotel in London achieved consumption figures close to the GP benchmarks for hotels – despite being a 24/7 building – due to Versatemp air conditioning.

The hotel's energy consumption figure, without the operation of the CHP system, would be about 14 per cent better than the typical practice benchmark, and gas being 59m per cent better than typical practice.

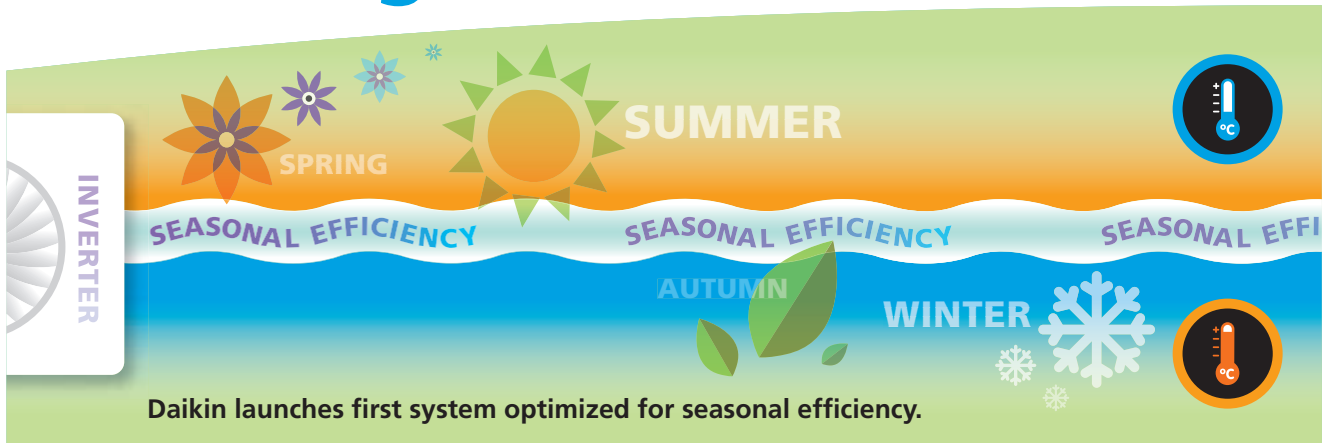
- Installation of variable speed drives in areas such as the foyer and the restaurant;
- Lighting in areas like corridors has been replaced with LEDs; and
- The Marriott group has established a bonus-related programme that aims to improve the environmental awareness of hotel staff. ●

For the full survey report, go to the digital version of the June 2010 CIBSE Journal at [www.cibsejournal.com](http://www.cibsejournal.com)

To obtain a copy of CIBSE's TM22: *Energy Assessment and Reporting Methodology*, visit [www.cibse.org/bookshop](http://www.cibse.org/bookshop)

John Field and Alexandros Balaskas work for Power Efficiency. [www.powerefficiency.co.uk](http://www.powerefficiency.co.uk)

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# Urban fallacy



## Masterclass

Professor Doug King

In this new series, **Professor Doug King** examines aspects of environmental and sustainable design, addressing common areas of misunderstanding and answering some of the ‘why’ and ‘how’ questions that crop up in design reviews and team meetings. Part one looks at wind power and explains why we are better off designing low energy buildings and systems, and then investing in large-scale wind energy, rather than trying to offset excessive building energy consumption with small-scale, urban wind generation

**T**o understand the importance of location and scale for wind power we need to start from first principles. The theoretical maximum power that can be extracted from the wind is given by the equation:

$$P = \frac{\rho A v^3}{2}$$

Where:

$\rho$  = the density of air

A = the swept area of the turbine rotor normal to the wind direction

v = the velocity of the wind

Now, since area scales as the square of dimension, it can easily be seen that the theoretical power of a wind turbine scales as the square of its size and the cube of



Doug King

the wind speed. In simple terms, large turbines are much more efficient at converting the kinetic energy of the wind into usable power than small ones – and turbines in windy locations will generate far, far more energy overall than the same turbines in locations with poor wind resource.

However, the size of wind turbines actually has a much greater impact than the simple scaling of dimension, due to the boundary effect of wind close to the ground. Figure 1 indicates the typical depth of boundary layer in different locations. Within this boundary layer the wind velocity is reduced due to friction with the ground, which dissipates the wind energy, generating turbulence.

At around 100m in height, even large-scale wind turbines are well within the boundary layer and so it is tempting to simply ignore the effect. But we cannot. Due to the cubic scaling of power with velocity, even small differences in velocity can have a significant impact on generation. We need to look at the situation in more detail.

In Figure 2, the Suburban and Open Country boundary layer curves have been enlarged to the point at which we can overlay some typical turbine sizes.

This is not 100 per cent accurate and should not be >

**In order to generate electricity it is necessary to place your turbine in the wind. If it is sheltered by its surroundings it cannot perform.**

Figure 1: The effect of surface friction in reducing wind velocity near the ground is pronounced. Over a city centre, the boundary layer extends to twice the height that it does over open countryside, due to the increased surface roughness.

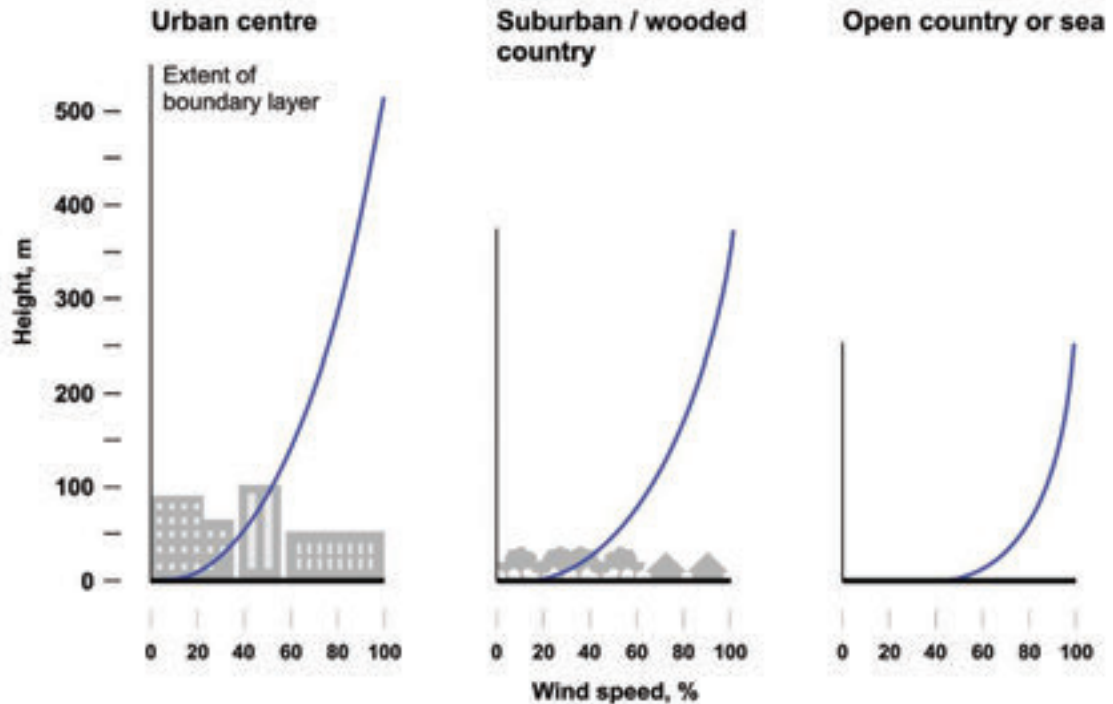
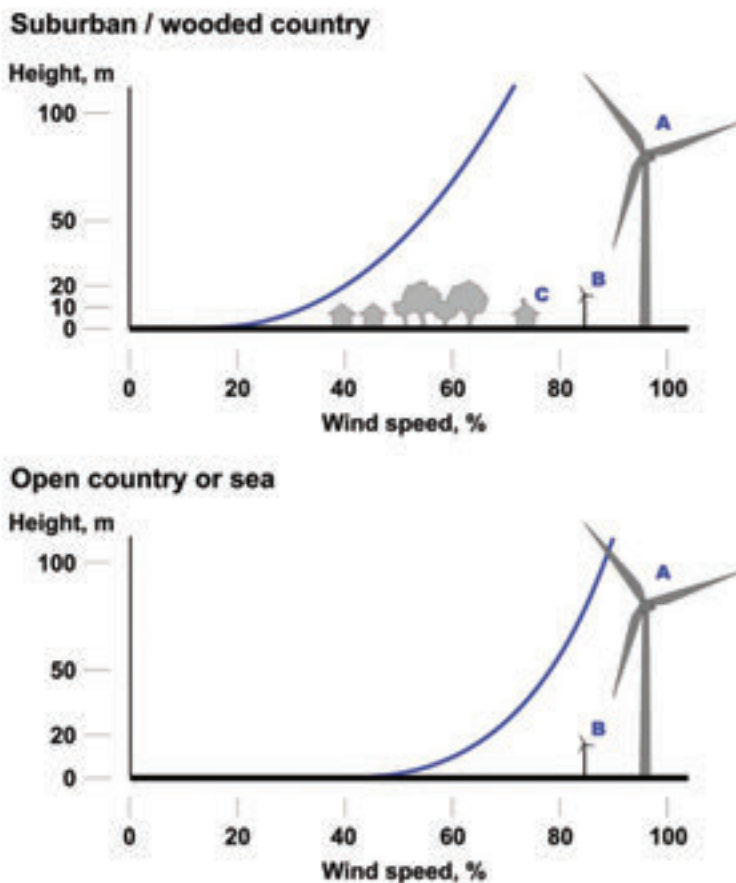


Figure 2: Within the boundary layer the wind power available is critically affected by both height and location.



> used in calculations, but for now we simply want to gain an understanding of the principles. This approach is more than adequate to demonstrate the sensitivity to height and location.

The large-scale turbine (A) has a 70m diameter rotor and is typically mounted on masts around 80m high. This machine will generate 2MW at peak output. The small scale turbine (B) is 15m to the hub, has a 10m diameter rotor and is rated at 15kWp. A typical 1kW domestic micro turbine (C) has a rotor diameter of 1.75m, and mounted above the ridge on a typical house is at a similar height to the small-scale turbine. However, by definition, a building-mounted micro-turbine will only ever be found in the equivalent of an urban or suburban location. This is because the turbulence created by the building itself is typically of a scale equivalent to or larger than the turbine.

Now, the large turbine is just over seven times the size of the small scale one. Based on size alone, we would expect the output to be 50 times greater than the small turbine. However, in open country the velocity is about 25 per cent higher at 80m than it is at 15m, and therefore the power available is nearly twice as much due to the cubic scaling. Our scaling estimate therefore works out to 1.5MW – close to the 2MW peak output actually achieved. The remaining increase in peak power output is due to the higher maximum wind velocity for the larger machine.

Wind turbines do not always generate at their peak capacity, as this only occurs at the maximum rated wind velocity. We should therefore examine the situation in terms of the annual energy generation, to complete the picture.

To estimate the annual generation capacity of a wind turbine, we apply a capacity factor to account for the annual distribution of wind velocity. For open country locations with good wind resources, we can expect a



Doug King



**Figure 3:** Two identical Enercon E-70 turbines, operated by Ecotricity, are shown. The one at Shooters Bottom in Somerset (right), is generating 5,700,000 kWh a year. The other one, beside the M4 at Green Park near Reading, (left) produces just 3,500,000 kWh. The difference is accounted for by the wind energy dissipated through friction and turbulence as a result of the surrounding buildings and trees.

capacity factor of 30 per cent. So, in an unobstructed location, a typical small turbine could be expected to generate around 40,000kWh and the large turbine about 5,250,000kWh.

Let's consider the opposite scaling. The micro-turbine is about 20 per cent of the size of the small-scale one and is mounted at about the same height above ground. So, based on the size difference, we would expect the output from the micro-turbine to be around 3.5 per cent of our small one, or 1,400kWh. It was estimates like these that led to one micro-turbine manufacturer claiming that their product could meet 33 per cent of domestic electricity demand.

However, in order to complete the picture we need to look at the influence of location in Figure 2. Due to the increased surface friction, the wind velocity at any given height is reduced over suburban or wooded locations compared with open countryside. The difference becomes more pronounced the closer you get to the ground. The wind velocity at 15m elevation drops by half compared with open country, and at 8m it still drops by around 15 per cent.

We would therefore expect the capacity of the large turbine in a suburban location to be around 60 per cent of the open country condition, due to this reduction in wind velocity. Based on our earlier estimate for generation capacity in open country, we can estimate the suburban capacity to be around 3,150,000kWh. Figure 3 shows two such turbines in different locations which exhibit this capacity reduction almost exactly.

Now when we come down to 15m and below, the height of small and micro-scale generators, the wind velocity is reduced by 50 per cent compared with open countryside, which means that there is just 12.5 per cent of the wind power available. The situation is even worse in city centres. That, in a nutshell, is why wind turbines attached to buildings in urban locations achieve little

more than decoration. Few people install small-scale turbines in urban or suburban locations because of this fact, as the generation capacity of around 5,000kWh or less could not possibly justify the installation cost. However, with the low cost of micro-generators, many are still tempted.

Applying the location factor for a suburban micro-turbine, you would expect an annual output in the region of just 175kWh. In fact, a recent survey by the Energy Savings Trust found no instance of a micro-turbine in an urban or suburban location that generated more than 200kWh per year. In some instances, the mains electricity consumed by the electronic control systems exceeded the annual generation from the wind. Micro-wind turbines are sold for around £1,500 to £2,000 and, in typical situations, may generate about four per cent of domestic electrical consumption. On commercial buildings, with their subsequently higher demands, micro-turbines are rarely justified.

Small-scale turbines of the size I have used as an example cost around £50,000 to £60,000 and, in a good location, will generate sufficient electricity to meet 100 per cent of annual demand for around six to eight homes. However, put them in an urban or suburban location and you will cripple them. Large turbines cost around £1.5m to £1.7m and can generate sufficient electricity for around 1,250 homes.

If you have cash to burn, buy a micro-turbine to make yourself feel good. But if you want to save carbon, invest in large-scale wind power or, even better, on energy efficient fabric and building services. ●

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**Doug King is principal of King Shaw Associates and visiting professor of building physics at Bath University. He was author of the Royal Academy of Engineering report, *Engineering a Low Carbon Built Environment*.**

SAFETY AND ENERGY MONITORING

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## Commercial kitchen design for safety and energy efficiency

As well as being a place where healthy and nutritious food may be prepared, the working environment in the commercial kitchen must be safe and comfortable, while meeting the increasing demands for energy efficiency and sustainable operation. There is a continuous need for risk assessment in the kitchen that requires appropriate staff training and a robust maintenance regime. However, to ensure both minimum risk to personnel and maximum operational effectiveness, appropriate and properly informed design is essential.

In terms of the services and system design, particular consideration should be given to the specific areas of gas safety as well as overall ventilation requirements.

This CPD will consider commercial kitchen gas safety, focusing on methods that may also save energy by controlling ventilation without compromising air quality.

### Ventilation

The appropriate British Standard (*Specification for the Installation of Gas-fired Appliances for Use in all Types of Catering Establishment*, BS 6713<sup>[1]</sup>) states that 'catering areas shall be ventilated to provide air for combustion and removal of combustion products and steam, etc, from the working operation'.

This is to ensure not just a comfortable

atmosphere but also that the by-products of the cooking process do not adversely affect the kitchen's occupants.

For example there are carcinogenic pollutants, Polycyclic Aromatic Hydrocarbons (PAHs), that can be present in the air as a result of cooking food and hot oil. So it is important to ensure adequate ventilation for health reasons, as well as sufficient fresh air

to enable complete combustion, and for the general comfort of the staff.

It is also essential to provide adequate make-up air for gas-fired appliances, as the lack of an adequate supply of air, and/or correct flueing arrangements can lead to incomplete combustion and the accumulation of combustion products such as carbon monoxide<sup>[1]</sup>.

> BS 6173 requires that appliances shall be interlocked with, 'any mechanical ventilation that is fitted to enable their safe operation'. This means that all fans in the kitchen, including those more normally associated with the removal of vapours and fumes from the cooking process itself (for example over a steamer), need to be interlocked with the gas supply.

Hazardous situations may arise if the products of combustion are drawn across a kitchen and taken up by the main extract hood because an extract canopy over a steamer is not switched on or interlocked with the cooking equipment controls.

The ventilation requirements for specific kitchen appliances may be determined from the European Scheme for the Classification of Gas Appliances According to the Method of Evacuation of the Combustion Products, CEN CR 1749<sup>[2]</sup>.

Most appliances installed under canopy systems are designed to operate without a flue (CEN CR 1749 Type A). Others, for example, including types of convection ovens and deep fat fryers, usually require connection to a dedicated flue system (CEN CR 1749 Type B). Due to the possible adverse effect on flue performance many manufacturers permit the installation of Type B appliances without the use of the flue, but under a canopy.

Therefore, the canopy/extraction system is performing the same function as a flue system. The Gas Safety (Installation and Use) Regulations 1998, (GSIUR) Regulation 27(4) deems this as a 'power operated flue' system and requires an interlock, which will shut off the gas supply to such appliances in the event of an air movement failure.

### Demand-based ventilation

Properly designed and implemented automatic, demand-based control of the ventilation rate linked to the level of cooking activity can be a means of saving energy whilst maintaining appropriate internal conditions.

Minimising the energy used by the fans in the kitchen can be achieved by measuring the level of carbon dioxide (CO<sub>2</sub>) and the room air temperature. Monitoring the internal kitchen environment can allow for seasonal temperature variations, and automatically takes account of any stand-alone appliances such as electrically powered fryers in the cook line or in the surrounding area.

Other methods of automatically controlling the ventilation rate, such as measuring gas flow, may be less effective since they provide an 'open loop' control mechanism where the actual working environment is not monitored.



Ventilation systems and gas supplies should be interlocked to ensure safe environments.

A minimum extract level should always be set for the speed controllers so that, even when there is minimal cooking activity, an acceptable ventilation rate is maintained. Specific guidance on extract and supply air flow rates may be found in DW172, the HVCA specification for kitchen ventilation systems<sup>[3]</sup>.

### Monitoring and maintaining safe and good air quality

The Health and Safety Executive (HSE) catering sheet 23 revision 1, allows a maximum CO<sub>2</sub> level of 2,800 parts per million (ppm) in the kitchen atmosphere.

The occupational exposure limit for CO<sub>2</sub> in the atmosphere is 5,000 ppm, eight-hour time-weighted average with a short-term exposure limit of 15,000 ppm over 15 minutes (HSE Workplace Exposure Limits EH40/2005).

As a comparative reference, BS 6896 'specification for installation of gas-fired overhead radiant heaters for industrial and commercial heating', sets a limit of CO<sub>2</sub> allowed in the atmosphere at 2,800 ppm; however, by comparison, the generally accepted normal guidance for comfort is 1,000 ppm. Considering that the ambient level of CO<sub>2</sub> in the outside air is between 350-400 ppm, a level of 2,800ppm in the kitchen would tend to indicate less than ideal ventilation.

Carbon monoxide detection systems may be installed. If installed, carbon monoxide detectors should give an audible alarm and be linked with an automatic gas shut-off system. This should be fail-safe and require manual intervention to restore the gas supply<sup>[4]</sup>.

Where CO and CO<sub>2</sub> sensors are used, they should be specifically designed for use in commercial and industrial applications –

domestic versions should **not** be employed. For example, the domestic 'traffic light' sensors should not be used.

### Interlock and monitoring solutions

The gas supply must be interlocked with the ventilation system using a gas solenoid valve (an electronic control valve) and this should conform to BS EN 161 *Automatic shut-off valves for gas burners and gas appliances*. In 2007 the Health and Safety Executive<sup>[4]</sup> reported that the requirement for interlocking specific equipment had been previously 'largely overlooked'; however, the necessity for this had been reinforced through the unambiguous requirement in BS 6173.

This interlock must **not** be fitted with a manual override function.

## ■ The drive for safety and efficiency has led to very high expectations in kitchen design and operation ■

The solenoid valve and the ventilation system is normally linked through a control panel that would, for ease of access, typically be mounted close to the fan speed controllers. Such a panel would also monitor the CO<sub>2</sub> levels both to ensure adequate ventilation and, combined with temperature monitoring, provide automatic adjustment of the ventilation rate for the comfort of the operatives. This system would also be designed to isolate the gas in the event that the CO<sub>2</sub> level rises above 2,800ppm.

Typically, such a panel would also be able





An example of a simple single control panel that provides fast feedback.

to monitor both carbon monoxide (CO) and atmospheric gas levels (ie methane and LPG). The system should be fitted with an on/off switch as well as being able to take a signal from one or more emergency gas isolation buttons. This panel may be capable of communicating with a building management systems (BMS) system to provide feedback of the kitchen's operational status.

### Gas safety proving

The supply of gas into the kitchen needs to be controlled and monitored safely. One of the practical issues is having confidence in the integrity of the gas supply pipework and appliances in the kitchen area.

BS 6173 states that where a solenoid valve is used, and where appliances are not fitted with a flame supervision device, there should be a means of proving that all the appliances are turned off before gas is allowed into the kitchen.

The Institution of Gas Engineers and Managers (IGEM) document, *Strength testing, tightness testing and direct purging of small, low pressure industrial and commercial natural gas installations* IGE/UP/1A<sup>(5)</sup>, states that the closure of an electronic control valve (ECV) on a gas supply can result in the complete loss of pressure on the downstream side of the valve.

This would then necessitate a tightness test, and possibly purging (in large installations) before the resumption of the gas supply.

This could happen even where flame safety type devices are fitted to equipment, since they can continue to allow gas flow for up to 10 seconds following the closure of the ECV, resulting in a loss of gas pressure downstream of the ECV.

A drop in the downstream system pressure may also occur during periods when cooking is not taking place (eg overnight or at weekends) when, due to the allowable leakage rate on a given installation, the gas pressure downstream of the valve may drop significantly (although within the allowable pressure drop for the installation).

Gas pressure proving provides a means of ensuring that all gas appliances are switched off before allowing gas into the kitchen. It also ensures that no gas is escaping from the pipework or the appliances, so ensuring the integrity of the installation.

There are two principal methods of monitoring the gas proving. Differential pressure sensing is the more recently exploited method. This technique measures the pressure differential across the inlet and outlet supply of the ECV – rather than just the supply as with the other methods – hence the incoming gas pressure is not critical to the system operation. This, in turn, eliminates nuisance tripping.

This method will also isolate the gas supply from the kitchen if the gas drops to a dangerously low pressure during use.

However, as differential pressure monitoring takes varying supply pressures into consideration, it will not close the solenoid valve for transient changes of gas pressure, as may happen with other methods. This is known as a 'dynamic' means of gas proving.

Older designs that rely on allowing a timed amount of gas through into the downstream pipework for a set time period are static in operation and so can miss small gas leaks.

For example, if the incoming gas pressure is slightly higher than when the system was installed, it would mean that more gas than anticipated could pass through the small valve

in the set time period – hence a small leak may not be identified.

### Systems for communications and control

Single control panel solutions that provide fast feedback are available and relatively simple to use.

They typically incorporate an LCD display to give instruction and clear guidance to the kitchen operative. Such systems can monitor CO<sub>2</sub> levels, as well as temperature, for controlling the ventilation to optimise energy consumption by controlling fan speed, and hence fan power and energy used to heat the air on cooler days.

They can also isolate the gas supply in the event of fan failure or if the CO<sub>2</sub> level exceeds prescribed limits. The integrity of the gas installation can be checked automatically each time such a panel is switched on by utilising pressure differential technology.

Natural and LPG gas, CO<sub>2</sub> and oxygen depletion detectors can also be incorporated into such controls panels where necessary.

### Conclusion

The drive for safety combined with energy efficiency and the need to improve the working environment has led to very high expectations in kitchen design and operation. Instrumentation design and functional capabilities have advanced greatly in the last few years to provide monitoring and control solutions that are simple, reliable and integrated.

However the monitoring of the air for safety and quality can only be used to support systems that have been correctly designed, installed and regularly maintained.

© Chris Dearden and Tim Dwyer 2010

1. BS 6173/2009/11.1 *Specification for the Installation of Gas-fired Appliances for Use in all Types of Catering Establishments*. BSI, 2009
2. PD CEN/TR 1749: 2005, *European Scheme for the Classification of Gas Appliances According to the Method of Evacuation of the Combustion Products (Types)*, ISBN 0580481034. 2005
3. DW172: *Specification for Kitchen Ventilation Systems*. Heating and Ventilating Contractors' Association, 2005
4. *Gas safety in catering and hospitality - Catering Information Sheet No 23 (rev1)*. HSE, 2007
5. IGE/UP/1A Edition 2 *Strength testing, tightness testing and direct purging of small, low pressure industrial and commercial Natural Gas installations*. IGEM, 2005

# Module 17

June 2010

**1. Which document is specifically relevant to the installation of gas fired appliances in catering establishments?**

- A BS 6173     B GSIUR     C DW172
- D EH40     E IGE/UP/1A

**2. Why do the Gas Safety regulations specifically require gas supply to Type B commercial kitchen appliances with a canopy extract system to be interlocked with the ventilation system?**

- A Because they use gas
- B To maintain comfort levels
- C Because they are all treated as deep fat fryers
- D Because the canopy extract system is deemed as a power-operated flue
- E Because they are designed to be operated with high fresh air supply rates

**3. Which document will provide explicit guidance on the air flowrates required for kitchen ventilation systems?**

- A BS 6173     B GSIUR     C DW172
- D EH40     E IGE/UP/1A

**4. Which one of these is most unlikely to be true for dynamic gas proving systems employing differential pressure sensing?**

- A It provides a means of ensuring that all gas appliances are switched off before allowing gas into the kitchen
- B It is unlikely to close the solenoid valve with transient changes of gas pressure
- C As it is dynamic in operation, it can miss small gas leaks
- D It typically monitors the pressure across the electronic control valve
- E The gas supply will be isolated if the gas drops to a dangerously low pressure during use.

**5. When monitoring CO2 in a kitchen, what is the approximate maximum increase above typical outdoor CO2 levels that is deemed acceptable before the gas should be switched off?**

- A 400ppm     B 1000ppm     C 1400ppm
- D 2400ppm     E 2800ppm



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Oventrop UK has supplied a significant quantity of its mechanical services valves for three different buildings in a £21m redevelopment of Southampton City College.

The Watts building was a complete strip-out and refurbishment, while the Hub and Aspire buildings are new and scheduled for completion in September. Haydon Mechanical & Electrical chose to use Oventrop equipment throughout the three buildings to consolidate and streamline its purchasing route by using one manufacturer. Haydon had used Oventrop valves previously and were pleased with its quality, reliability and cost.

● For more information call 01256 330441 or email [sales@oventrop.co.uk](mailto:sales@oventrop.co.uk)

## Bilco ensures access to students union

A recent addition to the University of Hertfordshire, The Forum, has benefited from the inclusion of two of Bilco's fire-rated floor doors. The building forms part of the university's existing College Lane Campus in Hatfield.

The doors, each providing a secondary means of escape from the Forum's plant room, were specified by the architect on the project. Each door provides up to two hours of protection in the event of a fire and has a steel construction with a fire-resistant coating for added safety.

● For more information call 01284 701696, email [bilcouk@bilco.com](mailto:bilcouk@bilco.com) or visit [www.bilcouk.com](http://www.bilcouk.com)



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HygroMatik is celebrating 40 years of innovative design and manufacture in 2010.

As one of the world's leading designers and manufacturers of humidification equipment, HygroMatik will be marking the anniversary during the year with a range of events and product enhancements.

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## Carbon emission calculations

The newly launched EDSL/Tas Academy has held the first of its one-day technical meetings at its Technical Training Centre in Milton Keynes.

The course was aimed at managers and engineers who needed a good understanding of the current options available in assessing the CO<sub>2</sub> emissions of buildings.

A key factor of Tas software is its ability to incorporate manufacturers' measured data for components in the mechanical services.

Two examples featured were EC/VAV fan coils from TROX and natural ventilation from Passivent.

● For more information visit [www.edsl.net](http://www.edsl.net) or email [academy@edsl.net](mailto:academy@edsl.net)



## Danlers PIR occupancy switches 'simply save energy'

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This site was designed to work as an aide during the planning and specification phases, as well as when the selections have been made and the systems are operational. Potential users of the system gave their input as to what they expected, needed and wanted to see from such an information hub.

● For more information email [uk-sales@grundfos.com](mailto:uk-sales@grundfos.com) or call 01525 850000





# Products & Services

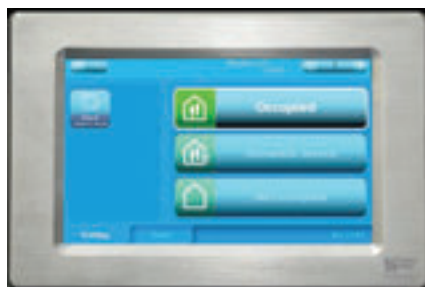
Telephone: 020 7324 2785 Email: [steve.soffe@redactive.co.uk](mailto:steve.soffe@redactive.co.uk)

## Windowmaster connects with Ivory Egg in distribution tie-up

WindowMaster is broadening its distribution network by appointing automated building systems wholesaler, Ivory Egg, as a re-seller.

Ivory Egg is an independent wholesaler of products for building automation systems that conform to the KNX building control standard. Initially, the wholesaler will be stocking WindowMaster's NV Comfort™, associated actuators and KNX power supplies. This indoor climate solution is designed for small and medium-sized buildings. The programmable and intelligent system automatically ensures that a window is in the position to create and maintain the desired internal air temperature.

● For more information visit [www.windowmaster.com](http://www.windowmaster.com)



## College chooses Atlantic Boilers



Lancashire-based Atlantic Boilers has installed rapeseed oil boilers at the Building Crafts College, Stratford, east London.

The boilers are two Atlantic R22kW year-round condensing boilers. The oil is kept heated in a storage tank, where it is maintained above five degrees C and continuously circulated to the boilers inbuilt pre-heat tanks. There the oil temperature is raised to 60 degrees C, and then, finally, the temperature is raised in the burner heads to ignition temperature. The boilers maintain seasonal efficiencies greater than 94 per cent GCV (gross calorific value).

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## Your guide to building services suppliers

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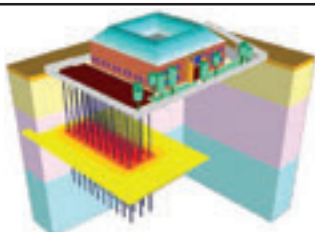
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# Events & Training

## NATIONAL EVENTS/ CONFERENCES

- **04 June 2010** Whole-day online event on sustainable refurbishment Online Conference on retrofitting. [www.chpa.co.uk](http://www.chpa.co.uk)
- **10 June 2010** Society of Facade Engineering Technical Meeting and City Walk London [www.cibse.org/sfe](http://www.cibse.org/sfe)
- **13-15 June 2010** International Theatre Engineering and Architecture Conference London Debating the issues in the built environment for the performing arts. [www.theatre-event.com](http://www.theatre-event.com)
- **15 June 2010** Smart Living – the way forward for disabled and older people London Implementing smart living systems. [www.phoneability.org.uk](http://www.phoneability.org.uk)
- **15 June 2010** Engineering Smart Home Networks London Introduction to custom installation. [www.cedia-expo.com](http://www.cedia-expo.com)
- **23-24 June 2010** Energy in the City London Celebrating the new renewable energy centre. [www.uk-ises.org](http://www.uk-ises.org)
- **07 July 2010** More effective air conditioning inspections: lessons from Harmonac Watford Discussing the project's findings. [www.harmonac.info](http://www.harmonac.info)
- **08-09 Sep 2010** Energy Insight Birmingham Security of supply. [www.theenergyevent.com](http://www.theenergyevent.com)
- **15-16 Sep 2010** World Green Roof Congress 2010 London Research/leading applications. [www.worldgreenroofcongress.com](http://www.worldgreenroofcongress.com)
- **22-24 Sep 2010** National Housing Federation Annual Conference Birmingham Affordable housing event. [www.housing.org.uk](http://www.housing.org.uk)

## SOCIETY OF LIGHT AND LIGHTING

- Visit the SLL pages via [www.cibse.org](http://www.cibse.org)
- **09 June 2010** euroLED Conference and Exhibition Coventry The seventh annual solid-state lighting conference. [www.euroled.org.uk](http://www.euroled.org.uk)
  - **15 June 2010** An overview of the society's 'Lighting Handbook' London Speaker: Peter Rayham of UCL.

[andrew.saville@armville.com](mailto:andrew.saville@armville.com)  
 ● **21 June 2010** OLED Lighting Design Summit London OLED lighting goes commercial. [www.oledinsider.com](http://www.oledinsider.com)

## CIBSE REGIONS

- **15 June 2010** An overview of the SLL Handbook – joint meeting of the SLL, YEN and Facilities Management Group London [andrew.saville@armville.com](mailto:andrew.saville@armville.com)
- **25 June 2010** Home Counties North East Region Summer Ball Brentwood Contact Debbie: 01708 440926
- **20 July 2010** CHP, the next generation? Brentwood Joint meeting with CIBSE Energy Performance Group. Contact Alex Hill: 01322 289977
- **21 July 2010** Crossrail – the story so far Croydon [jzhang2005@yahoo.co.uk](mailto:jzhang2005@yahoo.co.uk)

## CIBSE/OTHER TRAINING

- **09 June 2010** Scottish Construction Centre Procurement and PQQ workshop Edinburgh [www.scocon.org](http://www.scocon.org)
- **10 June 2010** CHP Group Seminar & AM12 London [www.cibsetraining.co.uk](http://www.cibsetraining.co.uk)
- **10 June 2010** Scottish Construction Centre Procurement and PQQ workshop Stirling [www.scocon.org](http://www.scocon.org)
- **13 July 2010** Summertime design guidance for London London [www.cibsetraining.co.uk](http://www.cibsetraining.co.uk)

## CPD TRAINING

Visit [www.cibsetraining.co.uk](http://www.cibsetraining.co.uk), call 020 7675 5211 or email [eventbookings@cibse.org](mailto:eventbookings@cibse.org)

### BUILDING REGULATIONS AND ENERGY EFFICIENCY

- **10 June 2010** Introduction to Renewables Birmingham
- **15 June 2010** Designing and developing biomass heating systems London
- **15 June 2010** Part L Building Regulations Birmingham
- **16 June 2010** Renewables: Solar Thermal Energy London
- **25 June 2010** The Carbon Reduction Commitment (CRC) London

## Two-day event offers insight into energy

Taking place during the Energy Event 2010, the Energy Insight conference aims to provide directors, energy procurement specialists and those at major energy-user organisations with an insight into the UK energy market. The conference, which consists of two half-day sessions, will be held at the National Motorcycle Museum, Birmingham on 8 and 9 September.

Chaired on both days by Jeremy Nicholson, director of the Energy Intensive Users' Group, the headline topic on the first day of the conference will be 'The Energy Retail Agenda'. This session will discuss energy generation and consumption and assist in understanding energy policy, combating volatility and creating market opportunities.

On day one, director of Network Operations for National Grid, Chris Train, will present a paper entitled: 'Concerns over the security of supply – a burden of the times or not as bad as everyone makes out?', which will



James Smith of Shell UK will deliver a keynote speech on the Energy Challenge.

cover how energy generation and storage capacity across the UK has changed over the last decade and whether Liquefied Natural Gas is a global solution for capacity constraints.

A keynote speech, entitled 'Stepping up to the Energy Challenge', will be delivered by chairman of Shell UK Ltd and president of the Energy Institute, James Smith. [www.theenergyevent.com](http://www.theenergyevent.com)

- **28 June 2010** Part L Building Regulations 2010 Loughborough
- **30 June 2010** Part L Building Regulations 2010 Liverpool
- **05 July 2010** Part L Building Regulations 2010 London
- **03 June 2010** Introduction to BS 7671: 2008 'Requirements for Electrical Installations' (IEE Wiring Regulations 17th Edition) Leeds
- **09 June 2010** Electrical Distribution Design London
- **29 June-01 July 2010** Electrical Services Explained London
- **02 July 2010** Introduction to BS 7671:2008 – IEE Wiring Regulations 17th edition London
- **07-09 July 2010** Electrical Services Explained Manchester
- **16 June 2010** Fire Sprinkler Systems: design to BSEN 12845 London
- **17 June 2010** Fire detection and alarm systems for buildings: BS 5839 part 1, 2002 London
- **21-23 June 2010** Fire Safety Engineering Design: Principles and Practice London
- **08 June 2010** Lighting Basics 3: Interior Lighting Applications Birmingham
- **02 June 2010** Air Conditioning Basics 3: Plant London
- **03 June 2010** Air Conditioning Basics 4: Automatic Controls and Refrigeration London
- **06-08 July 2010** Mechanical Services Explained London
- **22 June 2010** Report Writing London
- **22 June 2010** Mentoring Skills London
- **30 June 2010** Running Projects Effectively London

Send your event details to [cbailey@cibsejournal.com](mailto:cbailey@cibsejournal.com) to see them listed here



## Future features in CIBSE Journal

July 2010	Air conditioning Offices
August 2010	Heat pumps and combined heat & power Facades engineering
September 2010	Air movement & ventilation Public health engineering*
October 2010	Industrial & commercial heating Water conservation
November 2010	BMS & controls Lighting*
December 2010	Pipework (inc: pumps, valves, UFH & controls) Combined heat & power

\* = Supplements

Editorial submission: Please send editorial proposals/ideas three months before publication date, eg, 1st October for January publication. Send to: [editor@cibsejournal.com](mailto:editor@cibsejournal.com).

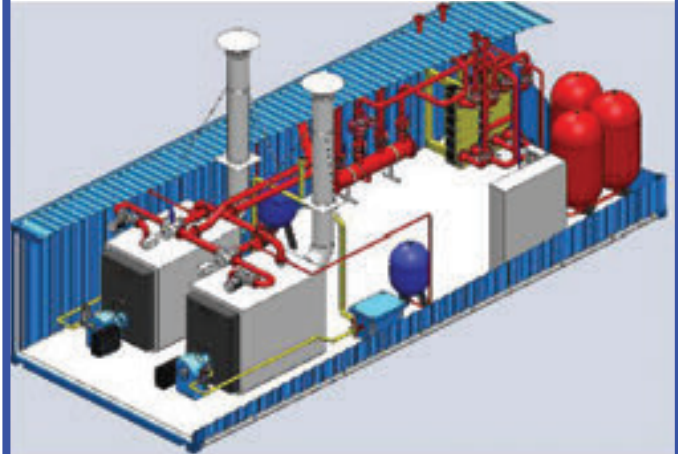
The final editorial copy deadline is one month before publication date.

**For advertising opportunities contact:**

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[www.cibse.org/sophe](http://www.cibse.org/sophe)  
Refer to website for competition details

## New energy savings in homes factsheets from CIBSE

There is much conflicting information on how to reduce energy and water use in residential buildings but authoritative free factsheets are now being produced by CIBSE, the leading source of industry good practice on energy savings in buildings. The factsheets will help developers, planners, designers and homeowners understand where to spend their effort for maximum effect.

The factsheets will be available this summer and will cover:

- Fabric analysis (the building envelope)
- Energy supply and efficiency
- Low carbon and renewable solutions
- Water demand, consumption and recycling

You can access the factsheets by visiting [www.cibse.org](http://www.cibse.org), logging in and visiting the downloads area in the Knowledge Bank, which contains a wealth of free information.

## New Homes Group formed

CIBSE is pleased to announce the formation of a new Special Interest Group, 'Homes for the Future'. This group addresses the growing need for information about low carbon homes, both for new build and refurbishment projects.

An initial workshop to plan the group's programme will be held in the early summer. To receive more information about the group, please email Nyree Hughes, Technical Networks Manager at CIBSE ([nhughes@cibse.org](mailto:nhughes@cibse.org)).



## What will you achieve next?



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Our buildings practice in Australia and New Zealand is enjoying continued growth, delivering exciting projects across the health, defence, education, justice, mining and transportation markets. All this leads us to cast our net wide for talented individuals who bring a wealth of experience from across the globe.

To assist with our search our team will be attending the Working In Australia and New Zealand expos in Manchester and London on July 10th-11th and July 17th-18th. Our team are keen to talk to experienced Engineers in the following areas:

- Mechanical Services Engineers
- Electrical Services Engineers
- Public Health Engineers
- Fire Services Design Engineers
- Sustainability Practitioners
- Multidisciplinary Project Managers
- Multidisciplinary Design Managers

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**Meet us at the Working In Australia and New Zealand Expos 2010: 10-11th July, Manchester Central or 17th-18th July, Novotel London North.**

[www.expo-australia.com](http://www.expo-australia.com)

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Ref: BAR452

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Ref: BAR453

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Contact Richard Sutton for further information about this and other M&E Design Engineering opportunities - richard.sutton@bsvconsultants.co.uk

### Principal Energy Sustainability Engineer

REF: 11171

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This is a role for a Chartered Engineer who has a Contractor AND Consultant background. With an eye for design but with good commercial acumen you will design, procure and project manage Plant and engineering services replacement within existing Commercial property. This role provides an excellent career and remuneration package for a talented all-round engineer.

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REF: 11173

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DCC/10/6504

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**Closing date: 13 June 2010**

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### Junior / Intermediate / M&E Engineers | London | £NEG! | ref: 7041

Our client is looking to extend its M&E team across all disciplines and at all levels. Junior and intermediate engineers will be looking to further their careers. A variety of commercial experience would be advantageous.

### Energy Engineer / Consultant | London | £NEG! | ref: 1142

Our client, an international consultancy is looking for an energy consultant. You will ideally have accreditation as an air conditioning inspector and/or low carbon consultant. Experience of dilapidation surveys, innovative energy efficient mechanical systems design and contractor installations is also essential. Knowledge and application of current legislation and regulations in relation to Carbon Reduction Commitment is also required.

### BIM Technicians - All Levels | London/Surrey/Hampshire | £NEG! | ref: 6358

An international contractor, our client is looking for BIM technicians from junior level upwards. The role will entail 3D modelling of building projects using CAD and BIM 3D and 4D software. Exciting opportunities!

For more information or a confidential discussion please contact Mark Butter

**t: 02392 603030**

e: [mark.butter@blueprintrecruit.com](mailto:mark.butter@blueprintrecruit.com) [www.blueprintrecruit.com](http://www.blueprintrecruit.com)  
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### Facilities Management

## Engineering Asset Manager

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Knowledge of site wide infrastructure and long term utilities planning relating to large and expanding sites is also essential. You should also have experience of managing LTM engineering works, engineering condition survey, construction contracts, appointing, co-ordinating, directing external consultant teams and complex programmes/portfolios of major building projects. The ability to take briefs, prepare drawings/specifications and manage in-house projects from inception to completion is also required together with excellent communication skills, the ability to work as part of a wider team and to manage a busy and varied workload.

See website for further information and an application form.

Closing date: 8 June 2010. Please quote reference

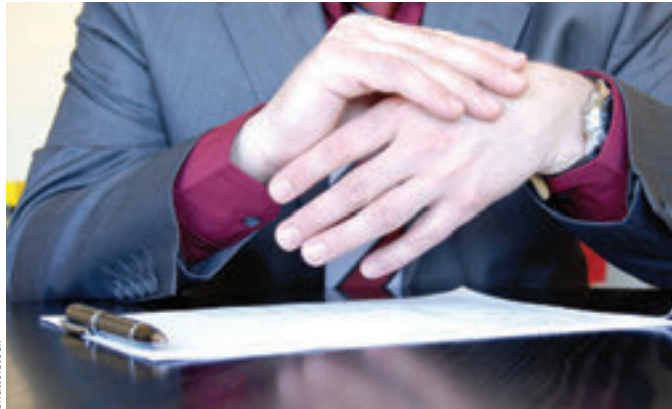
FM/1752/5810.

[www.lboro.ac.uk/jobs](http://www.lboro.ac.uk/jobs)



# Mind your Language

Recruitment specialist **Andy Holtham**, of NES, explains the importance of good body language for job applicants



Shutterstock

Job interviews can be a nerve-racking experience for even the most outgoing of individuals – and it's not always qualifications and experience that jobseekers will fall down on at this stage.

Complacency simply isn't an option, even for those who are confident that their skills and experience meet the requirements outlined in the job spec.

Something that's become a growing issue for NES is hopeful applicants attending numerous interviews and – understandably – feeling gradually less and less confident about their performance, as knock-back after knock-back begins to take its toll.

While high levels of anxiety were once more commonly displayed by recent graduates seeking their first role, recession-hit jobseekers, who had been used to practically walking straight into role after role after role throughout the course of their careers, have felt a severe impact of

ever-tightening budgets, ever-more stringent recruitment processes and ever-increasing competition.

So, while you, as such an accustomed professional, may well snigger at the prospect of carefully considering your body language, think about how recent times may have affected the way other people perceive you without you even realising it.

No-one is capable of avoiding body language – some are just more aware of it than others – but by being more aware of it, you can take greater control of it and learn to use positive body language to your advantage when it comes to that all-important job interview.

Think about the negative signals that you might be giving out. Saying all the right things in an interview isn't going to help if your interviewer reads the non-verbal message that your body language is sending. Weak handshakes can be hugely off-putting and can indicate a weak character, so put some effort in and ensure that yours says 'firm, but friendly'.

Next, think about things like posture, eye contact, tone of voice and the way you speak, which all contribute to the overall perception that you create: slouching indicates low self-esteem or lack of interest, whereas upright demonstrates confidence and comfort; avoiding eye contact is a sign of dishonesty

**“ Don't allow your lack of confidence or negative body language hinder your ongoing professional development ”**

## Movers & Shakers



M+E design consultant, Troup Bywaters + Anders, has announced that **Chris Lynn** will

head up the team at its new Cardiff office. Lynn joins from AECOM, where he was a director. He has worked in Wales and the rest of the UK on a large range of projects, including education, health, commercial, retail and leisure, residential and arts.

masterplanning projects, particularly looking at how the company translates climate change and sustainable policies into action.



**Steve Heap** has been appointed field sales manager at the gas safety panel manufacturer

Medem UK. Heap will strengthen the Medem team by orchestrating a business development strategy that identifies opportunities and responds swiftly to customer demand. He was previously business development manager at Omron Electronics.



**Gavin Loy** has re-joined CAD 21 Ltd as an associate, after five years in Dubai, to head up

CAD 21's new Thorpe Park office in Leeds. Gavin is relishing the challenge to build up CAD 21's profile in the Yorkshire region.



**Paul Dollin** has been appointed WSP UK managing director, and executive director

of WSP Group plc, the engineering and management consultant. Formerly managing director of design and engineering at WS Atkins, he will now help to strengthen WSP's UK business.



**Hugh Parry**, CEng MCIBSE, has joined Flatt Consulting as a technical director. He will work

alongside the current management team to further develop the company's building services, low carbon design and sustainability business.



The Rodin Group has appointed **Gary Maddison** as its national sales manager. He has more than 25

years' experience in water treatment and water systems as a public health engineer and senior sales engineer. He has also taught plumbing, heating and ventilating as a senior mechanical lecturer.



**Robert Shaw** has left AECOM to join LDA Design as director of sustainability and climate change.

At LDA Design he will continue to work on spatial planning and

(certainly not something that will be welcomed at a job interview!). So, whether you're speaking or listening, use eye contact without staring; slow down your speech deliberately, to compensate for any quickening pace – a clear and controlled voice conveys assurance and is easier to understand.

It's important to remember that you may no longer be a scarce resource – we're still fighting the effects of the recession, so there are plenty of applicants with strong technical skills and a lot of experience. Negative body language isn't going to do you any favours, so think about how you portray yourself and take steps to

ensure that it isn't something that will prevent you from finding work in the future.

With so many hopeful candidates applying for every vacancy, companies really can pick and choose according to whatever criteria they consider to be significant alongside those all-important technical skills – don't allow your lack of confidence or negative body language hinder your ongoing professional development.

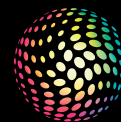
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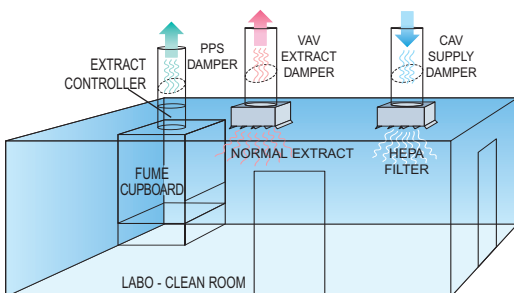


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