

# CIBSE

JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

March 2010

## Fits and starts

Will UK households take to feed-in tariffs?

### POLICY CHANGES

The low-down on April's big bang

### EATING UP WASTE

Pizza Hut on a roll to cut energy use

### INTERNATIONAL

South African bank pioneers Green Star  
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Product launches and refrigerants



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AIR CONDITIONING &  
HUMIDIFICATION SYSTEMS

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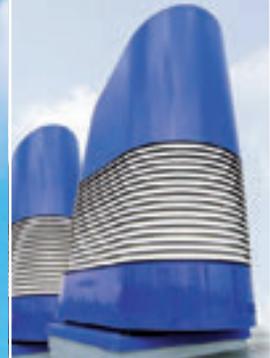
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# From the editor



## Cruellest month brings cheer

**T**he arrival of April will hopefully herald the end of the snow here in Britain, but there won't be any escape from the expected deluge of UK policy and legislative changes due to rain down on the building services engineering sector. But don't be too alarmed. This issue of the *Journal* covers the important developments, offering (excuse the pun) a rain check for readers.

Crucial developments include revisions to Parts F, G and L of the Building Regulations. As we stress (see page 29), these changes do not formally become law until October – so the six-month buffer is there for those who need it. More details on the Part L changes are expected from government, and these may well emerge after this edition has gone to press. Also in the wings are likely changes to the Code for Sustainable homes and more developments on definitions of both 'zero carbon' homes and non-domestic buildings – for more on which, watch this space.

Another key change that will impact on many companies is the introduction of the Carbon Reduction Commitment Energy Efficiency Scheme, the CRC. From next month those firms and bodies coming under the scheme will have to record and report their carbon emissions.

Although the CRC is, in effect, phased in over a number of years, businesses remain concerned about how it will operate and whether or not they will be represented fairly on the dreaded league table that will be compiled to reflect companies' carbon-cutting records.

A survey of about 1,000 companies shows the continuing concern and confusion that exists around the CRC (see page 6). In addition,

property developers have argued that they will be pushed towards the higher positions in the table, simply because they cannot require their tenants to improve the energy efficiency of the properties.

This is a reasonable concern. However, as we show on page 30, there are a number of misconceptions around the CRC that are relatively easily explained. Ultimately, it provides important carrots and sticks for facilitating significant cuts in emissions.

Controversy also surrounds a policy that is already with us. The arrival of feed-in tariffs (FiTs) should be heralded as a major step towards persuading homeowners to adopt renewable

technologies and cut their carbon footprint. However, doubts remain on whether FiTs will do enough to promote community-wide renewable energy schemes – which experts believe could have a major impact on cutting energy usage, in contrast to micro-renewables, much of which may just end up as ineffectual green bling (see

cover feature, page 14). But, as spring approaches, there is plenty to cheer about when it comes to policies that at least have the right intentions.

The outcome of the UK general election, widely predicted to take place on 6 May, will be another matter altogether. If the 'wrong' party is elected – and this can only mean, in non-party political terms, the party which will do the least to promote sustainability in the building sector – much good work may be undone. Once again, watch this space.

**Bob Cervi, Editor**

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As spring approaches there is plenty to cheer about when it comes to policies that have the right intentions

## International briefs

### Anglo-Indian investment

The UK and India are investing £2m into research programmes to develop cost-effective and efficient solar energy solutions. It is expected to help the UK meet its 2020 goals, as well as complementing India's ambitious plans to deploy 20 million solar lighting systems to 10,000 villages and hamlets currently without access to grid electricity.

### Design help for Ghana

A team of volunteers from engineering consultants, Arup and Davis Langdon, have helped a local workforce to build a new kindergarten in Ghana. The project involved using unusual sustainable materials, such as coconut fibre for sound insulation, a cement alternative derived from organic material and stabilised soil blocks.

### Dubai tower is topped

The last structural slabs have been poured on top of the 170m, 32-storey Iris Bay office and retail tower at Business Bay in Dubai. The £60m tower – designed, engineered and project managed by Atkins – is ovoid-shaped to create areas of negative pressure that draw air through the building and cut mechanical ventilation.

### Countries make pledges on climate change ...

The United Nations Framework Convention on Climate Change has received pledges by 55 countries to cut and limit greenhouse gas emissions. The pledges account for nearly 80 per cent of global emissions. The move was welcomed by the UK's Energy and Climate Change Secretary Ed Miliband.

### ... as scepticism grows among British public

The latest Ipsos Mori poll has found that people in Britain are becoming less convinced about the reality of global warming, with the proportion of adults who believe climate change is 'definitely' real dropping from 44 per cent to

# Businesses still uncertain over new energy scheme

Many organisations are still unsure whether they qualify for the new Carbon Reduction Commitment Energy Efficiency Scheme (CRC) just weeks before it is due to go live, according to a new survey.

The main objectives of the scheme, which launches in April, are to achieve an annual carbon reduction of 3.2m tonnes by 2020 and stimulate business to make their buildings more energy efficient.

But a survey by energy consultancy McKinnon and Clarke found that 54 per cent of participants were uncertain whether they come under the scheme, which encompasses all bodies and businesses that consume at least 6,000 MWh of electricity a year.

In addition, three in five companies in the survey had not factored in the financial implications of having to participate.

The survey sample covered 1,000 firms across construction, leisure, manufacturing and retail sectors.

McKinnon and Clarke has also produced a report on the CRC,



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Companies are concerned about the requirements of the CRC scheme.

which says that the scheme will account for only 1.4 per cent of the government's total 2020 carbon-reduction target.

Report author Callum Stuart said that it may work in a company's favour to have a high record of energy consumption in the first year of the scheme because, he said, the CRC doesn't take into consideration a company's past carbon-reduction performance.

He said: 'Unfairly, past performance is not given consideration and many of these proactive businesses have little additional scope to reduce consumption further.' The report adds that 15,000 organisations will be

burdened with providing 'information disclosure' without having to participate fully in the scheme.

'These organisations receive no incentive or otherwise to improve their performance,' said Stuart.

However, Danny Clark, director of consultancy Carbon Planning, criticised the report, accusing it of having 'flaws and inaccuracies'.

He said of the CRC: 'For the first time, businesses will be aware of their energy use, and may actually choose to act off their own back. Increasing awareness is a big issue. Those who take early action will benefit.'

See CRC feature, page 30

## Carbon trading process 'fails to cut emissions'

Europe's Emissions Trading System (ETS) is failing to deliver vital green investment after a collapse in carbon prices magnified by the recession, British MPs have warned.

The ETS is a carbon emissions trading scheme that aims to cut CO<sub>2</sub> from the energy and industrial sectors. It has been described as central to the UK's efforts to cut

emissions, but it is currently failing to reduce carbon dioxide levels, according to the report by the parliamentary Environmental Audit Committee (EAC).

The report, *The role of carbon markets in preventing dangerous climate change*, has concluded that the cap on emissions in Phase I (2005-07) was too weak and

allowances were over-allocated.

Caps in Phase II (2008-12) were supposed to be tighter, but have been seriously undermined by the impact of the recession, the MPs said. Prices of carbon currently stand at around 15 euros a tonne – way too low to drive investment in green technologies and energy efficiency.

[www.parliament.uk/eacom](http://www.parliament.uk/eacom)



Foster + Partners

### Urban renewal in Stockholm

Architects Foster + Partners have helped to design an area of Slussen in Stockholm, depicted. The master plan aims to provide new public spaces, an accessible quayside, and prominent new buildings, while transforming the existing infrastructure to minimise the threat of flooding.

# Grant cut condemned as new feed-in tariffs are unveiled

The UK government has been criticised for suddenly closing a grant system for renewables after announcing its policy on feed-in tariffs (FiTs), a clean-energy incentive.

The Renewable Energy Association (REA) welcomed the move to pay a tariff to householders, businesses and communities generating clean energy

But it claimed that the sudden closure of phase one of the Low Carbon Buildings Programme (LCBP) has left renewable customers 'high and dry'.

According to the REA, some installers were given less than an hour's notice of the closure, which affects all new applications for grants for electrical micro-generation.

Stuart Pocock, REA's head of on-site renewables, said: 'The speed of the announcement means many homeowners will not have been



Feed-in tariffs 'the only funding scheme'

able to submit their applications in time and may potentially be left out of pocket after submitting planning applications.' This means that FiTs are now the only funding mechanism available to the general public for renewables, he said.

It was originally intended that the grant programme would remain open until the end of March.

The Department for Energy and Climate Change (DECC) said the remaining unallocated LCBP funding would be focused on

thermal micro-generation in the run-up to the introduction of the Renewable Heat Incentive (RHI), scheduled for April 2011.

But the Solar Trade Association (STA) believes that the RHI does not place all renewable energy technologies on a level playing field.

It described the decision to 'single out' solar thermal technologies to receive a rate of return half that planned for other renewable heat energy sources as disappointing, and blamed the move on a lack of understanding of solar energy.

The STA is seeking meetings with DECC about the issue.

Meanwhile, the Combined Heat and Power Association welcomed the announcement that domestic micro-CHP had finally been officially included in the FiTs policy, describing it as a step in the right direction.

See News Analysis, page 14

## Cairo plan for multi use development

Rooya Group has appointed Hoare Lea to provide mechanical, electrical and public health engineering services to its Stone Towers development, a 525,000 sq m office, retail and hotel scheme located in the Stone Park district of Cairo, Egypt. Designed by Zaha Hadid Architects, the development comprises 18 buildings and will include a five-star hotel, retail units with food and beverage outlets, and a main plaza with sunken landscaped gardens.



Zaha Hadid Architects

## Call for joined-up approach to apprenticeships

A call for government to adopt a more joined-up approach to apprenticeships has been made by a body awarding qualifications in the building services engineering sector.

EAL said the move follows the proliferation of new ideas and incentives that have been introduced over the last year.

'While we wholeheartedly support the rationale behind these ideas, the government is neglecting what's

feasible for employers,' said EAL's managing director, Ann Watson.

'We are calling for two clear policies on apprenticeships: first, practical support for employers with tangible financial incentives, and second, for apprenticeships to be overseen by one government department.'

Three departments deal with apprenticeships, which can create a lot of red tape, according to the EAL. It said a more practical incentive would

be to offer employers a cut in National Insurance for the first two years of an apprentice's time with a firm.

'During these years, an apprentice spends the majority of their time learning their craft, either in the classroom or shadowing a more experienced employee,' added Watson. 'What government must realise is that apprenticeships are a long-term investment, so it needs to offer long-term incentives.'

## Four eco-towns share £60m for new homes

Four eco-towns are to share £60m to build more than 600 new homes to high environmental standards.

These new 'eco-show homes' will be built in and around the four pioneering eco-town locations, in Whitehill-Bordon in Hampshire, St Austell in Cornwall, Rackheath in Norfolk and North West Bicester in Oxfordshire. They are expected to include smart meters to track energy use, be properly insulated and built to the toughest ever standards, with systems for saving water and recycling or composting waste. Plus new energy projects will enable residents to take their energy from natural sources.

Funding will also be used for environmental education projects and boosting the energy efficiency of existing schools.

It is hoped the homes will introduce nearly 2,000 people to the idea of green living and save them hundreds of pounds on bills. Nearly a third of these homes will be affordable.

By 2016, 10,000 eco homes will be built in the four landmark areas. Construction could also potentially create and support up to 2000 local jobs, including apprenticeships to help advance new green building skills.

## Atkins upbeat despite revamp

Multidisciplinary consultancy Atkins says it is still upbeat about its performance, despite major restructuring to its design and engineering business last year.

In its latest interim management statement, Atkins said it continues to conduct 'significant restructuring' in its design and engineering solutions segment of the business, including scaling back its water operations business in the UK due to a reduced workload.

In contrast, it is investing in its nuclear and renewables sectors to meet the anticipated increase in demand. Atkins also revealed that its international business is in line with its expectations, and it is looking to expand its Middle East operations.

[www.atkinsglobal.com](http://www.atkinsglobal.com)

## News from institutions

### Heating specialists website

The Institute of Domestic Heating and Environmental Engineers is shortly to revise its website to allow potential customers to find local and qualified heating specialists in their neighbourhood. The list will include qualified heating consultants, designers and installers. [www.idhee.org.uk](http://www.idhee.org.uk)

### Qualifications accredited

The Fire Protection Association and the Fire and Security Association's courses in fire detection, alarms and emergency lighting are now fully accredited by BTEC – the first suite of qualifications of its kind for the industry. The training courses were launched a year ago. [www.thefpa.co.uk](http://www.thefpa.co.uk); [www.fireandsecurityassociation.co.uk](http://www.fireandsecurityassociation.co.uk)

### New maintenance code

The HEVAC Humidity Group has prepared a Code of Best Practice for commissioning and planned maintenance, CoBP4. The document is in response to fears that routine servicing of all forms of humidification equipment are being neglected until a failure arises with expensive consequences. The guide is aimed at owners and facilities managers. [www.feta.co.uk](http://www.feta.co.uk)

### RICS targets Ecobuild

The Royal Institution of Chartered Surveyors was due to address Ecobuild earlier this month, where its president Max Crofts was expected to discuss sustainability in property and the recent efforts to break the 'circle of blame' that has paralysed the sector. [www.rics.org](http://www.rics.org)

### RIBA awards deadline

The Royal Institute of British Architects (RIBA) is calling for entries for this year's RIBA President's Awards for Research. This is the fifth year of the awards, which are presented annually to reward and encourage outstanding research in architecture. The deadline for submissions is 7 May 2010. [www.architecture.com](http://www.architecture.com)

# Aircon regulations 'ignored' by most building owners

Regulations governing the inspection of air conditioning units are continuing to be ignored by most building owners, according to the Heating and Ventilating Contractors' Association (HVCA).

The HVCA is pressing for a UK government campaign aimed at building owners to tackle what it says is continuing non-compliance.

The issue of enforcement of aircon inspections was raised at a recent conference, Workplace Law, held in London. Facilities management consultant Martin Pickard told delegates that there is 'little or no motivation' to make the 50,000 eligible buildings in England and Wales achieve compliance with the Energy Performance of Buildings Directive regulations.

Bob Towse, HVCA head of technical and safety, told the



Bob Towse... Enforcement concerns

*Journal:* 'Less than 30 per cent of buildings that should have energy performance certificates (EPCs) actually have them and, we understand, only a tiny percentage of buildings covered by the legislation have had their air conditioning inspections carried out.' He questioned whether Trading Standards has the manpower and expertise to

enforce the regulations, adding: 'Many simply ignore the regulations because there is no evidence that anyone is being penalised for failing to comply with the law. If the government is unwilling – or unable – to address that issue then we have to make sure the inspections are 'sold' to clients as a valuable tool.'

He called for a high-profile campaign to ensure building owners are aware of their responsibilities: 'In this way, the building operator could see that there was a real, tangible benefit at the end of the process, as well as making sure they complied with the law.'

CIBSE is running a campaign aimed at informing trading standards officers in the enforcement of rules on air conditioning inspections.

## Grocers under fire over HFCs

An environmental pressure group has attacked British supermarkets for failing to phase out the use of hydrofluorocarbon (HFC) gases in refrigeration systems.

This is despite commitments from a number of leading grocery chains to switch to other non-HFC gases, even though there is no legislative requirement to do so.

In a new report, *Chilling Facts 2010*, the campaign group

Environmental Investigation Agency says that only 46 major supermarket stores – said to be two per cent of the total number – are using non-HFC systems. This compares with 14 such stores identified a year ago.

Research by *CIBSE Journal*, however, suggests leading supermarkets are moving rapidly to phase out the use of HFCs for new store developments and refits.

Some chains are also planning

to make all their stores HFC-free in coming years. Sainsbury's, for example, says it plans to achieve this by 2030.

But Cedric Sloan of the manufacturers' group FETA said the phase-out of HFCs in supermarkets would raise challenges around providing the industry skills and training needed for the change.

**See our Supermarkets feature in next month's issue of the *Journal*.**



### Kings Cross refurb chugs along

Building services provider NG Bailey is working with VINCI Construction UK to deliver the mechanical, electrical and information communication technology services for Network Rail's redevelopment of King's Cross Station, London, depicted here. NG Bailey will deliver the services in four parts, starting with a new plant room to serve the station. Other works include creating a new western concourse, incorporating shops and restaurants, and refurbishing the adjoining western range office block.

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## News in brief

### New wind factory for UK

Clipper Windpower is to start construction of a factory in Newcastle to build the biggest wind turbine blades in the world. It will employ up to 500 people by 2020 to manufacture blades for the 10 megawatt 'Britannia' offshore wind turbine. Separately the UK government has announced that £8m of funding for offshore wind technology is now available.

### Preferred bidder for Essex

Skanska has been chosen as the preferred-bidder for developing, constructing and maintaining three schools for Essex County Council. The private finance initiative will see Skanska responsible for the financing, design and construction of the new schools, as well as their maintenance for a total of 26 years, beginning in 2011.

### Emissions data revealed

UK emissions of the six greenhouse gases (GHG) covered by the Kyoto Protocol fell by 1.9 per cent in 2008, according to latest figures from the Department for Energy and Climate Change. Carbon dioxide emissions, which accounted for 85 per cent of GHG emissions, fell by 2 per cent. The overall GHG emissions reduction was mainly due to the switch from coal to gas for electricity generation. [www.decc.gov.uk](http://www.decc.gov.uk)

### Crossrail contract awarded

The third and final tunnelling contract for the Crossrail project has been advertised. The construction for Thames Tunnel involves twin six metre diameter bored tunnels from Plumstead Portal to North Woolwich Portal. [www.crossrail.co.uk](http://www.crossrail.co.uk)

### Balfour in £1.9m acquisition

Infrastructure group operating in construction services, Balfour Beatty, has acquired both Multibuild Hotels and Leisure Ltd and Multibuild Interiors Ltd, based in Stockport, specialising in the construction and fit-out of hotel and leisure facilities. The companies were acquired from Multibuild Holdings Ltd for a cash consideration of £1.9m.

# LED lighting will have 'profound' impact on wider BS sector

In 20 years' time the UK lighting market will be dominated by LEDs, according to CIBSE president Mike Simpson.

Speaking at last month's meeting of the Rumford Club, Simpson said this would have profound implications for all aspects of building services design, because future light fittings will be much smaller and will not emit as much heat.

'We are seeing a 15 per cent improvement year-on-year in lighting design, reflected either in improved output quality from solid state technology or reduced energy consumption,' he told the meeting at the Army & Navy Club in London last month.

Simpson said lighting in the UK currently consumes 17 gigawatt hours (GWh) of electricity annually, but the gradual conversion to compact fluorescent lamps (CFLs)



Mike Simpson... Impact of LEDs

will cut that to six GWh by the end of this decade. However, CFL lighting is only an interim stage and will eventually give way to LEDs, which will finally cut lighting loads to just 0.2 per cent of the country's total

generating capacity, compared with the current five per cent.

'LEDs are already lighting many public spaces and next year they will move into commercial office designs,' said Simpson, who is also technical & design director at Philips Lighting.

'The façade of Buckingham Palace, for example, is lit by LED floodlighting that uses about the same amount of electricity as a domestic kettle. LEDs are also being used in supermarket freezer cabinets to reduce heat loads and to cut energy by as much as 60 per cent.'

He added: 'More engineering teams are starting to employ lighting specialists and it is being considered earlier in the design process. Because this lighting revolution will have a major knock-on effect on the rest of the industry, it is ideal that we are all working together in CIBSE.'

## Institute defends dimming the lights in Coventry

An allegedly cash-strapped council has been criticised for spending £250m on a controls system to dim its street lights – but the Institute of Lighting Engineers (ILE) believes it is a smart move.

Coventry City Council was criticised in a report in the *Daily Mail* newspaper for spending £250m on new lamps to help it save cash. The move will allow the lamps' brightness to be turned down when the streets are quiet in the early hours.

But Nigel Parry, technical services manager at the ILE, said the country would see a big rise in these types of dynamic lighting systems in the next six to 12 months in order to cut carbon and bills: 'In Coventry, they could potentially reduce their lighting levels by half and make substantial carbon savings.'

He added that these types of systems help to keep a uniform level of light and prevent lights being switched off. They will also help eligible local authorities to pay less under the Carbon Reduction Commitment Energy Efficiency Scheme (CRC).

See CRC feature, page 30



## Shedding new light on Lloyds

Lighting company Prologik has completed the final phase of the installation of a new integrated lighting control system at Lloyd's of London. The work has been phased over a three-year period to work around the building occupants. In addition to lighting controllers, Prologik supplied the heat pump and fresh air controllers. The conference suite has architectural dimming, and the executive areas and meeting rooms are supplied with scene set controls.



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## News in Brief

### Boiler scrappage success

More than 50,000 vouchers provided under the UK government's boiler scrappage scheme, aimed at promoting energy saving, have been used by people to discard old, inefficient heating systems. There are now about 70,000 vouchers worth £28m remaining to help householders to upgrade to more energy efficient boilers.

### Zero carbon test-bed

AECOM has been appointed lead engineer to Scottish and Southern Energy's zero-carbon development in Berkshire, UK. Ten homes – to be constructed to Level 6 of the Code for Sustainable Homes – a community room and energy centre will be built to test and research new products and technical innovations. Their performance will be monitored for two years.

### KPI deal for Glenigan

A three-year contract to deliver UK construction industry key performance indicators (KPIs) has been awarded to Glenigan in partnership with Constructing Excellence. KPIs are national data sets against which a construction project or a company can benchmark its performance.

### Family homes set to rise

Latest research by property specialist movewithus has revealed that more residential property developers are expecting to build family properties rather than first-time buyer homes in the 2010s. The study questioned residential property developers across the UK and found 64 per cent of developers are expecting the level of development for larger properties to rise significantly.

### DEC software now free

A new partnership between the National Home Energy Rating scheme and Integrated Environmental Solutions (IES) has made access to the IES VE-SBEM and DEC assessor software free for NHER Accredited Commercial and Public Building Energy Assessors.

# Report calls for green plan for communities

Local authorities should develop 'joined up' sustainability plans to deliver the green infrastructure needed to cut carbon, according to a new report.

It also says that community-scale heating, water harvesting, waste disposal and waste re-use all have a key role to play in future building services.

The report, from a group led by the UK Green Building Council and the Zero Carbon Hub, argues that a well-planned infrastructure, delivered in an integrated way, can offer both carbon and cost savings as well as community benefits.

Key recommendations of the report proposals are that:

- Local authorities should develop 'sustainability option plans' to identify opportunities to deliver joined-up sustainable community infrastructure, and, should work in partnership with the private sector to supply this;



Paul King ... Calling for integrated plans

- Public sector buildings should be required, where available and viable, to connect to existing or planned community heat networks, to provide an 'anchor load' of demand. Large businesses should be encouraged to do the same; and
- The 'allowable solutions' mechanism should be used as a way of providing additional ring-fenced capital to support the

delivery of heat infrastructure.

The government has agreed that developers will be able to invest in so-called allowable solutions, in order to meet the required standard when constructing new zero carbon buildings.

Paul King, chief executive of UKGBC, said: 'Our homes and buildings cannot be sustainable in isolation. In many cases it makes sense to join up delivery of infrastructure such as energy, water and waste at a community scale.'

David Adams, of the Zero Carbon Hub, added: 'Community energy systems are an important component of delivering low carbon energy on larger developments.'

'This report reinforces the key role that government can play, both providing demand as a client and enabling provision of heat infrastructure through allowable solutions.'

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

## Recession still biting construction

On-site construction works fell by eight per cent in January compared with the same time last year, according to the Glenigan Index.

Poor weather was thought to be to blame for the fall in the value of project starts, with residential schemes particularly suffering. This temporarily halted the pick-up in new private housing projects seen during the autumn of 2009. Meanwhile, the non-residential

index for January was 14 per cent down on a year ago due to the continued weakness of the private, industrial and commercial sectors, combined with fewer government-funded health, community and amenity projects.

The latest Construction Skills Network (CSN) figures show that construction output has contracted by 13 per cent in 2009, with employment dropping by 375,000

workers between 2008 and 2010.

There is expected to be a further contraction of one per cent in 2010 before the recovery begins in 2011, according to the CSN. The forecast recovery is likely to be long and slow, with a UK average output growth of 1.7 per cent during 2010-14. There are also fears that a fall-off in public investment while the private sector has not yet recovered will mean a deeper, more prolonged recession.

### Stadium scores on efficiency rating

Engineering consultancy NG Bailey is to provide mechanical, electrical and information communication technology services for the development of a new state-of-the-art stadium for Brighton and Hove Albion Football Club. When completed, the stadium is set to achieve a BREEAM Very Good rating and a grade B for its Energy Performance Certificate – believed to be a first for a UK sports stadium.



# New builds 'fail to lodge EPCs'

Almost two-thirds of commercial properties being marketed in January failed to lodge an energy performance certificate (EPC) on the UK government's official register.

A total of 64 per cent of commercial properties available for sale or rent failed to comply, despite EPCs being a legal requirement for more than a year, according to the EPC Index, run by National Energy Services (NES) and Building.co.uk

Brian Scannell, managing director of NES, said: 'For over a year now it has been a legal requirement that all commercial buildings being marketed for sale or rent should have an EPC available to inform prospective buyers and tenants about the energy performance of the building.'

'Despite increasing attempts at enforcement action by Trading Standards, compliance is only proceeding at a snail's pace – we can see that almost two thirds of all

commercial properties for sale or rent are still flouting the law.

'You can't argue that it doesn't matter, especially in the face of this week's latest warnings about energy shortages and significant fuel price rises. The display of the EPC rating should be mandatory on all commercial building agents' particulars.'

The EPC Index is a monthly study monitoring how many commercial builds being marketed have a valid EPC.

The index was introduced to follow up on NES' research in June 2009, which showed that more than 80 per cent of commercial property agents were unable to supply a mandatory EPC for the offices or shops they were marketing.

The sample for January included 564 commercial buildings throughout Cheshire, Gloucestershire and Shropshire that had been on the market in the previous 30 days.



## Illuminating award

Seda Kacel, far left, is the 2010 Society of Light and Lighting Young Lighter of the Year after competing against three other candidates in the finals held at the ARC exhibition in London last month. Kacel works for ZKLD Light Design Studio.

The candidates each presented a paper to the judges and an invited audience. The Worshipful Company of Lightmongers prize for the Best Presented Paper went to Vasiliki Papakammenou (second from left),

who is studying at Bartlett School of Graduate Studies. The Institution of Lighting Engineers prize for Best Written Paper went to Mitija Prelovsek (far right), who works for Steensen Varming.

The four finalists, which also included Anna Whittaker (second from right) who works for Holophane Europe, were selected from among 28 entries.

Also pictured is SLL president Stephen Lisk.

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# Fitting incentive?

A range of measures for boosting renewables in the UK has emerged recently, but some professionals question whether they are the right policies. **Carina Bailey** reports

Government policies aimed at encouraging the use of renewable and low-carbon technologies could lead to people simply investing in more green bling, according to some in the building services sector.

Last summer the Department of Energy and Climate Change (DECC) consulted on whether residents, communities and businesses should receive an incentive for installing small-scale renewable technology. DECC has now announced that feed-in tariffs (FiTs) will be launched across England, Scotland and Wales on 1 April 2010.

A consultation on a second incentive scheme, the Renewable Heat Incentive (RHI), was published alongside this response and will come into effect in April 2011.

The RHI is expected to guarantee payments for those who install technologies such as ground and air-source heat pumps, and biomass boilers. The consultation ends on 26 April.

It is hoped that FiTs alone will save 7m tonnes of carbon dioxide emissions by 2020 and financially support more than 750,000 small-scale renewable projects.

Under the proposed tariffs for the Renewable Heat Incentive, the installation of a ground-source heat pump in an average semi-detached house with adequate insulation levels could see householders



Shutterstock

receive £1,000 a year and attract savings of £200 a year if used instead of heating oil.

But Doug King, of the Royal Academy of Engineering, warns that government payback figures for certain technologies could lead to people making unwise choices: 'I believe that the introduction of feed-in tariffs will provide a great stimulus to the renewable energy sector. However, I am concerned that the

headline figures being quoted for financial returns could encourage people to make unwise investments.

'Unlike the previous capital grants scheme, FiTs will pay according to the amount of renewable electricity generated, and studies have shown that small-scale renewable systems often generate far less in practice than originally anticipated.

'A 2009 study of small-scale, domestic wind turbines by the Energy Savings Trust found no urban or suburban installation that generated more than 200 units of electricity per year. Under the new feed-in tariff, this level of generation would pay a homeowner just £69 per year on top of the electricity bill savings of £26.'

Rob Manning, president-elect of CIBSE, says: 'We have a wonderful opportunity to kick-start local generation of electricity through FiTs, but it needs to work with improving energy efficiency and reducing

demand, otherwise it's just green bling. The best business case for electricity generation from renewable sources is at community level – local wind turbines, for example – larger than for individual households and therefore ineligible for the feed-in tariff scheme.'

Alasdair Young, of engineering consultancy Buro Happold, also welcomes the introduction of FiTs, but fears other factors may prevent a home energy revolution: 'Is the FiT a sufficiently large incentive to overcome the up-front capital cost and the 'hassle factor' of having work undertaken?'

'Increasing the subsidy level may not be the answer, but innovative financing techniques that secure borrowing against future revenues could help, as could making sure the UK has a sufficient number of trained and accredited installers, making installation a less painful process for the householder.'

## Renewables factfile

- The UK currently gets around 5.5 per cent of electricity from renewable sources, but that will need to increase to around 30 per cent to meet the 15 per cent 2020 target for all energy (that is, in the electricity, heat and transport sectors).
- Modelling shows that small-scale renewable installations could meet

two per cent of electricity demand in 2020.

- The UK currently gets less than one per cent of heat from renewable sources. This will need to rise to around 12 per cent in order to meet the 15 per cent 2020 target for all energy (that is, in the electricity, heat and transport sectors). *Source: DECC*

## Policy Key aspects of the proposed Renewable Heat Incentive:

- RHI payments to be claimed by, and paid to, the equipment owner. Installations completed after 15 July 2009 should be eligible;
- The RHI will remain open to new projects until at least 2020. Its design and tariffs will be reviewed from time to time for new projects;
- In small- and medium-sized installations, both installers and equipment are to be certified under the Micro-generation Certification Scheme (MCS);
- Payments are to be calculated on the annual amount of heat output

(in kilowatt hours). At the small and medium scale, the amount of heat generated by the equipment will be estimated in most cases;

- For large installations and process-heating, heat output should be metered, and the total annual support calculated from the actual energy generated, multiplied by the tariff level; and
- Ofgem will administer the RHI scheme, making incentive payments to recipients and taking responsibility for auditing and enforcing the programme.

'Achieving the government's 80 per cent emissions reduction target requires a combination of energy efficiency measures, lower carbon intensity of grid electricity, and on-site low carbon sources.'

He argues that a 30 per cent reduction in emissions in grid energy supply, energy efficiency, behaviour change, and on-site low and zero-carbon generation would give a 76 per cent reduction in emissions from a notional building. 'The target is daunting and requires large-scale interventions – at present rates of uptake it won't be met. Perhaps FiTs will contribute, but more radical change is required.'

Technologies covered by FiTs include new anaerobic digestion (a process that produces a methane- and carbon dioxide-rich biogas for energy production); hydro; solar and photovoltaic (PV); and wind, all with a maximum power capacity of 5MW. As part of a pilot programme, the scheme will also support 30,000 micro combined heat and power (mCHP) plants, with a maximum power capacity of 2kW or less.

However, according to the DECC report, the scheme will not initially fund solid or liquid biomass. However, these will continue to be supported through the Renewables Obligation (RO), a scheme that binds UK electricity suppliers to source a proportion of electricity from renewable sources.

FiTs will involve two types of payment: the 'generation tariff' will be paid to anyone generating electricity via renewable means, whether it be consumed on-site or exported to the grid. The amount paid will differ depending on the type of technology used and its size.

The second type of payment will be an 'export tariff' that will either be

metered and paid as a guaranteed amount, or, in the case of small-scale renewable generation, additional metering will not be required. For exported electricity, participants can either choose to receive a guaranteed payment of 3p/kWh, or they can sell their electricity on the open market. Once FiTs are introduced, renewable micro-generators will not be supported by the RO.

DECC expects the tariffs to deliver between a five and eight per cent return on an initial technology investment. They will last up to 25

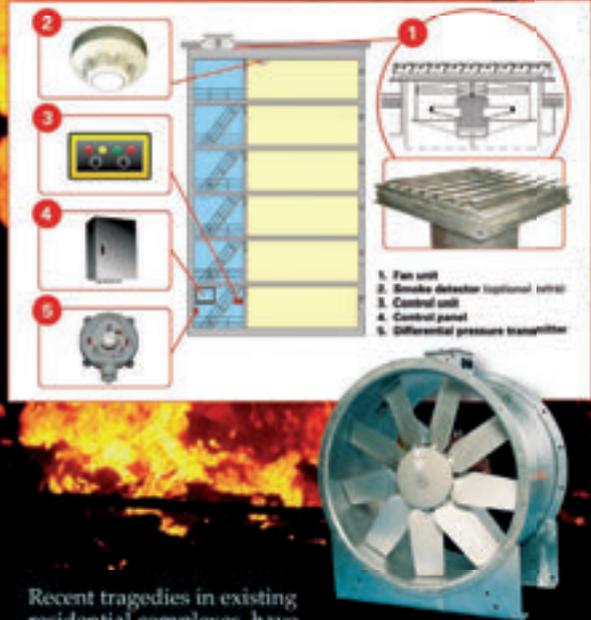
**“ Studies show that small-scale renewable systems often generate far less in practice than originally anticipated ”**  
– Doug King

years and will reduce during this time to reflect decreases in technology costs, although the generation tariffs will rise with inflation.

According to DECC, power from solar panel technology alone could earn a business or householder £900, on top of the £140 reduction on household energy bills a year, and ministers claim the move could see up to 300 additional green energy jobs created. But scepticism remains in the industry as to whether these schemes will do enough to kick-start a revolution in renewables – and whether micro-generation will meet the UK's targets on emissions. ● Visit [www.decc.gov.uk](http://www.decc.gov.uk) and click on 'Consultations' to find out more.

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## News in brief

### Ready Steady Light is here

Fifteen teams, one lighting kit, three hours... what do you get?

Ready Steady Light 2010.

The Society of Light and Lighting would like to welcome spectators to watch their free annual Ready Steady Light competition on 17 March, at Rose Bruford College, Sidcup, Kent, from 3.30pm. To attend as a spectator call Amber Perry on 020 8772 3692 or email [aperry@cibse.org](mailto:aperry@cibse.org)

### Final call for bursary entries

Applications for the Ken Dale Travel Bursary close on 31 March 2010. The award is open to members in the developmental stage of their career, with between £1,500 and £4,000 available to the lucky winner to research an aspect of building services outside their home country.

[www.cibse.org/bursaries](http://www.cibse.org/bursaries)

### Eoin Kenny's contribution

Past president Eoin Kenny died in January, aged 88. He qualified as an M&E engineer at University College Dublin, and went on to work with JA Kenny and Partners in energy infrastructure, chemical plants and much more. After retiring from his practice in the 1990s, he continued to work as a consultant and expert witness 'keeping his brain active' until a few years ago.

## Celebrating low-carbon performance in services

As I write this, the success of the CIBSE Annual Dinner and Low Carbon Awards is ringing in my ears. The Grosvenor House was packed and the atmosphere electric. There were many successful facets to the night; the number of applicants for the awards was an all-time high, and the quality was superb. Our sponsors were excellent too, and the event certainly increases the profile of the institution. In another significant change, we welcomed many more clients to the event and, during this economic gloom, there were fewer traditional corporate supporters. Nevertheless, it was a celebration of success but also demonstrated a real determination to do better.

Following on from the Copenhagen COP15 talk, I sense a growing concern on 'what next?'. The government policy statements to move to a zero carbon new build and cut carbon emissions by 80 per cent by 2050 only highlights the gulf between the ambitious government policy and the ability of industry to deliver. It is not only in the 'carbon' agenda but the whole spectrum of the built environment where there is now a huge expectation that buildings simply have to deliver client satisfaction



Rewarded: CIBSE's low carbon performance winners.

from start to finish of the life building. We all have to do much better. Into this maelstrom CIBSE sits, representing the engineering capability and knowledge, and currently evaluating how we should properly articulate this responsibility.

The latest Royal Academy of Engineering report, *Engineering a Low Carbon Built Environment*, outlines many of the challenges that face us: not only the timing but also the content of this report are, in my opinion, an important milestone for the institution. We now have tangible recognition of the role and opportunity that is open to us, if we are prepared to meet this challenge. Professor Doug King, the author of the report, is a CIBSE fellow and a staunch

supporter of the institution. We have already been asked for a more formal response by the Royal Academy of Engineering. Some who have read the report have concluded that it is not entirely complementary to CIBSE; from my perspective I read the report positively, as it outlines the scale of the challenge ahead. The report may be viewed online at [www.raeng.org.uk](http://www.raeng.org.uk) – I encourage you to read it. You may not agree with all of the recommendations or the commentary, but what is clear is that there is a requirement for CIBSE to pick up the gauntlet. If you have an opinion then please let us know – after all, it is **your** institution.

**Stephen Matthews**  
Chief executive

## Having your say on non-doms and sustainable homes

In February, CIBSE's technical department held two well-attended consultation workshops on proposals for working towards the government's ambition that all new non-domestic buildings should be zero carbon from 2019, with the public sector leading the way from 2018. The input from practitioners made for a solid, well-founded response. Visit the Knowledge Bank at [www.cibse.org](http://www.cibse.org)

There is still a chance to

contribute to two key consultations: *Building Regulations Competent Person Self-Certification Schemes for England and Wales*; and *Sustainable New Homes: The Road to Zero Carbon: Consultation on the Code for Sustainable Homes and the Energy Efficiency Standard for Zero Carbon Homes*.

There is still time to respond. The first seeks views on proposals to amend the conditions of authorisation, the application

process and monitoring of performance for competent person self-certification schemes. There are a number of significant issues in this consultation that may impact more widely and should therefore be of interest to members, low carbon energy assessors and low carbon consultants. The consultation can be accessed at [www.cibse.org](http://www.cibse.org). Comments should be sent to Samantha McDonough at [smcdonough@cibse.org](mailto:smcdonough@cibse.org)

Thursday 11 March 2010.

The second consultation seeks views on changes to the code for sustainable homes in 2010, to align with changes to Part L of the Building Regulations and the proposed approach to adopting the 2016 definition of zero carbon. The most significant changes are within the energy section of the code. Visit [www.cibse.org](http://www.cibse.org) and send comments to [smcdonough@cibse.org](mailto:smcdonough@cibse.org) by Thursday 18 March 2010.

# SoPHE Young Engineer of the Year Award revealed

This year's SoPHE Young Engineer of the Year award was won by Liam Pole, Yewande Akinola and Grzegorz Jaroszewicz, from Arup Bristol, who will now enjoy a trip to Hong Kong.

The theme of this year's competition was 'the conservation of energy within buildings' public health systems'. The competition was open to individuals or teams of up to three people. Their remit was to propose an innovative idea that could potentially be adopted to conserve energy in public health systems. Teams were required to consider an appropriate development as an example, within which their ideas could be used and compared to a typical approach – demonstrating the predicted



The winners will now visit Hong Kong.

energy savings and providing a whole-life cost analysis.

The best two entrants presented their ideas to a judging panel. Both presentations were of a very high standard and demonstrated a good understanding of the technical aspects of the proposals.

The winning presentation showed the adaptation of current

technologies to develop a flushing tank for toilets, incorporating a passive rain-water harvesting system. The proposal made use of the roof to store the rainwater and therefore removed the need for underground tanks and pumping. A controls system ensured that rain water was maximised and fresh mains water use minimised.

The runner-up, Martin Bryan, who was highly commended, focused on the conservation of energy by reducing the design temperature within the domestic hot-water circulating system.

*The 2010 competition will be announced shortly. Look out for further details in the CIBSE news pages, or online at [www.cibse.org/sophe](http://www.cibse.org/sophe)*

## Membership matters...

Thank you for renewing your CIBSE membership for another year – a year in which we can look forward to some bright prospects for your professional development:

- **Affiliates day, 8 April** – another chance to upgrade your membership – don't miss it!
- **Member to fellow 17 June** – join us for a glass of wine and hear how to upgrade to the most senior level of membership in CIBSE;
- **Company briefings** – we are happy to visit your office and talk to your staff about their professional development needs. Presentation on the routes to registration, covering: EngTech IEng and CEng;
- **Company Ambassador Scheme** – want to improve CIBSE links with industry and raise the profile of building services engineers? Sign up as a CIBSE Company Ambassador now – we will equip you with all you need.

For further information contact Bobby Wright, membership communications manager, on 020 8772 3639 or email [bwright@cibse.org](mailto:bwright@cibse.org)

### Not renewed your membership yet?

Do you pay your membership subscription by direct debit or continuous credit card?

If your details have changed recently, contact the subscription team on 0208 772 3621/3691 or email [golateju@cibse.org](mailto:golateju@cibse.org) [skamal@cibse.org](mailto:skamal@cibse.org) as soon as possible.

### Does your company pay your subscription?

To ensure your membership does not lapse, please make sure that your company pays your subscription promptly.

### Subscriptions 2010

CIBSE would also like to take this opportunity to remind all members that membership subscriptions run from January to December and we strongly recommend that you pay your subscription as soon as possible so as not to miss out on all the benefits available for 2010.

## Become a regional officer

Members wishing to be considered as officers in their region are being sought.

New officers are formally inducted every May, but anyone interested or wanting more information should contact their regional secretary. The CIBSE regional structure is an essential part of the institution's organisation, and provides the grass-roots understanding of what is happening in the industry. Each region is managed by a regional committee; these normally meet monthly to plan events, address specific issues and provide information to CIBSE headquarters through the Regional Liaison Committee, attended by all regional chairmen. Participation in regional committees is voluntary, but can provide useful experience. Regions are particularly interested in retired members and young engineers wishing to get involved in regional activities; past experience has shown they can make an important contribution to the effectiveness of the region. Details are available at [www.cibse.org](http://www.cibse.org)

## BSE ambassador scheme

CIBSE and Summitskills, the building services engineering Sector Skills Council, have signed a memorandum of understanding committing themselves to working together to develop and promote the Building Services Engineering Ambassadors programme.

The scheme enables engineers to visit schools and colleges to inform and enthuse youngsters about the sector, explaining what they do in terms of managing energy and resources to mitigate climate change. CIBSE is committing to

encouraging members to sign up as ambassadors, facilitating feedback and evaluation and providing training and resources. Summitskills, which operates the scheme in partnership with STEMNET, will provide the necessary CRB checks and induction services, and work with CIBSE to promote the scheme. It is open to any interested member practising within the sector. For more information contact [aringguth@cibse.org](mailto:aringguth@cibse.org) or [fred.titterington@summitskills.org](mailto:fred.titterington@summitskills.org)

## Calculate your personal carbon

The CIBSE Carbon Calculator for individual carbon-foot printing is now available online.

The institution makes no mandatory requirement for members to know their carbon footprint, or do anything about their own personal carbon emissions. Members are, however, required under the code of conduct to have due regard to environmental issues in carrying out their professional duties and may wish to extend this to their private life.

With increasing interest in climate change, building services engineers may be asked by their clients if they have a personal

carbon footprint and having an awareness of what it is may stop you from being caught unawares.

Clients may also be looking for an appropriate methodology to use themselves. CIBSE recommends the Carbon Trust for businesses and the Department for Energy and Climate Change's ActOn CO<sub>2</sub> methods for personal use. Both are becoming well known and CIBSE provides a web link to them. However, the CIBSE calculator uses a methodology which may appeal more to engineers, with the calculation methodology and assumptions explained. [www.cibse.org/carboncalculator](http://www.cibse.org/carboncalculator)

# Climate change essays win Hong Kong branch competition

The winners of CIBSE's Hong Kong branch writing competition were announced at an award presentation on 27 November, 2009.

The competition, which invited essays around the theme of climate change, was won by Sung Ka Leung, in the open category, and Ip Wan Yin in the student category. The full essays can be read at [www.cibse.org.hk](http://www.cibse.org.hk)

Essay Extracts:

## Use of BSHP system in a super high-rise building in China, by Sung Ka Leung

Due to rapid economic growth, China now faces the challenge of insufficient power supply and booming infrastructure development. Clients are also demanding value-added and energy-conservation building design to enhance building image and attract potential tenants. As a result, application of integrated

building saving systems in China is growing to cater for energy saving and environmental protection.

Building cooling, heating and power (BCHP) is a building energy supply system that produces cooling, heating and electricity simultaneously from a single primary energy source. The goal of using BCHP is to improve efficiencies or source fuel utilisation by availing the low grade heat that is a by-product of the power-generation process for heating and/or cooling protection. According to US Department of Energy combined cooling, heating and power systems are potentially 70 to 85 per cent than the 30 to 51 per cent of central power plant. However, BCHP system design and application requires detailed system evaluation and facility scheme optimisation analysis, otherwise BCHP systems may be worse than conventional energy supply systems.



Ms Ip Wan Yin and Mr Sung Ka Leung collect their awards.



## Should we change now, by Ms Ip Wan Yin

As energy source is limited, being building services engineers, we now have to take some action before it becomes too late to save our environment. There are many things we can do. The set-up cost for those environmentally friendly systems or equipment is relatively high. However, the return of these investments is significantly beneficial to humans as well as the world. When we come to design a building system, we may need to

take our environment, our world and our future generation into consideration. By choosing an environmentally-friendly system and building materials, we could make a difference in saving our world. Making a profit might be the ultimate goal for the corporation that we are working in, however, as ethical and professional building services engineers, we should be responsible to society in implementing ethical and moral behaviours, aside from just making profit for a company.'

## More new members join the institution worldwide

Eight members are made CIBSE fellows this month, each with a wealth of experience to offer the institution. They are:

### FELLOW

**Cousins, Fiona**  
New York USA



Fiona Cousins is a principal with Arup. Based in New York, she is one of the leaders of the buildings practice. She has 22 years' experience in the design of buildings, including aquariums, museums, offices, stations and laboratories.

**Charlesworth, Brian Colin**  
Hornchurch Essex



Brian Charlesworth, recently retired after 31 years with Troup Bywaters + Anders, was associate partner since 1988. He has been a CIBSE interviewer since 1993, continues to be active in this role and is on the membership panel, among other things.

**Hunt, Steven Alan**  
Liverpool



Steve Hunt is managing director of Steven A Hunt & Associates, based in Liverpool, and has been CIBSE regional chairman for two years. He is keen to encourage young engineers into the industry.

**Hextall, Richard**  
Brough, North Humberside



Richard Hextall is a senior project manager for Mace Ltd. Having been with the company eight years he is now based in the Middle East and is responsible for MEP on Mace's projects in Abu Dhabi.

**Wigley, David Neil**  
Tadworth, Surrey



David Wigley is an electrical associate with Atkins, who initially trained as an installation electrician with experience of domestic and commercial installations. Wigley

has 18 years' experience designing nuclear projects, healthcare, retail, tunnels and airports. He is also a CIBSE regional chairman.

**Perera, Wijitha Kanthi**  
Colombo, Sri Lanka



Wijitha Perera is a leading freelance consultant in building services, with more than 30 years experience in the industry. He is a specialist in air conditioning and has extensive experience in the hospitality trade.

**Picton, Edward John**  
Slough, Berkshire



Eddie Picton is now the founding director of a M&E consultancy. His particular 'soap box' is the drive for engineers to be more influential in the client's business decision-making process, at the very early stage of project inception.

**Wong, Chi Wai**  
Hong Kong

This month there are nearly 30 new members to add to CIBSE's books. They are:

### MEMBER

Abell, David John	Faringdon, Oxfordshire
Arnold, Bruce	Bristol
Aw, Chen Hoong	Singapore
Batton, Laura Elizabeth	Glasgow, Scotland
Chow, Wai Choi Ivan	Hong Kong
Chow, Hon Pan	Hong Kong
Chu, Cheuk Hang Patrick	Hong Kong
Doyle, Francis Anthony	Southampton
Grout, Clifford	Canterbury Kent
Gula, Andrzej Tomasz	Altrincham, Cheshire
Jackson, Rolfe	London
Lau, Keng Cheong	Hong Kong
Leung, Chi Fai	Hong Kong
Mukiibi, Vincent Bamundaga	London
Ng, Hon Sum	Hong Kong
Ng, Shu Wun Todd	Hong Kong
Or, Ka Chi George	Hong Kong
Pillai, Dinesh Kodiyattu Parameswaran	Doha, Qatar
Ravenscroft, Stephen Roy	Manchester
Rodriguez Perrino, Ivan	London
Ryan, Patrick J	Dublin, Eire
Sirisoma, Yodasinha Pathiranage	Etul Kotte, Sri Lanka
Small, Brian James Denis	Bristol
Stewart, Paul	Ballyclare, Northern Ireland
Tang, Chi Hang Calvin	Hong Kong
Wong, Chung Tong	Hong Kong
Yeung, Yun Kai	Hong Kong

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# Honouring the carbon counters

The 2010 CIBSE awards paid tribute to worthy winners from different parts of the industry supply chain

**M**ore than 700 guests were welcomed to the Grosvenor House Hotel in London last month for the CIBSE Low Carbon Performance Awards 2010, held in association with E.ON.

This year, 15 awards were presented to companies and individuals in honour of their efforts to cut carbon emissions. The host was television impressionist, Alistair McGowan.

Speaking at the ceremony, CIBSE president Mike Simpson said: 'CIBSE believes that changing buildings and cities is the first and fastest step to a less carbon-intensive world. All the engineers, contractors, facilities and energy managers recognised here are united in their aim to create a sustainable built environment. We are proud to showcase some of the best low carbon projects, products and innovations out there – and urge all of our winners and runners-up to continue their efforts and to further raise the profile of the construction and engineering industry.'

'Rewarding excellence in sustainable and aspirational buildings, the awards are raising industry standards by recognising those who are designing and managing the UK's most sustainable and innovative projects and products.'

The awards were judged by: Cal Bailey, NG Bailey; Hywel Davies, CIBSE; Dave Farebrother, Land Securities; Simon Hancock, Atkins; Steve Irving, AECOM; and Mike Simpson, Philips Lighting and CIBSE president.



Comedian and actor Alistair McGowan kept the audience on its toes.





# The winners

## 1. Consultancy of the Year

**Sponsor:** by Baxi Commercial Division  
**Winner:** Atkins  
*Left to right: Yan Evans, technical director, Baxi Commercial Division; Simon Hancock, building services design director, Atkins; Mike Simpson, CIBSE president.*

## 2. Contractor of the Year

**Sponsor:** CIBSE Journal  
**Winner:** Wates Construction  
*Bob Cervi, CIBSE Journal editor; and Simon Wilkinson, business development director at Wates Construction.*

## 3. New Build Project of the Year

**Sponsor:** Imtech Technical Services  
**Winner:** Max Fordham, City Academy, Hackney  
*Jim Steele, chief executive of Imtech Technical Services; and Tom Bentham, team leader, partner at Max Fordham.*

## 4. Refurbishment Project of the Year

**Sponsor:** Monodraught  
**Winner:** London Fire Brigade, Croydon fire station  
*Tony Cull, managing director; and Lloyd Bentley, project manager.*

## 5. Training Initiative of the Year

**Sponsor:** SummitSkills  
**Winner:** Nu-Heat, Nu-Heat Training Centre  
*Keith Marshall OBE, chief executive of SummitSkills; and Steve Rhodes, training centre manager at Nu-Heat.*

## 6. Low Carbon Manager of the Year

**Sponsor:** Fläkt Woods  
**Winner:** Stuart Dunkley, Leicester Marriott Hotel  
*Alan Butcher, business development director at Fläkt Woods; and Brett Hercock, F&B service director at Grosvenor Marriott, who accepted the award on behalf of Stuart Dunkley, engineering director of the Leicester Marriott Hotel.*

## 7. Product Innovation of the Year

**Sponsor:** CIBSE Energy Performance Group (EPG)  
**Winner:** Klima-Therm, Cool-Therm and Geoclima: Turbomiser  
*Phil Jones, chairman of EPG; Roberto Mallozzi and Ken Strong, managing directors.*

## 8. Client of the Year: Low Carbon Operation

**Sponsor:** E.ON Sustainability Energy  
**Winner:** Swire Properties  
*Michael Woodhead, managing director of E.ON Sustainability Energy; and Swire's Fiona Shiu, senior portfolio manager, and Cary Chan, head of technical services.*

## 9. Low Carbon Energy Assessor: DEC of the Year

**Sponsor:** Wilo (U.K.) Ltd  
**Winner:** Andrew Gardner, Sheffield Park Hotel  
*Gary Mannus, UK and Ireland managing director of Wilo (U.K.) Ltd; and Andrew Gardner, managing director of CCL Consulting.*

## 10. Low Carbon Consultant of the Year

**Sponsor:** Mitsubishi Heavy Industries Europe  
**Winner:** Andrew Gardner, CCL Consulting  
*David Lettis, UK sales manager at Mitsubishi Heavy Industries Europe; and Andrew Gardner, managing director of CCL Consulting.*

## 11. Client of the Year: Energy Performance

**Sponsor:** Elta Fans  
**Winner:** Transport for London  
*David Osgerby, managing director of Elta Fans; and Andy Stanton, head of sustainable buildings at Transport for London.*

## 12. Low Carbon Energy Assessor: EPC of the Year

**Sponsor:** Gratte Brothers  
**Winner:** Darren Jones, Eland House  
*Ian Gratte, managing director of Gratte Brothers; and Darren Jones of dt energy.*

## 13. Design/Technical Innovation of the Year

**Sponsor:** Vaillant  
**Winner:** Norman Disney Young, HP Wynyard Data Centre  
*David Lacey, commercial director of Vaillant; and Maurice Julian, UK facilities project director at HP Enterprise Services.*

## 14. Best Carbon Saving Programme

**Sponsor:** Dimplex Renewables  
**Winner:** Spire Healthcare  
*Stuart Mackenzie, Dimplex Renewables; and Philip Belton, engineering and estates manager at Spire Healthcare.*

## 15. Champion of Carbon Saving Champions

**Sponsor:** M&E Sustainability  
**Winner:** Glynnan Barham, Natural History Museum  
*Jim O'Neill, chairman of M&E Sustainability; and Glynnan Barham, former energy and emissions controller at the Natural History Museum.*



# Scaling new heights

Building services engineers are poised to cash in on a multi-billion dollar market for sustainable designs and energy efficiency. Ewen Rose reports

'This is going to be huge.' Orlando is not a place for understatement, and ASHRAE president Gordon Holness did not disappoint during the society's recent winter meeting there, where he brandished a copy of the society's new 'game changing' standard for sustainable buildings, ASHRAE Standard 189.1.

The figures quoted during the conference were suitably mind-boggling for such a larger-than-life venue. Holness told delegates that the US would need to spend \$170bn (£110bn) a year retrofitting buildings to meet its climate change targets. But he added that the return on that investment would far outstrip what President Obama was trying to get back from Wall Street following the hugely controversial bank bailout programme.

Obama has also committed federal buildings to a 30 per cent cut in energy use by 2015, and Holness urged ASHRAE members to take the lead on that effort. He offered the society's 'triple whammy' of 189.1, a revamped Standard 90.1 on energy efficiency in buildings that raises the energy efficiency benchmark by another 30 per cent, and the country's first building energy labelling programme as a toolkit for engineers to go out and capture the business of 'greening' the US building stock.

Offices and residences in Manhattan are being used to pilot a building energy labelling scheme.

'We need to change our ways,' said Holness. 'This is not our fathers' ASHRAE. We will not achieve our goals using our current incremental approach to building improvement – we have to challenge ourselves and develop more ambitious performance modelling standards.'

He said that the US Clean Energy and Security Act, which was adopted last year, would drive energy targets 'very aggressively', but he added that European targets were much tougher and urged the US to learn from the EU Energy Performance of Buildings Directive (EPBD).

## New code

Standard 189.1 is the first 'code intended' commercial green building standard in the US. It has been drafted in 'code language' so that individual state legislatures can adopt its provisions directly into their local building codes. ASHRAE says it provides a 'total building sustainability package' for design engineers, builders and building operators covering the whole process from site location to energy use and recycling. The standard has a large potential market as there are 1,600 local 'jurisdictions' across the US looking for some form of green code to apply to their building stock, according to former ASHRAE president Kent Peterson, who chaired the 189.1 drafting committee.

Site sustainability, water use and energy efficiency, indoor air quality (IAQ) and the building's impact on

the atmosphere, materials and resources are all part of the standard. Every new building will have to be 'renewable energy ready', but if enough energy efficiency is achieved in the design, then renewables will become optional.

The final section of the standard looks at building operation including commissioning and lifecycle costing and the importance of training facilities managers.

IAQ is seen as a key subject for the standard, and, initially, the code drafters had problems balancing adequate ventilation rates with the need to keep energy consumption as low as possible. However, as Peterson explained, once IAQ experts were involved the committee had a rethink.

'The specialists pointed out that you get better results if you tackle the emissions [of pollutants] rather than increasing dilution, so we changed the target to controlling VOCs [volatile organic compounds], and that helped us with the energy aspect too.'

## Energy label

Holness explained that the standard was an important step on the road to zero carbon new buildings, but members already had almost unlimited business opportunities in tackling energy efficiency in existing buildings. 'This is not low-hanging fruit, it is already on the ground,' he said.

The building energy labelling

**"This is not low hanging fruit, it is already on the ground"**  
– Gordon Holness



scheme, developed by ASHRAE and the US Green Building Council, with significant input from CIBSE, is seen as critical to tackling poor performance in existing buildings. Currently the Building Energy Quotient (bEQ) scheme is voluntary, but Holness said he expected to see building labels become a mandatory requirement across the US 'within five years'.

The bEQ is being piloted by a number of major property firms including the Durst Organisation, which owns and manages 9m sq ft of office and residential space in Manhattan, and the US General Services Administration, which owns or leases 8,600 federal properties.

The bEQ labels include 'As Designed' (asset) and 'In Operation' (operational) ratings for all building types, except residential. They include data on actual energy use, energy demand profiles, indoor air quality and other energy related information.

CIBSE played a key role in the development of the scheme as it was able to share the lessons learned during the energy performance certification process.

Ron Jarnagin, ASHRAE treasurer and chair of the EQ committee, thanked CIBSE technical director Hywel Davies for his 'vital' contribution to the scheme and said that CIBSE's ongoing experience in establishing professional standards and training for energy assessors could be of particular benefit to the EQ programme in the coming years.

'Sorting out the basic algorithms of energy efficient buildings is a huge task, but a common goal for both organisations,' said CIBSE president Mike Simpson at the event. 'We must work together to get there.' ●

## Accolade for graduate winner

CIBSE/ASHRAE Graduate of the Year Emma Marshall from RPS Gregory in Newcastle received a special plaque during the Orlando meeting from ASHRAE President Gordon Holness.



The winner of the award, which is organised annually by the CIBSE/ASHRAE Group, receives a free trip to the Winter Meeting. The 2010 winner will attend the meeting in Las Vegas.

For details of how to enter, email: [ewenrose@btinternet.com](mailto:ewenrose@btinternet.com)

For more information about CIBSE and ASHRAE working together visit: [www.cibseashrae.org](http://www.cibseashrae.org)

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# Letters

## BIM too costly for most of us

Building information modelling (BIM) will not be the panacea that your articles suggest, ('Model activity', page 48, '2020 Vision', page 28, *Journal*, January 2010). For a start, the total cost of ownership is high, with software licensing and staff training. After users are trained, they need to use it a lot to stay 'fresh'. BIM can pay its way on large projects – in the same way that CAD brought improvements. However, the overhead is often not justified on the smaller ones. Small to medium companies definitely can't justify these costs.

In all the complexity of what engineering has become, we need some simplicity. The 2D drawing probably remains the most effective tool to communicate design intent between different disciplines and contractors. And what's more, you can use a pen to revise it!

**Chris Yates, C Eng MCIBSE**  
Associate, Zero Energy Design

## Get off climate gravy train

I received my January 2010 *CIBSE Journal* with a great deal of disappointment. It is filled with items on climate change and sustainability, despite the fact that the science has never been proved beyond reasonable doubt and not one sceptical voice was raised. The content, as organisations clamour to mount the gravy train, borders upon hysteria. I expect CIBSE, through its technical publications, to present an engineering and scientific approach with reasoned arguments.

The political view of CHP is a case in point ('Politicians back combined heat and power', News, page 6). To be efficient, CHP depends upon a balance of electrical and low grade heat output. When the domestic heat requirement is satisfied in summer, does one stop generating or throw the heat away? Why is maintenance and infrastructure configuration ignored in most cases? Why are 'savings' for low-energy lamps generally overstated and power factor and harmonics ignored? Payback period figures are often unrealistic.

**Peter Lawson-Smith OBE, FCIBSE**

## Nuclear is a key renewable

While the UK government's plan to increase its energy from renewable sources from one to 15 per cent by 2020 is laudable, there is

also a very strong need to invest in nuclear energy so as to meet the country's energy demands by 2023 when most of the reactors might have been decommissioned. The UK nuclear power generation at the moment stands at about 20 per cent of the total energy generation.

Meeting the nation's energy needs in the next decade is a big challenge to engineers and other professionals in the industry. There is an urgent need to embark on

Many argue vociferously for a nuclear solution, but I am yet to see evidence convincing me that it offers the best solution. History and future uncertainties must propel us towards energy efficiency, renewables and low carbon. Firm decisions must be made since the closer we get to the anticipated energy crisis, the harder it will become to justify a radical change in direction away from centralised supply.

**Robert Shaw**



## Bling or bust?

Does micro-generation work?

intensive education of our young engineers and engineering students in renewable energy technology. The government needs to invest hugely in renewable energy as well as nuclear engineering, not only to meet the energy target but to also create the more needed employment now as we go through this painful recession.

**Chiedozie Ukaigwe MSc, C Eng, MCIBSE**

## Yet to be convinced on nuclear

The prospect of a new generation of nuclear power stations has once again raised its divisive head. The battle is on two fronts: the need for serious and sustained reductions in CO<sub>2</sub> emissions and an impending energy gap. The answer, the UK government now tells us, has to be nuclear despite us being led to believe in a White Paper only a few years ago that it was firmly off the agenda.

## Unsubstantiated claims....

While the intent of your reply to my letter in the December *Journal* (page 16) was noble, it overlooks an important point. Many authors state hoped-for results such as significant energy reductions or comfort improvements as accomplishments rather than as goals, without showing if or how those goals are actually achieved. That is unfair to your members and readers. I believe that the author, and if necessary, the editor, has the responsibility to remove or not publish unsubstantiated assertions.

**Eur Ing Int PE Larry Spielvogel, PE,**  
CEng, FASHRAE, FCIBSE, FSLL

## ....And questions to answer

It was instructive to read your sustainability case study on the KPMG building (December, page 32) in the context of the letter from Larry Spielvogel in the same issue (page 16). But if the occupied footprint is 37,000 sq m, can the installed cooling load really be 8189kw (221W/sq m)? Or, if cooling towers have been used very sensibly to achieve optimum performance from the chillers, why not utilise the tower water to provide cooling through the beams without chiller operation, since the temperatures are ideal for this purpose?

**Eric Innes, FCIBSE**

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

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

## Headway Down Under

Australia is a rewarding location for environmentally minded young building services engineers. But, says **Illina Nanitsos**, the profession needs to push the green agenda harder



**A**ustralia has in the past been thought of as a country that lags behind the UK and other European countries in discovering new initiatives and technological advances. Today, however, this gap seems to have decreased dramatically as our connections around the globe increase and organisations such as CIBSE provide a 'real time' view of technological and sustainable advances in the industry.

Building services in Australia are driven primarily by the industry. Ratings that we use to measure efficiency, such as NABERS and Green Star, have the effect of pushing us further to improve the country's standards in design. These ratings did not begin as legislative requirements – they were the result of the industry aiming to raise building services quality, efficiency and effectiveness.

The large populations and building-project density in the UK and around Europe give the advantage of being able to test new technologies and green initiatives. At the same time, this concentration creates an inertia that affects the rate at which these fine ideas may be integrated into society.

Australia has the advantage of implementing these ideas at a somewhat faster rate as they filter their way to our side of the globe. Ideas, once grasped, are quickly implemented and, due to our lighter density, each structure that is built creates a huge impact 'down under', and helps push our industry forward.

Being an Engineer in Australia has been a great experience for me and many other young engineers that I work with. In the short time that I have worked in the industry, I have learnt not only a fantastic amount about building services design (and am still in awe of how much more there is still to absorb), but I have also become aware of the importance of being a consultant, not just an engineer.

It has been a tremendous learning curve and I feel that I have been fortunate enough to work with consultants who have emigrated from all over the world, each with the knowledge and expertise they have acquired from their own country or through

their travels. Unfortunately, it seems that much of the Australian public remains unaware of the ever-changing and expanding green technological advances that persist around the globe, as we strive towards a more sustainable future.

This makes it difficult to recruit young Australian engineers into an industry that has so much to offer.

It is up to engineers in the industry to make others aware of the importance of sustainable development so that we may set in motion an avalanche of ideas that will make the industry and our society develop into the sustainable vision that we strive for.

Creating a sustainable future is everyone's responsibility. Each person should take a stand to minimise their own carbon footprint and take care that their lifestyle encourages a greener environment. While the bulk

of society can separate paper from plastic, shut the lights off when they leave the room, and maybe even buy a Prius, a great burden of responsibility falls on the building services engineer to create designs that promote a high level of sustainability within commercial and residential buildings.

Buildings are part of every society across the globe. It is essential when producing a design that will ultimately become a part of this society, that we are not merely conscious of the sustainability issues inherent in the makeup of every building, but we must use our powers of engineering for good instead of evil.

Through the command of our designs we have an obligation to practically minimise the detrimental effect these structures have on our environment. ●

**We have an obligation to minimise detrimental effect that these structures have on our environment**

**Illina Nanitsos** is project engineer, Steensen Varming (Australia), and president of CIBSE Young Engineers Network Australia/New Zealand. This article represents her personal views.



**The future of commercial heating is changing dramatically. Rising fuel costs and the need to reduce carbon emissions are driving the demand for renewable technology.**

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## Spring into action



A host of new regulations is due to hit the building services sector next month, followed by another key date in the autumn. **Hywel Davies** looks at what's in store

**O**n 6 April this year we can expect to see a raft of changes to the Building Regulations 2000. As well as the delayed changes to Part G of the Regulations on water services, we'll see amendments to Part L (conservation of fuel and power), Part F (ventilation) and Part J (combustion appliances). These developments are part of the new three-yearly review cycle, which means there will be no further changes until 2013.

The expected changes to **Part G** require new homes to meet a minimum water efficiency standard and maximum bath water temperature. Rules on safety of hot water systems and supply of water of suitable quality for personal use and food hygiene are amended, allowing recycling of water for certain uses. These changes are expected to come into force on 6 April – although this is still to be confirmed – which gives the industry six months to get ready.

Changes to **Part L** have been much discussed in *CIBSE Journal* over recent months. As the magazine goes to press, a final announcement is still awaited, but is expected to require a further 25 per cent reduction in carbon emissions from new buildings. New versions of SAP and SBEM will be introduced to support this, along with new compliance guides for domestic and non-domestic buildings.

The key point to note about these changes is that although it is expected that they will formally become law next month, the date on which the new legal requirements will come into force is expected to be 1 October 2010. This is intended to give everyone six months to get to grips with the details and to train or inform staff, clients and suppliers about the implications of the new requirements. It also allows Building Control to prepare for the changes. CIBSE will be providing further information, guidance and training in the new Part L once details are published.

There is also the **Carbon Reduction Commitment Energy Efficiency Scheme**. This is discussed in detail by Richard Hipkiss on the following pages. Note that, while the sale of emissions allowances was delayed by a year to April 2011, the recording and reporting element begins next month for anybody that consumes at least 6,000MWhr

of electricity a year. Other changes that are due to come in next month include:

**Rubbish:** The standard rate of landfill tax goes up by £8 to £48 per tonne, so tenders for work after 1 April 2010 need to use that figure. Landfill tax is paid in addition to normal disposal fees, to encourage businesses to produce less waste and use alternative waste management methods. To enhance the incentive, VAT is charged on the full fee, including landfill tax. A lower rate of £2.50 per tonne applies to inactive waste such as rocks and soil. The standard rate is due to rise by £8 per tonne each year until 2013.

**Training:** A new 'time for training' initiative gives all employees in firms with more than 250 staff a statutory right to request training, with legal criteria for declining the request, and rights of representation to discuss the request. These rights extend to all employees from 6 April 2011. See [www.bis.gov.uk/time-to-train](http://www.bis.gov.uk/time-to-train), and follow the links to further advice for employers and employees.

**VAT:** HM Revenue and Customs has moved more and more business online in recent years. From 1 April this year all existing VAT-registered businesses with an annual turnover of more than £100,000 (excluding VAT), and all businesses registering for VAT, must submit VAT returns online and pay VAT electronically. For more information go to [www.hmrc.gov.uk/vat/start/register/signup-online.htm](http://www.hmrc.gov.uk/vat/start/register/signup-online.htm)

If all this is not enough to keep industry busy, the recast **Energy Performance of Public Buildings Directive** is due to be published in final form shortly, and this will require changes to the associated regulations in all parts of the UK and Europe (which are likely to feature in this list a year from now). The current consultation on changes to the Code for Sustainable Homes will lead to further changes in associated requirements relating to publicly funded housing, again likely to be this time next year. ●

Hywel Davies is technical director of CIBSE.

**The April changes to Part L give the industry six months to get ready**



**LINKING UP TO CHANGE** Business Link provides information on forthcoming legislation at [www.businesslink.gov.uk](http://www.businesslink.gov.uk). To find the page on forthcoming new legislation, type 'new legislation 1 April 2010' into the search box. For those who want to plan ahead, the UK government publishes a forward plan of expected new regulations, at: [www.berr.gov.uk/files/file53203.pdf](http://www.berr.gov.uk/files/file53203.pdf) The Forward Programme lists 430 regulatory changes that may be implemented by April 2011 (364 new measures and 66 simplifications of existing measures).

# Myth makers

How do we separate fact from fiction in the expectations surrounding the Carbon Reduction Commitment? **Richard Hipkiss** offers a guide

**B**urdensome, a stealth tax, unfair, restrictive, punitive' – these are just a few of the negative comments I hear from client companies who are looking to take on the Carbon Reduction Commitment Energy Efficiency Scheme (CRC). Much of this criticism seems to be based on hearsay. When the rules, intentions and requirements of the scheme are explained to clients in both the public and private sectors, they are quick to see its potential value to their business.

The roll-out of CRC has created significant confusion among building owners, operators and industry professionals – more so even than the scheme's distant cousin, the Energy Performance of Buildings Directive (EPBD). From a geographical perspective the EPBD is a European approach, with specific member-state variations applied by EU member states and implemented differently across UK countries. The CRC, on the other hand, is deployed only in the UK with a single set of rules for all participants. There are, however, softer links, as, in reality, action under one measure will support activity in the other.

So what are the most common myths and misconceptions surrounding the CRC?

## 'Just a stealth tax'

Despite the Department for Energy and Climate Change going to great lengths to communicate to potential participants that the CRC is revenue neutral, a view remains that its main purpose is to raise cash for government.

There is little doubt that the aim of the scheme is to generate infrastructure and behavioural change in both private and public sector organisations, leading to improved energy efficiency. Surely this is a benefit to organisations? Energy efficiency can often lead to both business and financial efficiency, especially with the continual rise in the cost of fuel and power.

## 'Not my responsibility'

There is a general assumption among multi-site organisations that 'Head Office' or 'Corporate' or 'Central Services' will take the responsibility for the CRC. It's true that the scheme is an organisational approach and that the responsible party for reporting emissions will usually be the highest parent company. However, every individual retail store, school or office location will have a responsibility to report and take

action to reduce the emissions under their control. The sooner organisations wake up to devolved responsibility, the more prepared they will be for the CRC implementation process.

## 'The polluter pays'

There is also a misguided impression that the 'polluter pays' is the main principle behind the CRC. The key aim, in fact, is to ensure that organisations, groups of organisations under the same banner, or even those in a transactional relationship, are working together to change behaviour and infrastructure. The reality is that the same challenge applies to a larger company with multiple sites as to a local authority that has responsibility for schools, or a landlord with many tenants. These all have to consider the infrastructure and how to implement energy efficiency collectively. But it is equally true that, under the CRC, there is no gain without some pain. However, landlords will argue that, where the polluter is the tenant, they may not pay directly, or even at all.

## 'No need to act now'

Perhaps the biggest myth surrounding the CRC – and potentially the most readily accepted one – is that to do nothing until the scheme starts and is under way will be beneficial. This misconception is based upon the fact that the initial scheme year is the footprint year; hence, by having a higher carbon footprint at the start of the scheme, it will be easier to reduce emissions and move quickly to the top of the league table. The simple fact remains that the potential for benefit is in the implementation of energy efficiency without delay to make savings on energy costs directly.

In fact the design of the league table involves three metrics – one to determine an organisation's position, based on its absolute carbon reductions, with optional growth and early action metrics. The latter warrant closer examination.

There are two early action metrics: certified reduction of carbon emissions over a three-year period by: a) gaining the Carbon Trust Standard (or equivalent), and b) the installation of automatic meter reading (AMR). The weighting has been increased and extended to make both more attractive, which is commendable. But even without the weighting, consider the benefits of AMR, which provides accurate knowledge of actual consumption.

■ **The biggest myth is: it's best to do nothing until the scheme starts and is under way** ■



Not only does this avoid a potential 10 per cent uplift from the use of estimated billing data, it also provides up-to-date information to assist in forecasting future emissions.

The Carbon Trust Standard is awarded to organisations that can demonstrate a reduction of emissions over a three-year period and have energy management systems and processes in place to encourage continual reductions. But think beyond the standard: a three-year reduction means three years of savings on energy bills before the CRC scheme starts; and proven energy management systems and processes mean that you are well on the route to a good infrastructure. And interaction with an experienced assessor, who will request evidence of compliance, leads to good expert advice on what can be done next and how to improve.

Acting now rather than later will reduce energy bills ahead of the introduction of the CRC – a reduction that, if ring-fenced, would even provide the budget for the initial carbon allowance purchase in 2011. Consider how much an organisation can save per kWh at today's prices, rather than waiting to pay a higher rate in the future and have to purchase carbon credits to cover it. Detailed examples and comparisons of savings can easily be modelled for a specific organisation.

### Tools for change

A key tool in an organisation's success in the scheme is the simple forecast; and to produce a forecast, good

knowledge is needed. Here we can link early action on the CRC with the energy performance certificates introduced in the UK under the Energy Performance of Buildings Directive.

The Energy Performance Certificate (EPC) provides an asset rating for a property; so, wouldn't knowing your best and worst assets be beneficial to you, and help you target energy saving actions? Similarly, the Display Energy Certificate (DEC) provides operational ratings, on a scale of best to worst-performing building in actual energy consumption; so, DECs not only provide information, they can also change behaviour if used as an energy management tool. In addition, the requirement for an air conditioning system inspection can provide essential action points to drive energy efficiency.

All these EPBD requirements can aid CRC compliance.

There are also wider opportunities through the implementation of collect-once-use-numerous-times (Count) principles. So don't bury your head in the sand with the CRC Energy Efficiency Scheme. CIBSE has organised a number of introductory courses to CRC through the Mid Career College. Training and understanding is an excellent starting point on the route to enlightenment. ●

Richard Hipkiss, director at i-Prophets Energy Services, is a Low Carbon Consultant and a CIBSE Mid-Career College trainer. [www.i-prophets.com](http://www.i-prophets.com)

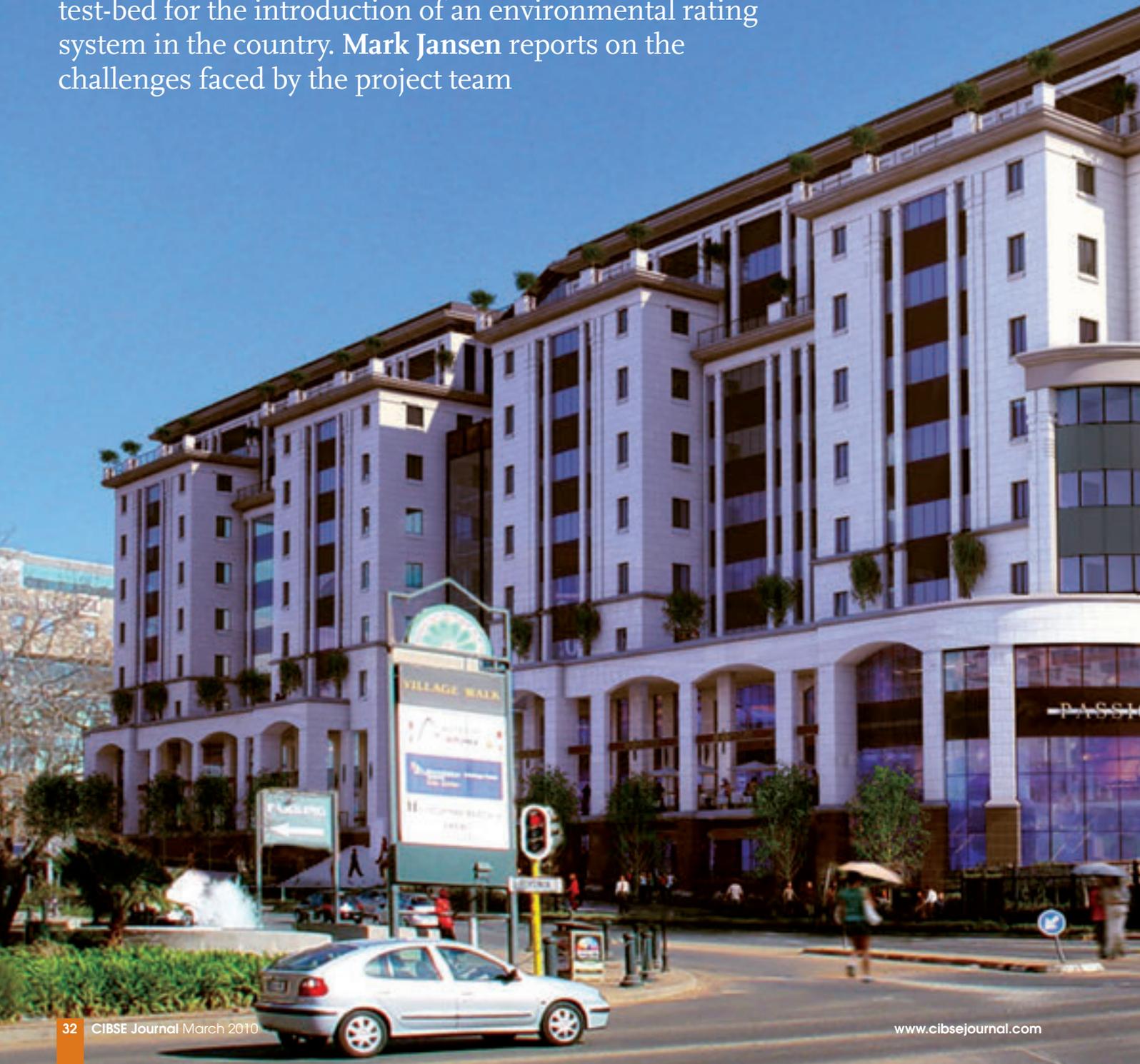
Each company office location will have a responsibility to cut its carbon emissions.

### CIBSE TRAINING

The next CIBSE training course on the CRC will take place on 16 March in London. For further details, to book a place or find out about future courses, visit [www.cibsetraining.co.uk](http://www.cibsetraining.co.uk)

# Star attraction

A South African banking group's new office block became the test-bed for the introduction of an environmental rating system in the country. **Mark Jansen** reports on the challenges faced by the project team



**S**outh Africa's first Green Star-rated building will reach practical completion next month. It's a large one – Phase II of financial services group Nedbank's headquarters in Sandton, the business district of Johannesburg, comprises 42,000 sq m of office space and will accommodate 3,000 employees.

WSP Green By Design, the sustainability adviser on the project, has calculated that the building's green features will reduce carbon emissions by 30 per cent, for an additional build cost of just 2.5 per cent. It is the first development to undergo certification by the Green Building Council of South Africa, scoring four stars out of a possible six under the council's Green Star system.

Points are awarded under nine separate category headings; developers can pick and mix from a range of green features, allowing, for example, a building to score highly on energy efficiency but much less for water efficiency.

The four-star certificate only covers the Nedbank

building's design, although a separate certificate for the completed building, known as the As-Built certificate, is also being pursued. Four stars under the Green Star system means a score of 45 to 59 per cent and 'Best Practice' status, while five stars reflect a score of 60 to 74 per cent and 'South African Excellence' status. Six stars means a score of 75 per cent or above and 'world leadership' status, although the council's technical manager, Jason Buch, believes it will be some time before a six-star building is completed in South Africa.

Climate is an important factor in Nedbank Phase II's design. Johannesburg has dry winters that last from March until November, with average daytime temperatures a comfortable 15C to 20C, although they can drop to zero at night. Summers are both wet and hot, with temperatures reaching 35C.

WSP's Marloes Reinink, the green building consultant on the Nedbank project, says offices in Johannesburg only need heating for three months of the year. Air conditioning in most South African >

Nedbank Phase II (here and over pages) became a test-bed for Green Star in South Africa





> buildings still recycles internal air – warming or cooling as needed – despite the suitable temperature of the external air much of the time, Reinink says. Nedbank Phase II has an air conditioning system that uses untreated fresh air for about 60 per cent of the year, taking advantage of long, relatively warm winters.

Reinink predicts that shortages of water will be a major problem in the coming five years in South Africa. Phase II has been designed to use a ‘black water’ system, whereby a recycling plant in the basement collects all flushed toilet water in the building, along with water from the washbasins. The solids go into the sewer while the water is cleaned and reused for non-drinking purposes, such as flushing toilets, irrigation and supplying the cooling towers that serve the air conditioning. The black water system reduces the amount of water used by the building by around 60 per cent, Reinink says.

Unfortunately, as WSP Green By Design’s managing director Eric Noir explains, the black water system has yet to be installed as it is still awaiting approval from the local municipal authority and other bodies. Noir is hopeful that the bureaucracy can do its work within a few months so that the ‘As Built’ certification can be completed with the black water system in place.

As in Britain, green buildings in South Africa win points for proximity to public transport, and Phase II is within 1km of the forthcoming Gautrain network across Johannesburg.

While the city has a serious traffic congestion problem, public transport is still in its infancy and therefore the parking space allocation is relatively high, at almost one space for every two of the building’s 3,000 occupants – although this is still lower than standard council requirements.

The building boasts a lighting system that will be up

## South Africa goes for Green Star, with help from Down Under

The Green Building Council of South Africa was established in September 2007 and became affiliated to the World Green Building Council a year later. It uses a Green Star rating method based on the one developed by the Australian Green Building Council.

Eric Noir, managing director of WSP Green By Design and a founding member of the council, explains that Green Star was chosen over the BREEAM and LEED assessment methods partly because BREEAM was considered ‘a bit too UK-centric for us, from a climate point of view’, while the Australian council, which already had the Green Star system, offered practical

support to help the South African council get up and running quickly. ‘The Australians were unbelievably instrumental in getting us set up quite fast,’ says Noir.

Apart from Nedbank Phase II, so far only four projects have been fully registered for an assessment with the council: three are part of the forthcoming Menlyn Maine mixed-used development in Pretoria, while the fourth is the Lincoln on the Lake mixed-use development at Durban.

Jason Buch, the council’s technical manager, insists this is a good start by South African standards: ‘We are aware of at least 10 to 20 building projects that are working towards [the standard].’ A certification for

retail buildings is due to be launched in April and there are plans to develop rating tools for industrial buildings, hotels, mixed use developments, data centres and also for the efficient management of existing buildings.

Unlike Australia, which has its Building Code, there are few if any legal controls on carbon emissions in South Africa. There is also no equivalent to Part L of the Building Regulations for England and Wales.

‘The government has been working on an energy code for buildings for the last five years,’ says Buch. ‘They were supposed to have released it a few years ago. Hopefully one day soon. it will be a legal requirement. But there’s nothing so far.’

**“ The professional team has been unbelievably enthusiastic about Green Star. A lot of it is to do with overcoming resistance to change in people’s minds ” – Eric Noir**

to 40 per cent more energy efficient than conventional systems. It includes daylight sensors around the façade perimeter to adjust the electric lights according to natural light levels, and motion sensors to switch them on and off depending on whether anyone is working in the area. Occupants can also adjust the lighting levels in their own particular working area.

To some extent the hands of the green construction team were tied by the fact that Phase II is an extension of Phase I; the basement was already in place and the orientation and massing were predetermined.

The aesthetics of the façade also had to follow Phase I, including the glazing ratio; although Noir says that, where possible, the tinted glass was actually downgraded to clear glass, because anti-heat gain glass captures the sun’s heat and acts like a radiator for a two-metre zone near the window.

The windows are double-glazed, which is not a given in South Africa, while the walls are well insulated by local standards. In addition, the construction company Group Five managed to recycle 85 per cent of construction waste on the project.

Reinink says the Green Star application was a huge learning curve for all concerned – WSP was effectively ‘test driving’ the newly introduced tool, and there was no previous experience of the process.

WSP Africa team spent time with WSP Lincoln Scott in Australia to benefit from their experience of developing and implementing the Australian Green Star system.

One complication, say Reinink, was that building

was already under construction and Green Star requirements were not included in the tender documents – so changes had to be made retrospectively. All construction documents had to be reviewed and redrawn where necessary.

The team needed to achieve consistency in modelling for daylight, thermal, energy – each of which was done by different team members. There was also the challenge of helping the whole team to understand the CIBSE Codes and other codes that are part of the Green Star requirement.

Noir, a founding member of the Green Building Council of South Africa, adds: ‘The professional team has been unbelievably enthusiastic about Green Star. The rating entails quite a bit more effort and documentation that they wouldn’t submit normally. A lot of it is to do with overcoming resistance to change in people’s minds.’ ●



## Project team

**Architects:** GLH; Terra Ether

**Sustainability adviser:** WSP Green by Design

**Project manager:** Coffey Projects

**Mechanical engineer:** Aurecom

**Structural engineer:** WSP Structures

**Electrical engineer:** Claasen Auret

**Main construction contractor:** Group Five

**Quantity surveyors:** SBOS; LDM JHM

Adapting Nedbank Phase II for Green Star standards was a learning curve for the project team.

## Design plan Environmental aims of Nedbank Phase II

### Energy

- Heat rejection via energy-efficient, open-circuit evaporative cooling towers
- Economy cycle designed to provide 100% fresh air to 60% of the floor plates when outside conditions allow
- Lighting power densities for 95% of the offices with an energy use of 2.25 W/ sq m per 100 Lux
- Digital addressable lighting system for 95% of the offices, providing greater flexibility for light switching

### Emissions

- Refrigerants and gaseous fire suppressants have an ozone depleting potential (ODP) of zero

- Thermal insulants to have an ODP of zero
- Development should not increase peak storm water flows for rainfall events of up to a 1-in-2 year storm
- Outflows to sewerage system due to occupant use to be reduced by implementing high-efficiency fixtures and fittings, with the blackwater treatment system to further reduce the outflow

### Indoor environment

- Fresh air intake in the building 100% greater than required by SANS 10400-O (5 litres/second/person for offices)
- Air Change Effectiveness to be >0.95 for 97% of the office usable area

- Carbon dioxide sensors integrated at the return points on each floor to ensure continuous monitoring and adjustments of fresh air into the building
- High frequency ballasts installed in fluorescent luminaires in all offices
- Lighting design to achieve an average maintained illuminance level of no more than 400 Lux for the offices
- 60% of the offices with a direct line of sight to the outdoors or into the day-lit atrium
- Noise levels not to exceed 45dB(A)eq in open plan office
- Volatile organic compounds of office interior paint and carpets to minimum Green Star South Africa Office v1 nominated levels

# Eating up waste

In-depth monitoring of one of its restaurants enabled Pizza Hut to trial new energy-saving measures as part of a refurbishment project. **Carina Bailey** reports

**A**mid rising energy costs across its chain of restaurants, Pizza Hut decided it was time to investigate where its energy was being consumed. A store in Watford, Hertfordshire, was chosen as a test-bed for assessing wasteful energy consumption.

An energy monitoring system, NoWatt, was installed in the store in April 2008. The system measured consumption every 30 seconds. 'Originally, Pizza Hut had half-hourly data, which makes analysis of individual items like looking for a needle in a haystack,' says Richard Groves, who conducted the study for consulting engineer AECOM.

'This only tells you that you've used, say, 20KW, in

half an hour, but you've no idea where it's gone. To establish exactly which devices were using the most power, we needed to look at the sub-circuit level, and this is where more detailed sub-circuit monitoring comes in.'

The circuits chosen for monitoring included the air conditioning in both the dining and kitchen areas, cooker hood supply and extract fans, lighting circuits, and walk-in fridge and freezers. Within a matter of days, Groves could see that about 72kWh of electricity per night was being wasted because the aircon system was not switching off after the store closed. One quick call to the maintenance company to reprogramme the time clocks resulted in this level of energy saved each night.

Monitoring also revealed that one of the aircon units was not providing any cooling at all, which could be seen by the constant 3kW load on the kitchen aircon sub-circuit – which Groves knew, from the technical manual, was the consumption of the fresh-air fans.

Another problem was the exterior and signage lighting was defaulting to 'on' when it was only supposed to be providing power to the circuit between 3pm and midnight, with a photocell turning on the lights when it was getting dark. This resulted in 41kWh of electricity being used. This was repaired, but the monitoring showed it failing again a few months later.

This time, the sub-circuit was monitored, and Groves was able to see the electrical contractor testing the switching of the circuit. 'We were also able to see that they had not left the circuit set up correctly, and

Pizza Hut's Watford Dome site has become a regular place for testing new products and services.





*kWh saved*

the lighting was coming on at 4pm, even though it was June and not dark outside. A subsequent recall of the contractor ensured the problem was properly fixed.' This reduced energy consumption to 17kWh, generating a saving of about 58 per cent.

A fire at another Pizza Hut restaurant in Shrewsbury, Shropshire, later in 2008 presented an opportunity to retrofit lots of the energy-saving technologies that it had been trialling in Watford. This ultimately led to a 25 per cent decrease in energy consumption at the Shrewsbury store – despite an increase in sales – compared with the amount the site had been using prior to the fire. In the four months before the fire 63,000 kWh of electricity was used; in the same period one year later, 47,000 kWh of electricity was consumed.

The main energy-saving measures that were implemented included:

- Thicker insulation in the walk-in fridge-freezers, increasing it from 75mm to 100mm;
- Relocating external condensers out of a suntrap to a different wall;

- Changing the kitchen's air conditioning from a package unit to a split system; and

- Replacing around a quarter of the lights with LEDs. Groves admits he would have liked to incorporate more LEDs, but says at that time the fittings weren't of a good enough standard.

Inverters were also fitted onto the supply and extract fans of the cooker hoods to reduce the frequency of the electricity supply to the fan. This allowed the fan to operate at a slower speed, rather than it just working at full power or being off, saving about 12,000 kWh a year.

'The inverters were originally set at 50hz during the oven-commissioning stage, as the oven manufacturer used to have an overly onerous extract requirement, which was further exacerbated by a further overly onerous smoke capture test,' says Groves.

'This alone resulted in the ventilation system using approximately 1.5kW more than the design duty required.

'We reduced the fan speeds with the inverters to

**“What's fatal to any business is to invest in technology before you know if it's going to work”** – Raefe Watkin-Rees



Energy monitoring of both the air conditioning and lighting systems at the Watford site have produced interesting results.

> the correct air-flow commissioning values, and were able to see on the monitoring system the reduction in consumption straight away on the relevant sub-circuit.'

As part of the monitoring work at the Watford restaurant, a new energy-efficient oven was tested to see if it met its efficiency claims. Says Groves: 'The gas consumption prior to the new oven being installed was hovering just under 300kWh per day. And then they put the new oven in, and straight away it jumped up to just under 400kWh a day, and then they did something in November and it just went crazy, around 500kWh per day.'

'This new oven was supposed to be a modulating oven, which is supposed to ramp down when there are fewer pizzas going through it, but there was something wrong with the settings. Without the NoWatt system we would never have known that, we would have just assumed, yes it's a low-energy oven, great, roll it out across all 500 or so Pizza Huts.'

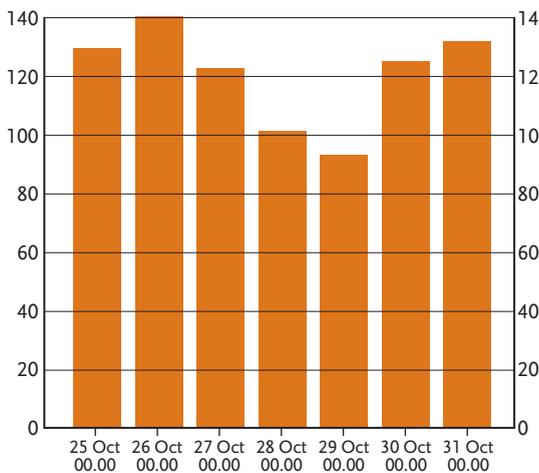
The oven manufacturer changed the settings again

in April, and it did help to bring the energy usage down again to about 300kWh a day, and then they changed the settings for a third time in June and put in a battery because the oven was losing its memory each time it was turned off, and now, finally, it is actually saving energy – around 10 to 15 per cent lower than the original oven.

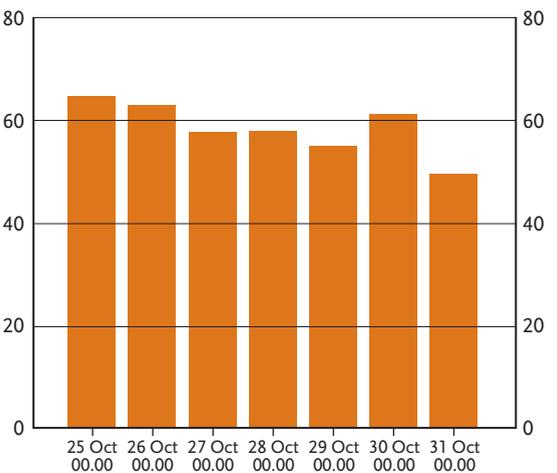
In addition to Watford and Shrewsbury, five other restaurants are to have their energy consumption closely monitored and the appliances checked – at Brent Cross and Enfield Home Delivery in London; Staines; Leicester Meridian; and Gravesend, Kent.

Raefe Watkin-Rees, commercial director at Pizza Hut, said: 'What's fatal to any business is to invest in technology before you know if it's going to work in real life, especially as it's never cheap stuff. If it doesn't give the savings you want, then the reputation of all energy-saving devices suffers and not just the technology that has not worked. I want to make sure that what we invest in is sustainable and validated because – especially in this economic climate – capital is tight.' ●

Watford restaurant



Shrewsbury restaurant



Energy usage for the walk-in fridge and the walk-in freezer at the Watford restaurant and the refurbished Shrewsbury restaurant in the same week in 2008. The two newly-configured walk-ins at Shrewsbury used around 60kWh per day against Watford's 120kWh per day. This equates to a saving of about 20,000kWh per year.

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# Code of dishonour?

Engineers are too often just ticking boxes when they commission building services, says Laurence Aston, who tells **Carina Bailey** why it's important to push this message forward at CIBSE's national conference



Anna Branthwaite

Laurence Aston explains why the industry needs to change.

**E**ncouraging good sustainable practice in buildings is one of Laurence Aston's passions. Another is rushing around the country on his classic 1978 Yamaha SR500. But, despite this carbon-polluting vice, Aston is zealous about spreading the word – whether it be educating youngsters at his children's school and getting involved with their carbon club, or simply instigating change in his role as director of mechanical engineering at Morgan Professional Services.

And one key message he is keen to get across is how the industry desperately needs to change – something he'll be outlining in his speech at CIBSE national conference next month (see details below).

His presentation, *Beyond Commissioning: The Art of Improving Building Performance* will aim to make engineers question why, if they expend so much time at the conception stage of a project, they don't follow through and test the systems to see that they deliver what was promised in the sales pitch.

Part of the problem, Aston insists, lies within the commissioning codes themselves failing to go far enough. 'I think the commissioning codes in what they do are very good – but, for me, they stop too early in the process. They focus on simple regulation of flow rates and the recording of data. There is no testing to show that components are working correctly and no proving that the designs achieve the building performance promised.'

These codes are a series of methodological processes that professionals go through when commissioning a building, and they help engineers during maintenance works or if systems break down. But, says Aston: 'Too often, commissioning is only undertaken to tick the right box at handover time.'

'For example, the designer does a whole load of calculations to decide what types of system and how much heating or cooling he needs to provide to a building. Then the builder builds it, using the commissioning codes to make sure he's got the same

amount of water or air going through a particular pipe or duct.

'And, if the constructor can demonstrate that, then he's finished his work – that is 'I have done what the designer told me to do' – that's where it tends to stop. But, of course, that doesn't necessarily mean that the building works. If the designer didn't get the design quite right, and the occupiers are either too hot or too cold and so on, the phone calls start coming. And we never really service our clients properly as a result.'

Aston believes it's time that services in all buildings were put under the same sort of stringent testing as medical research labs, for example, where designers have to prove they can achieve a certain temperature, not just get a certain amount of water running through a pipe. In fact, Aston believes that designers ought to be testing aspects like temperature, humidity and energy consumption, rather than measuring flow rates, as a matter of course.

'Just proving that you've done what the designer told you is not good enough to demonstrate that you're getting the performance you need. These days it's become even more important, because not only are designers trying to get the right performance to keep the right temperature and humidity in that space, we're also, fundamentally, trying to limit carbon emissions.

'And, if the designers had a whole load of really bright ideas about how they're going to do that, and we don't test the result is what he expected it to be, we run the risk of not delivering the carbon savings we all say we can do – and we also don't learn anything for the next job that we do.'

Much of Aston's career has been spent working in the pharmaceutical industry on projects for companies such as Merck Sharp & Dohme, Boots and GlaxoSmithKline, where testing and proving practices are much tighter. But the biggest obstacle facing the industry is that no one is yet ready to take responsibility.

'If the design doesn't work on site, there's usually 10 different ways for different people involved in the process to try and wriggle out of it. The designer will claim the contractor didn't build it properly, the contractor will claim the design wasn't right and the problem never gets solved.'

He believes one way around the problem would be to engender ownership of responsibility all the way through the project in order to serve clients better, but he concedes that there would probably be a fair amount of resistance to designers taking responsibility, as well as commercial and financial implications.

He believes there are a few reasons for this resistance. Firstly, he says, it's not to everybody's advantage (financially and commercially) to take responsibility. Secondly, in most projects the commissioning process is compressed because of delays on site, because 'there's always a good excuse for why you can shorten the commissioning process but still finish on time'.

And thirdly, no one is asking engineers to check – although Aston says this is likely to change as time

moves on and the Part L 2010 Building Regulations come into force – but he doesn't believe it will serve to test the actual performance of a building, only the existing codes. 'You basically have to tick a box and say "yes I've commissioned a building". To me, that's not enough.'

He also believes there is also an issue with the disjointed nature of the appointment process; quite often a number of different designers become involved in a project, so 'if there is an error in the design process, you don't know where it is'.

Aston believes the answer lies in strengthening the codes to include an element of system testing and proving of the building services and the overall building performance, a process which he would like to see be made mandatory.

He agrees that BSRIA's Soft Landings programme is complementary and goes some way to addressing the issues, but still believes more can be done. But Aston admits that change cannot be instigated by engineers alone. 'I think we are in a relatively limited position. If you imagine the carrot-and-stick scenario, we are trying to offer them a carrot. If you've got a client who's a building owner, there's definitely an incentive to do it if they're prepared to think about a slightly longer term aspect of their facility. If they're paying for the running costs this should have the potential to improve it for them. 'The more difficult market may be the design and build let to a tenant-type situation, but again there would be some advantages.'

These advantages centre on display energy certificates (DECs), which show how buildings work. 'A lot of times you get a poor DEC and everyone wants to walk away from that building now. So if they properly commission buildings, resulting in a better DEC, then potentially that building's more marketable.

'But it is always more difficult to demonstrate to a developer that he's going to get the benefit, particularly if he's not going to be responsible for the running costs.' ●

**“ Just proving that you've done what the designer told you is not good enough to demonstrate that you're getting the performance you need ”**

## Sign up for the conference

The CIBSE national conference, *Resilience and Building Services: How to Secure the Future*, will be held on 27 and 28 April at the British Museum, London. The event aims to cover all issues that are, or are set to become, major topics in the building services sector. Topics include possible scenarios for the future, addressed by Rob Manning, CIBSE president-elect and director at AECOM; threats to the building services sector, tackled by Paddy Conaghan, a partner at Hoare Lea; opportunities in building services, with Professor David Fisk, Imperial College London; and how the current economy is affecting contracts, with Richard Ward, head of construction group at Eversheds.

To book a place, visit

[www.cibse.org/nationalconference](http://www.cibse.org/nationalconference)

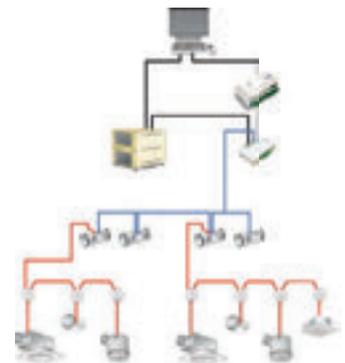


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# Familiar system given new shine

A crop of new product launches is taking VRF aircon systems a step further, according to the makers. **Ian Valley** looks at some technologies on offer

**V**ariable refrigerant flow (VRF) air conditioning systems have been around since at least the 1980s and have captured a significant slice of the commercial market. VRF systems are used in about 60 per cent of commercial buildings in the UK, according to research body BSRIA. With this level of market saturation, you might think that the technology had matured to a point where further innovation was unlikely. Judging by the latest crop of new launches from several leading air conditioning manufacturers, however, this is far from the truth.

Although a more traditional example of VRF technology, Sanyo Air Conditioners claims its new ECOi Series 6 air conditioning unit represents a big step forward in both efficiency and performance. The two-way system has been designed in accordance with Sanyo's three new product development priorities – high efficiency, marketability and reduced size and weight.

The final efficiency figures have yet to be confirmed, but Sanyo expects the minimums to be an Energy Efficiency Ratio of 4.0, a CoP of 4.4 and a seasonal energy efficiency ratio of 6.0. The unit's weight is a third less than its predecessor, at 400kg, and the required installation space has been cut by a fifth. The range now extends up to 56kW in a single unit and is connectable in a 3:1 combination system of up to 168kW.

The maximum length for refrigerant pipework has been increased, from 300m to 1,000m, extending the application and enabling its use in larger buildings, says Sanyo. Units have been significantly redesigned, enabling some outdoor units to be transported to building rooftops in lifts, rather than requiring expensive cranes or external lifting platforms.

Also, the external optimal static pressure for fans has been significantly increased, therefore allowing ductwork to be connected for internal plant room installations.

Mitsubishi Heavy Industries Europe (MHIE) has also focused on higher efficiencies in its expanded KX6 VRF range. Eight new 'full size' KX6 heat pump models (33.5-68kW), which can be paired to configure systems with capacities up to 136kW, join the existing Compact



range (11.2-33.5kW). MHIE has also introduced 15 new indoor units to replace the outgoing KX4 range in a variety of capacities, making 77 models in total. KX6 is said to achieve Class A ratings for energy efficiency, with CoPs up to 4.33.

New compressors, heat exchangers and inverter controls contribute to the greater efficiency of the new KX6 models, the company says. Other claimed improvements include a new refrigerant system control, more efficient DC fan motors, a redesigned three blade fan, and a compact integrated PCB, which needs a smaller control box.

Samsung's DVMplusIII.



**The Centrifugal from Hitachi.**

> The new units also feature longer pipe-runs (up from 510m to 1,000m) and a piping length after the first branch that has more than doubled to 90m, and the maximum height difference between indoor units is up from 15m to 18m. Maximum vertical separation of outdoor and indoor units is 50m. Even the length of electrical wiring is increased by 50 per cent to a maximum 1,500m.

Efficiency is also a priority for Samsung, whose DVM Plus III system – available in both heat pump and heat-recovery versions – have CoP ratings up to 4.57 in heating mode and 3.89 in cooling mode.

However, although the CoP is important, Samsung says it does not believe it tells the whole story. ‘For example,’ it says, ‘most manufacturers measure CoP when their systems are operating at an optimum 60-100 per cent of maximum output, as in mid-winter and mid-summer. But what about the months between, where demand for heating or cooling is less than 30 per cent of capacity?’

For Samsung, one answer lies in IPLV (Integrated Part Load Value) – a part-load efficiency rating system originally developed by the North American Air-Conditioning and Refrigeration Institute to determine seasonal efficiency in chilled water air conditioning systems in large buildings – but now, claims Samsung, also applicable to R410a refrigerant systems like DVM Plus III, ‘which operates with full efficiency down to 10 per cent or even 1 per cent of capacity’.

DVM Plus III’s 64hp outdoor combination can, says the company, serve up to 64 indoor units. Combinations are built up from five basic units of 8, 10, 12, 14 and 16hp. Units have a footprint of 880mm

by 765mm, or 1,200mm by 765mm for the two largest models with three rather than two compressors.

At the core of this technology, says Samsung, is the Copeland digital scroll compressor, teamed with fixed scroll compressors to provide variable output across the operating range. In the larger capacity systems, compressors are activated in a different sequence each time in a bid to improve long-term reliability and part-load efficiency.

The digital scroll compressors permit continuous heating or cooling during oil recovery, said to be a >



The KX6 heat pump from Mitsubishi Heavy Industries Europe.

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Daikin's I-controller

significant efficiency improvement over inverter-controlled VRF systems, which interrupt heating or cooling regularly for full-power oil recovery cycles.

The digital scroll engineering has been pushed still further with the digital hybrid system which incorporates vapour injection technology. This two-stage compression is designed to increase refrigerant flow rates and – in conjunction with a turbo intercooler which sub-cools the liquid refrigerant – to improve cooling and heating performance and ensure reliable operation in systems with long pipe runs.

Like the Sanyo and HHIE systems, Samsung DVM Plus III supports pipe runs up to 1,000m. The longest run between outdoor and indoor units is 200m. The systems are designed for up to 50m height difference between outdoor and indoor units and 15m difference between indoor units.

Also contributing to the high efficiency of DVM Plus III is a new heat exchanger design. New high and slim grooves are designed to reduce pressure loss in the tubes, while the 19 per cent increase in surface area is said to improve the heat exchange process by more than 30 per cent. Externally, the new G-fin improves heat transfer by 13 per cent. Airflow through the heat exchanger is said to have been improved and quietened through an optimised fan guard.

VRF technology such as the Sanyo, MHIE and Samsung systems are typically used in larger installations, which can be difficult to monitor. Daikin believes it has a solution to this with the Daikin Network Service System (DNSS EcoSave) linked via the internet between the Daikin air conditioning equipment installed on a site and Daikin's remote monitoring centre.

A team of Daikin experts monitors the operating status of the system all day, every day. The primary aim is to prevent malfunction and prolong the lifespan of the systems. However, Daikin claims that an energy-saving feature of the system also optimises the efficiency of the equipment, resulting in reduced CO2 emissions and lower running costs.

The DNSS EcoSave is designed to alert Daikin before the equipment actually breaks down. 'In this

**VRF systems are used in about 60 per cent of commercial buildings in the UK, but technologies are still being developed**

way, failures can be prevented and possible down time reduced to an absolute minimum,' the company says. It adds: 'This feature will also flag certain operational issues such as blocked/contaminated air filters or heat exchangers; this information will be passed on to the customer to improve performance and efficiency.'

The DNSS EcoSave will continually monitor around 130 points of information from the air conditioners, including pressures, temperatures and running hours, says Daikin. When a malfunction occurs or is predicted, Daikin engineers analyse the data to identify the source of the problem.

Energy-saving potential can be improved by employing inverter-driven technology in air conditioning equipment, and Hitachi Europe has introduced the DC Inverter driven RASC 3hp, 5hp and 10hp units into its centrifugal range of air conditioners designed for indoor installation, reducing annual electricity usage by up to 25 per cent.

DC Inverter control also increases customer comfort as the set temperature is reached quickly and maintained more accurately. The 3hp and 5hp models are 15 per cent lighter than their predecessors, due to a reduction in height and the introduction of DC Inverter horizontal scroll compressors. The 10hp model features increased piping length of 30m to 50m.

Hitachi says all the models allow flexible inlet and outlet airflow configurations, meaning each installation can be tailored to individual customer needs. ●

**Renewables Manufacturer goes for airconless pump**

If you think of VRF, then cooling systems typically spring to mind. However, Mitsubishi Electric has developed a range of commercial heating products based on VRF heat pump technology.

The system is designed and manufactured as heating-only to ensure that it qualifies as renewable energy because even the most advanced heat pump air conditioning systems are not defined as 'renewable' technologies in the EU.

Systems that cool will also be excluded from the proposed Renewable Heating Incentive scheme when it comes into force next year.

Philip Ord, product marketing manager for Mitsubishi Electric, says: 'It is important to make this distinction because, individually, the components that make up the system look similar to our usual range of air conditioning products, but we have removed any capability for these to provide cooling.'

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# Kitted out

With R22 refrigerant in air conditioning systems due to be phased out, should specifiers be looking at wholesale replacement of kit or refurbishment? **Ian Vallely** asks some manufacturers for their views



**A**n important milestone in the phase-out of R22 refrigerants in air conditioning systems was reached at the beginning of this year, when the use of virgin R22 refrigerant for topping up air conditioning systems was banned. This was one more step along the road towards a complete ban on R22 in 2013.

Nonetheless, currently there remain a significant number of R22-based aircon systems in buildings. Estimates vary, but there may be between 60,000 and 100,000 such systems in the UK.

Those running R22-based systems can expect costs to rise, according to Toshiba Air Conditioning's commercial director David Dunn. He says: 'When a commodity is in low demand, the costs are guaranteed to increase. The cost of R22 refrigerant is expected to quadruple in price year-on-year.'

As well as the expected price hikes, there are also good technological reasons to replace R22-based systems sooner rather than later. Mark Grayston, product marketing executive at Mitsubishi Electric, says: 'When it was installed, a 10-year-old R22 system might have had a coefficient of performance (CoP) of 2.6 across the whole system.'

'We estimate that, over 10 years, the system would typically have dropped by about 15 per cent in capacity

and increased by around 15 per cent in power input. So you might be looking at a CoP in the low twos – and that is only going to diminish.'

There are three ways to move away from R22, says Graham Wright of Sanyo Air Conditioners: 'You can replace the whole installation with a new system; use a non-standard refrigerant to replace the R22 within the system; or re-use the existing pipework – and possibly wiring – and install new indoor and outdoor units that operate on a more up-to-date HFC refrigerant.'

Retrofitting with an alternative refrigerant overcomes the need to remove old equipment and install new systems and pipework. However, it may be difficult to predict actual system performance and reliability following retrofit, and there may be a question mark over how long the system will last. Alternative refrigerants can also be expensive.

Making use of existing pipework and wiring – and replacing indoor and outdoor units – is now a viable and cost-effective alternative, according to Wright: 'It also allows installers to fit the latest high-performance units, benefiting from government grants and delivering lower running costs for end users.'

Using this approach, the R22 is typically replaced by R410A-based systems. These offer distinct advantages, Dunn explains: 'R410A offers a heat transfer rate that

“The cost of R22 refrigerant is expected to quadruple in price, year on year” – David Dunn

is 35 per cent greater than R22. It also has an ozone-depleting potential of zero and is classed as an A1 refrigerant, meaning it is neither flammable nor toxic.

‘Finally, R410A has a decreased compressor displacement of 30 per cent, so the compressor does not have to work as hard and is therefore likely to last longer.’

Significant technological developments in inverter drives and heat pump technology mean that older forms of air conditioning – including those running on R22 – run less efficiently than the systems available today. According to Daikin, an increase in efficiency of more than 30 per cent can be achieved with R410A inverter air conditioning, compared with older equipment running on R22.

Opting for a retrofit approach – replacing the main aircon units but retaining existing pipework and so on – also brings a significantly lower installation cost and less disruption than would be the case from complete replacement of an existing R22 system. It also avoids the risks and uncertainties around the cost and quality of recycled supplies of R22. ●

[www.defra.gov.uk/fgas](http://www.defra.gov.uk/fgas)



## Technology Four approaches to R22 replacement/renewal

**Sanyo Air Conditioners' R22 Renewal system** is designed to be used with existing Sanyo systems and most types of R22 systems from other leading manufacturers. It uses existing refrigerant pipework to speed up installation and cut replacement costs by around 30 per cent, the company says. It also delivers running-cost savings due to the increased energy efficiency of R410A equipment – with CoPs of up to four, compared with 2.5 and below for R22 systems. On most installations, existing wiring can also be used, although flare connections are replaced to accommodate the higher working pressures of R410A. R22 renewal can also be applied to existing R407C systems.

**Mitsubishi Electric's 'Replace' technology** allows R22 systems to be upgraded using existing pipe work without the need to apply any special cleaning machines. This technology uses Mitsubishi Electric patented Hard Alkyl Benzene oil, claimed to be more tolerant of contamination. By combining this oil with developments in oil separator technology, it is possible for the inverter models to use existing pipe work without any special operations. Mitsubishi Electric has launched a range of Mr Slim models incorporating Power Inverter technology for small- to medium-sized applications with 'Replace' technology to allow for easier upgrade from existing R22 systems.

**Daikin UK's upgrade for VRV systems** operating on R22 refrigerant – VRV-Q – uses R410A refrigerant and is said to allow all existing VRV R22 piping and,

potentially, controllers and indoor units installed since 1996, to be retained so only the outdoor units and heat recovery BS branch selector boxes need to be replaced. VRV-Q is designed to operate at the lower pressures required by existing R22 piping without compromising efficiency. During system recharging, new R410A refrigerant circulates through the copper piping and collects residual contamination. The refrigerant, including the remaining oil from the R22 system, is filtered in the outdoor unit in which the contamination is also then deposited. This process is only done once and generally takes about an hour.

**Toshiba R22 replacement systems** – Digital and Super Digital Inverter – use R410A refrigerant. By re-using existing services such as the pipe work, Toshiba Carrier claims that it typically saves 37.5 per cent on installation cost and 30 per cent on installation time. Digital Inverter and Super Digital Inverter systems are said to reduce energy costs by at least 40 per cent compared with older R22 systems 'and, in many, cases this percentage can increase to almost 75 per cent'. Toshiba compared the cost of an old R22 split system and a new R410A system based on installing two new ceiling cassette systems on to an existing R22 installation system using the old pipework. The supply and installation of all the equipment was £4,875. This compared with £7,800 had the existing services been stripped out and replaced with new. The R22 fixed speed systems cost, on average, more than £11 per day in January – whereas the new R410A Digital Inverter system was just over £4.

Retrofitting with an alternative refrigerant overcomes the need to replace existing equipment.

“ Making use of existing pipework is now a viable and cost-effective alternative ” – Graham Wright

# Reliable sources

Cost pressures mean that only a small proportion of the UK building stock is protected by sprinkler systems. **Craig English** and **Sam Bennett** show how probabilistic design techniques can be used to assess the benefits of sprinklers

**S**prinkler systems are arguably the most effective means of protecting buildings and their contents from fire. This, however, is not their only benefit: in attacking fires at source, sprinklers also provide significant life-safety and environmental benefits. Yet, despite these benefits, sprinklers are rarely provided in new buildings unless explicitly requested by fire safety guidance documents.

In theory, if a sprinkler system works there should be little or no need for passive fire protection measures. However, historical concerns regarding the reliability of sprinkler systems means only minimal reductions

in other fire safety measures are granted when they are used. Unfortunately, the cost savings afforded by reductions in other measures rarely equal the costs of providing a life-safety sprinkler system; hence the vast majority of UK buildings tend to be constructed without them.

Risk-based modelling techniques can be used to generate further reductions in passive fire-safety measures, and in doing so could significantly change the way developers, clients, architects and building control authorities think about sprinkler systems. In this article Monte Carlo simulations are used as part of a probabilistic approach to justify bigger compartment

## Fire safety

### Jargon buster

#### Event tree analysis

Event trees are a graphical representation of a problem with frequencies of occurrence attached to various branches.

#### Eurocodes

These are European-wide standards for structural design developed by the European Committee for Standardisation. They have been adopted by British Standards and replace and supercede the BS Design Code.

#### Fire compartment

A fire compartment is an area within a building, which is completely surrounded with fire-resistant construction.

#### Fire load

The sum of thermal energies that are released when all combustible materials (building contents and construction elements) in a space ignite.

#### Monte Carlo methods

These methods are a class of computational algorithms that rely on repeated random sampling to compute their results.





sizes when sprinklers are used in schools, assembly and recreation buildings, and manufacturing spaces.

A probabilistic approach requires calculation of the likelihood of a fully developed compartment fire occurring. For a compartment with and without sprinklers, this can be done relatively easily using event trees. Event trees assume fires will develop via a series of discrete stages and that each different stage will produce a number of subsequent events, such as: ‘fire burns out of its own accord’; ‘fire spreads beyond one material item’; and so on. The event trees used in this analysis are illustrated in figures 1 and 2. This analysis technique is comparative, so it is hoped that any inaccuracies in these simple event trees will cancel out.

### Heating conditions

The heating conditions within the fire compartment then need to be determined. This stage is more difficult to quantify, due to uncertainties in fire load quantities and the rate at which ventilation enters the room when glazed elements fail. In the case of windows, for example, the proportion of glass that shatters will depend on numerous factors – such as the thickness and type of glass, the type of frame and the quality of workmanship. Uncertainties like these can be addressed using Monte Carlo simulations.

### “ A probabilistic approach requires calculation of the likelihood of a fully developed compartment fire occurring ”

The main benefit with Monte Carlo simulations is that the embedded calculations are based on physical theory and experimental measurement. This helps compensate for a lack of information about real fires in a manner that other risk methods cannot. Furthermore, assumptions made within the analysis are explicit – which means that the sensitivity of these assumptions can be measured. This is achieved by changing the values for each variable, re-running the same set of simulations, and then comparing the new results with those originally generated.

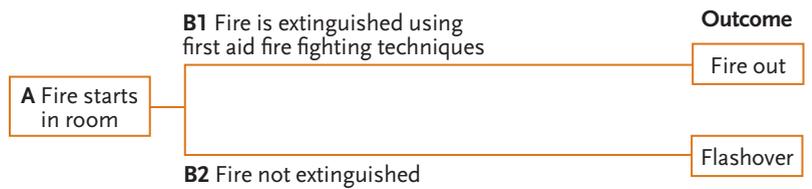


Figure 1: Illustration of fire development stages prior to flashover occurring in a non-sprinklered compartment

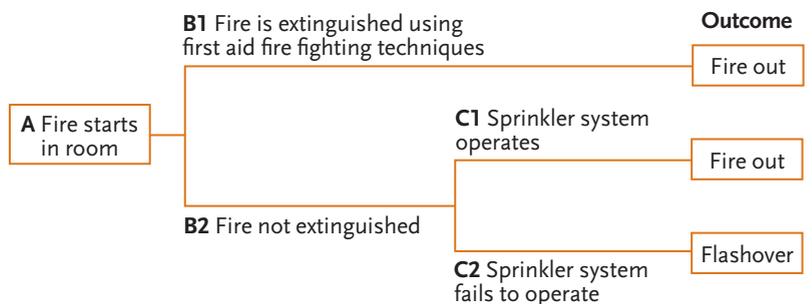


Figure 2: Illustration of fire development stages prior to flashover occurring in a sprinklered compartment

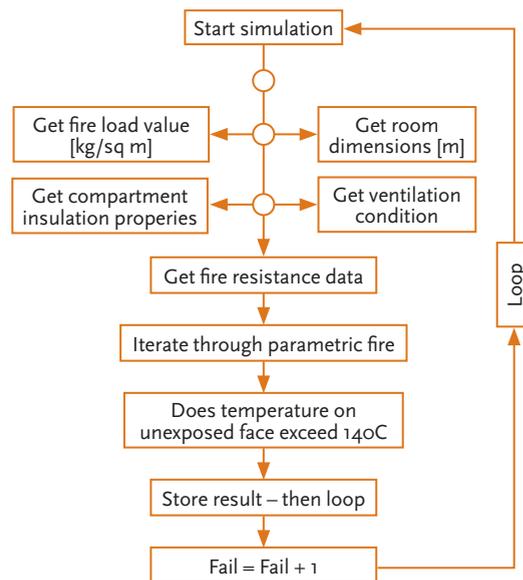


Figure 3: Illustration of Monte Carlo simulation process

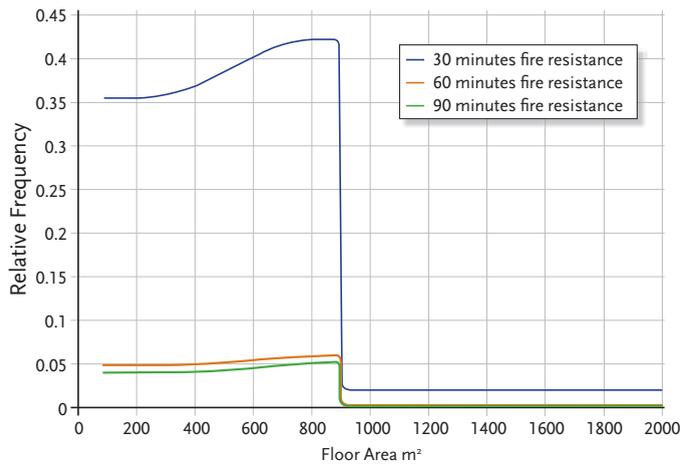


Figure 4: Schools – relative frequency of compartmentation failure

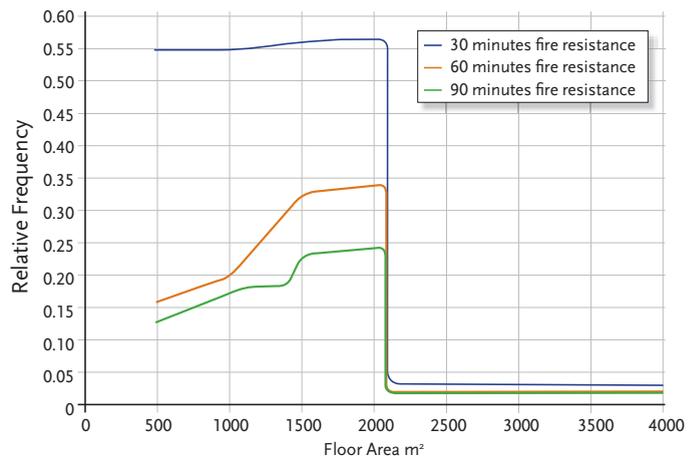


Figure 5: Assembly and recreation – relative frequency of compartmentation failure

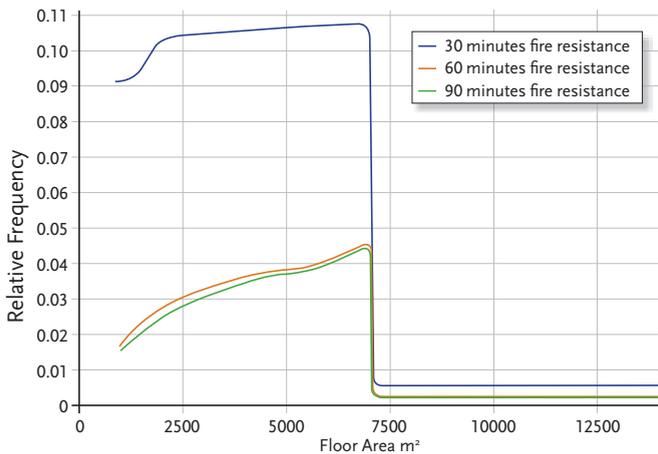


Figure 6: Manufacturing – relative frequency of compartmentation failure

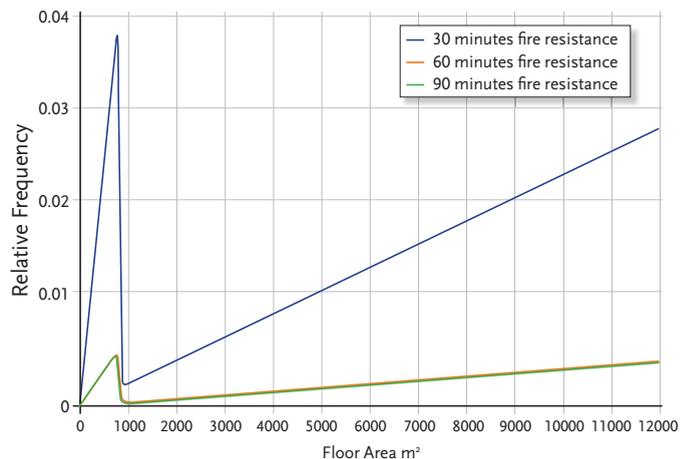


Figure 7: BB1000 – risk of compartmentation failure versus compartment size

**Updated guide from CIBSE**

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> In these examples, the iterative parametric fire calculation in Eurocode 1-1-2 and the heat transfer calculations in Eurocode 3-1-2 were executed thousands of times using randomly selected values for fire load and ventilation. In the absence of statistical data, ventilation values have been assumed to increase linearly between the validated minimum and maximum opening values permitted in EC1. The simulation process is illustrated in figure 3.

**Compartments**

Fire-separating elements are considered to have sufficient fire resistance if, when subject to a controlled heating exposure [standard fire test], the temperature of the unexposed surface remains below an average temperature of 140°C [peak temperature of 180°C]. This laboratory type test is run for different time periods (30, 60, 90 and 120 minutes) depending upon the purpose of the fire-separating element and nature and size of the building in which it is to be placed.

Using the process outlined in figure 3, the frequency that a real fire (typical of that which may occur in the building) will heat the same fire-separating elements

beyond 140°C, can be measured. The data in figures 4, 5 and 6 show the relative frequency that a real fire will heat the unexposed surface of different sized, fire resisting compartments in different buildings beyond 140°C. A relative frequency of 1.0 means the compartment enclosure always fails. The break in the plots relates to the reduced risk of flashover when sprinklers are introduced.

As the floor area of the fire compartment increases, so will the frequency of fire starting. If this is factored into the analysis, the results given in figures 7, 8 and 9 are derived.

The graphs show that, for a school, the likelihood of a fire spreading from 800 sq m fire compartments, without sprinklers – but with a 60 or 90-minute fire-resistant enclosure, is the same as that for a 12,000 sq m compartment with sprinklers. It is noted that the design guide, *Building Bulletin 100: designing and managing against the risk of fire in schools*, calls for compartments with sprinklers to be no greater than 2,000 sq m.

Using the same approach, a 20,000 sq m compartment can be achieved in assembly and >

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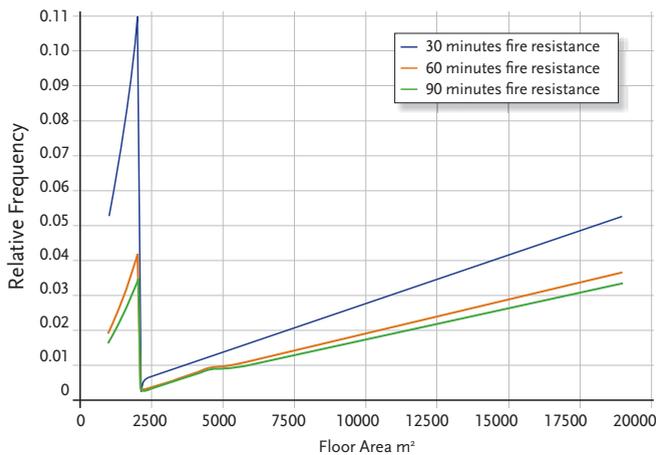


Figure 8: Assembly and recreation – risk of compartmentation failure versus compartment size

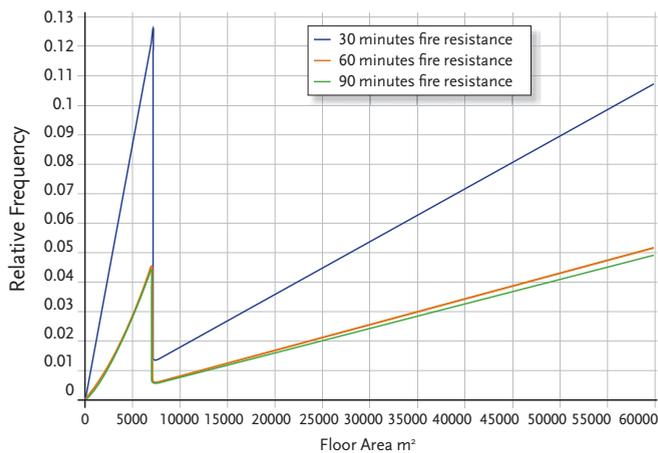


Figure 9: Manufacturing – risk of compartmentation failure versus compartment size

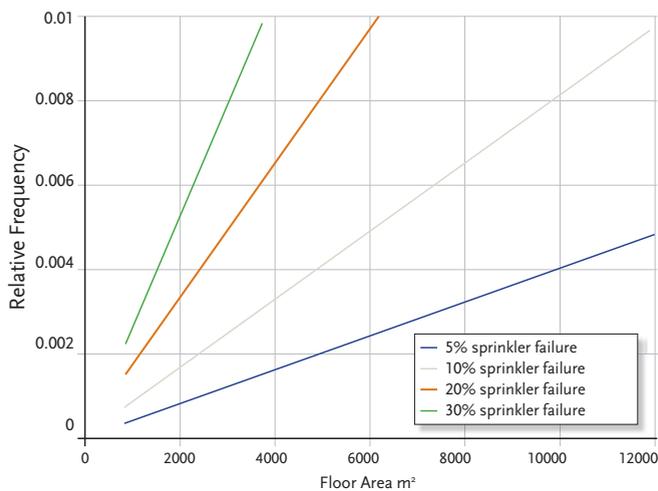


Figure 10: Risk of compartmentation failure versus sprinkler success rate – schools

■ The main benefit with Monte Carlo simulations is that the embedded calculations are based on physical theory and experimental measurement ■

> recreation buildings with sprinklers. This is five times greater than the 4,000 sq m called for in Approved Document B. In manufacturing-type buildings, Approved Document B requests that compartments with sprinklers are restricted to a 14,000 sq m area, yet the graph indicates that a compartment size of 60,000 sq m could be reached before precise equivalency is attained.

The data in these figures assume that the sprinkler system will fail only five per cent of the time. Using Microsoft Excel, it's very simple to determine how the results will change when a higher sprinkler failure probability is used. The outputs in figure 10 show how the results generated for a school may change when the sprinkler system failure rate is increased to 0.1 [10 per cent], 0.2 [20 per cent] and 0.3 [30 per cent] for a 60-minute fire resisting enclosure. This means of accounting for reliability is one of the main benefits of using a probabilistic approach.

**Conclusions**

Current compartment sizes stem from the recommendations made in the *Fire Grading of Buildings Report* published in 1946. This publication does not thoroughly explain the thinking behind current area limits; however, it does state that 'a proper solution to the issue of compartment size limitation requires extensive statistical analysis and the data needed for such a study is not available at the current time'.

Sixty years on, robust statistical data still don't exist. However, the restriction this imposes on design is less severe. This is because computational, risk-based design approaches of the type described here can be used to generate statistical data via simulation.

Design techniques of this type are starting to gain widespread acceptance. For example, the BRE tool CRISP III, which uses a similar approach, was recently used to justify open-plan sprinklered apartments. In other studies, sprinklers have been used as a substitute for passive fire protection in low-rise steel-framed buildings and to derive new fire-resistance periods for UK buildings.

Probabilistic methodologies can be used to compare the performance of any fire engineered design. However, if used to promote the inclusion of sprinkler systems in buildings, by justifying significant reductions elsewhere, a sharp reduction in annual UK fire losses would most certainly result. ●

Craig English and Sam Bennett are fire engineers at Hoare Lea



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## Remeha-Gilles biomass boilers slashes Norfolk school's bills



A replacement Remeha-Gilles 550kW biomass boiler at Flegg High School in Martham, Norfolk, has reduced the school's annual CO<sub>2</sub> emissions by an estimated 177 tonnes, and should save £7,000

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## Bilco launches new website



Roof hatch, smoke vent and access equipment supplier, Bilco UK, has updated and relaunched its website showing new videos of its:

- single-leaf smoke vents automatically opening to 140 degrees, reducing potential smoke blow-back into the building; and
- roof-access hatches with easy, single-handed opening and closing, allowing users to keep one hand on the ladder for improved safety.

● For more info visit: [www.bilco.uk](http://www.bilco.uk)

## Fläkt Woods new chilled beams set to become the stars of the future

Fläkt Woods has launched two new active chilled beams as part of its new IQ-STAR range – the Stella, an exposed multi-service chilled beam, and the Astra, an integrated model.

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## New Dimplex SmartRad – perfect partner for heat pumps

Dimplex is expanding its portfolio of low carbon heating solutions with the launch of SmartRad, a range of wall-mounted fan-convector radiators suitable for both new-build and retrofitting.



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● For more information email: [marketing@dimplex.co.uk](mailto:marketing@dimplex.co.uk) or visit: [www.dimplex.co.uk](http://www.dimplex.co.uk)

## Rehau underfloor heating chosen at G1 Glasgow

Rehau underfloor heating has been installed by Express Heating throughout the impressive reception hall and toilets on all nine floors of Glasgow's prestigious G1 office building. The project is part of a £70m, two-year redevelopment by HF Developments.



Underfloor heating was chosen because it eliminates the need for visible heat emitters and efficiently delivers the necessary comfort levels for the building's workforce and visitors.

● For further information visit: [www.rehau.co.uk](http://www.rehau.co.uk), tel: + 44 (0) 1989 762600 or email: [Jo.Price@rehau.com](mailto:Jo.Price@rehau.com)



## Grundfos puts in great performance in Vancouver

Gathered at the 2010 Winter Games in Vancouver were 2,077 Grundfos pumps and packaged sets, providing support for both athletes and media from all the corners of the globe.

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● For more information email: [uk-sales@grundfos.com](mailto:uk-sales@grundfos.com) or tel: + 44 (0) 1525 850000.

## High efficiency CompactGas steel shell boilers from Hoval

Hoval's new CompactGas welded steel LTHW boiler is the first non-condensing boiler to incorporate the company's internationally patented aluFer heat exchanger technology to maximise heat exchange efficiencies.

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● For more information visit: [www.hoval.co.uk](http://www.hoval.co.uk) or email: [hoval@hoval.co.uk](mailto:hoval@hoval.co.uk)



## DANLERS launch smallest self-contained energy-saving PIR occupancy switch yet!

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## Futuristic SAS International ISMs meet architectural demands at iconic Hills Place development

Integrated Service Modules (ISMs) from SAS International,



featuring both active chilled beams and Micro Prism Optic (MPO) luminaires, have been installed in an iconic refurbishment project in Hills Place, Oxford Street, London.

Amanda Levet Architects specified more than 200m of the futuristic ISMs for the striking 1,300sq metre office refurbishment and extension with its billowing façade off Oxford Street in the city's West End.

● For more information visit: [www.sasint.co.uk](http://www.sasint.co.uk) or email: [enquiries@sasint.co.uk](mailto:enquiries@sasint.co.uk)

## Alumet leads the way

A new series of slim tubular lighting columns, introduced by Thorn, provides a comprehensive and flexible system for landscape architects and planners.



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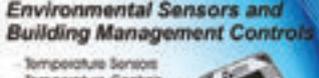


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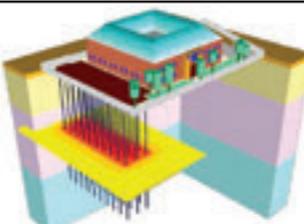
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## The psychrometrics of air conditioning systems

The CPD articles in the April, August, November and December 2009 editions of the *CIBSE Journal* have set out the principles of the Psychrometric Chart and how to use the chart to plot individual processes, determine the respective component loads and combine these into commonly employed sub-systems

This article will further develop the use of the chart to combine the processes to develop a basic constant volume, full fresh air system – this technique may then be used to determine the required components of an air conditioning system and may also provide the basis for comparisons of the performance of different systems or operating regimes.

Symbols are defined in the box at the end of the article – you may also find it useful to be able to refer to those earlier articles (they are all available online at [www.cibsejournal.com](http://www.cibsejournal.com)). To help understand the example in this article you are recommended to build up the process on a psychrometric chart.

### Combining the processes

The psychrometry for the complete air conditioning system can be developed from the combination of the individual components and sub-systems that have been

previously described. It is the function of the individual processes that determine the plant requirements although, of course, the final components are normally restricted to those commercially available. To provide an example a system will be developed to satisfy the room loads for a 8m wide by 5m deep by 3m high single room that have been determined as:-

- summer (cooling) room load of 5kW (sensible gain) 1.2kW (latent gain)
- winter (heating) load of 1.9kW (sensible loss) and 0.8kW (latent gain).

The design conditions for the room are 20C to 24C operative temperature and 35 per cent to 50 per cent saturation (ie a range of acceptable conditions that can vary season to season). The room is of medium thermal weight (medium to fast response) and has a moderate amount of glazing, and so at this stage it would be reasonable to assume that values of air temperatures equivalent to values of operative temperatures be used.

### Establishing the supply air mass flow rate

As a design decision (based on the strategy being used to distribute air in the room) the minimum supply air temperature will be 16C (8K lower than the room temperature). If, alternatively, a low level supply system was to be used, the supply air temperature may well have been limited to being no more than 5K cooler than the room temperature. (See CIBSE Guide Section B2.4.2 [1] for more details.) It is normally the requirements of room cooling as opposed to heating (in air conditioning applications) that will determine the air supply rate in a constant volume system. Hence the mass flow rate,  $\dot{m}$ , of the supply air can be calculated from the room sensible cooling load,  $\Phi_{SC} = C_p (\theta_{RS} - \theta_{SC})$  where  $C_p$  is the air specific heat capacity of air that can be taken as  $1.012 \text{ kJ}\cdot\text{kg}^{-1}\cdot\text{K}^{-1}$ . So  $\dot{m} = \Phi_{SC} / [C_p (\theta_{RS} - \theta_{SC})] = 5.0 / [1.012 \times (24 - 16)] = 0.62 \text{ kg}\cdot\text{s}^{-1}$ .

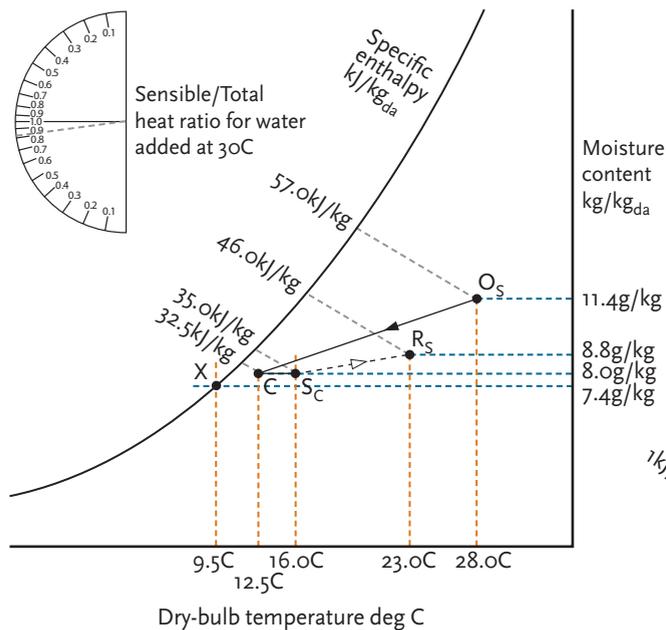


Figure 1: Summer psychrometric processes

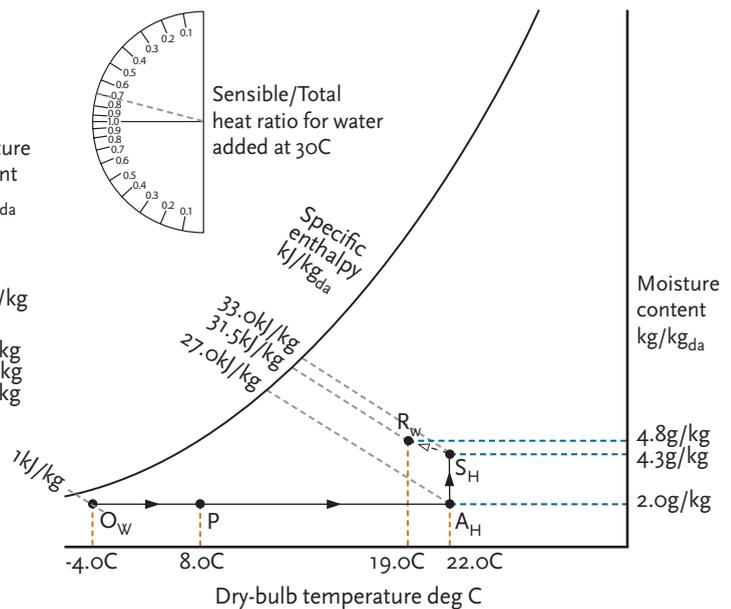


Figure 2: Winter psychrometric processes

**The summer system**

> The summer room sensible/total heat ratio will be  $5.0/(5.0+1.2) = 0.81$  and since this is a coincident sensible cooling and latent cooling load, the gradient of the room ratio line (RRL) is taken from the bottom quadrant of the protractor on the psychrometric chart and is drawn through summer room point  $R_s$ . The intersection of this line with the specified value of  $\theta_{SC}$  (ie 16C) provides the summer supply air point  $S_c$ . As an alternative to using the RRL to determine the supply air point, the room latent load may be used to calculate the supply air moisture content from  $\Phi_L = h_{fg} (g_R - g_S)$  and so reading the value of  $g_R$  from the chart as  $8.8\text{g}\cdot\text{kg}^{-1}_{da}$  or  $0.0088\text{kg}\cdot\text{kg}^{-1}_{da}$  the value of  $g_S = g_R - (\Phi_L/h_{fg}) = 0.0088 - [1.2/(0.62 \times 2450)] = 0.0080\text{kg}\cdot\text{kg}^{-1}_{da}$  or  $8.0\text{g}\cdot\text{kg}^{-1}_{da}$ . Looking at the chart (Figure 1) these two methods provide the same supply air point – the simple calculation method is probably the most reliable. However, the use of the RRL allows the designer to look at the range of supply air conditions that **could** be used if there was flexibility in the design supply air temperature.

To develop the ‘summer cycle’ the outdoor air,  $O_s$ , is plotted (the values identifying  $O_s$  having been established from climate data such as Table A2.6 of CIBSE Guide [2]). In a full fresh air system, air at  $O_s$  must be finally conditioned to produce air at  $S_c$ . Looking at the chart  $O_s$  has a higher temperature and moisture content than  $S_c$ , where (from the chart)  $h_o = 57\text{kJ}\cdot\text{kg}^{-1}$  and  $h_s = 35\text{kJ}\cdot\text{kg}^{-1}$ . Hence there is a need to reduce the enthalpy of the air by  $(57 - 35)\text{kJ}\cdot\text{kg}^{-1} = 22\text{kJ}\cdot\text{kg}^{-1}$ .

In this simple system (and in many

installed systems) a cooling coil will be used to both cool and dehumidify the air. The air condition leaving the coil will be determined primarily by the dehumidifying requirement and the contact factor,  $\beta$ , of the coil. From the manufacturer a contact factor of 0.85 has been obtained (based on the flowrate of the air passing through the coil, and the coil size) and from this the coil temperature, (the coil ‘ADP’) indicated by point X on the chart may be determined.

So  $\beta = 0.85 = (g_o - g_s)/(g_o - g_x)$  so  $g_x = g_o - (g_o - g_s)/0.85 = 11.4 - (11.4 - 8.0)/0.85 = 7.4\text{g}\cdot\text{kg}^{-1}_{da}$  and hence the point X may be plotted where the saturation curve intersects with a moisture content of  $7.4\text{g}\cdot\text{kg}^{-1}_{da}$ . The cooling coil process line is then  $O_s \rightarrow C$  where C is the intersection of the line  $O_s$  to X with the supply air moisture content,  $g_s$  and has an enthalpy,  $h_c$ , of  $32.5\text{kJ}\cdot\text{kg}^{-1}$ .

The air now has an appropriate moisture content to supply the room but, as a result of the need to dehumidify the air, the dry bulb temperature is below the required value of  $\theta_s$ . An afterheater is used to increase the temperature from  $\theta_c$  to  $\theta_s$ . (The fan will also act as a sensible air heater).

**The winter process**

To outdoor condition,  $O_w$  is plotted (on Figure 2) based on a knowledge of local climatic data (that can, for example come from Table A2.4 of CIBSE Guide [2]). To determine the supply air point (at winter design),  $S_h$  the supply air temperature,  $\theta_{SH}$  must be established.  $\theta_{SH}$  will be determined either from a knowledge of the supply air mass flowrate  $\dot{m}$  in combination with the

room sensible heating load,  $\phi_{SH}$ , the supply air mass flowrate having previously been established from the cooling requirement,  $\phi_{SC}$ ; or the supply air temperature may be determined from a requirement of the particular supply regime (eg low level or high level supply).

In this case, having already determined the air mass flowrate from the cooling load as  $0.62\text{kg}\cdot\text{s}^{-1}$  the heating supply air temperature will be  $\theta_{SH} = \theta_R + (\Phi_{SH}/C_p) = 19 + [1.9/(0.62 \times 1.012)] = 22\text{C}$ . The winter room sensible/total heat ratio will be  $1.9/(1.9 + 0.8) = 0.70$  and since this is a coincident sensible heating and latent cooling load, the gradient of the room ratio line (RRL) is taken from the top quadrant of the protractor and is drawn through winter room point  $R_w$ . The intersection of this line with the calculated value of  $\theta_{SH}$  (ie 22C) provides the winter supply air point  $S_h$  (and of course a similar calculation to that used for the summer design may be undertaken using the winter latent load to confirm the supply air moisture content). The supply air enthalpy  $h_{SH}$  can be read off as  $33.0\text{kJ}\cdot\text{kg}^{-1}$ .

Point  $S_h$  is clearly both at a higher temperature and moisture content than the winter outdoor air condition,  $O_w$ , and so a sensible heater and a humidifier is required; in this example a steam humidifier has been used. To increase the temperature typically a water or electric coil (or frequently two coils - a preheater or frost coil, and an afterheater) may be used. In this example one heating process will be shown from  $O_w \rightarrow P \rightarrow A_h$ , where  $\theta_{AH}$  is the supply temperature (or maybe just slightly cooler as the subsequent steam humidifier will also add a small

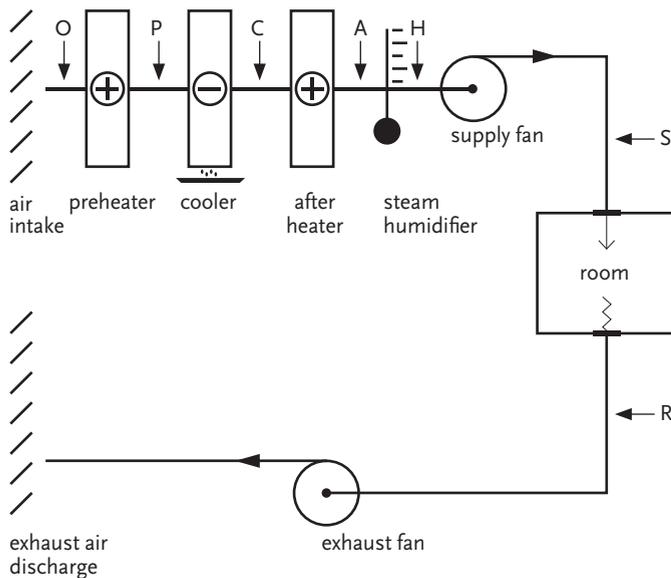


Figure 3: Basic system component schematic

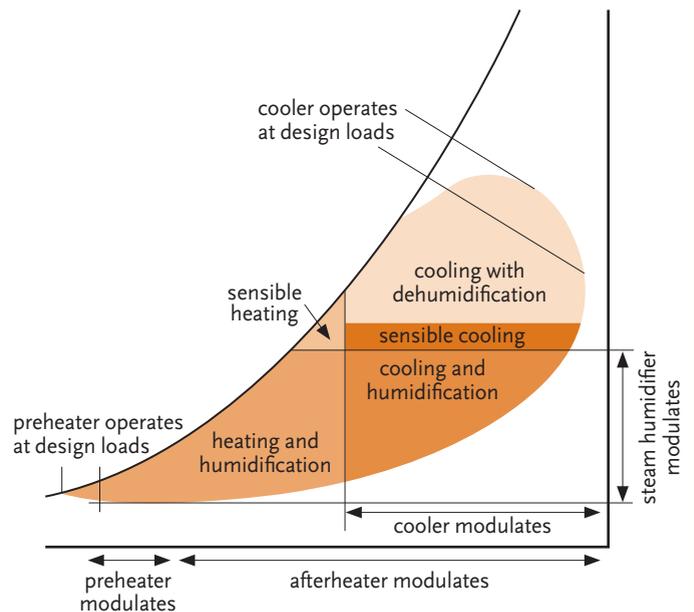


Figure 4: All-year-round operating regime based on outdoor conditions

degree of sensible heat to the air) where  $h_{AH}$  is  $27.0\text{kJ}\cdot\text{kg}^{-1}$ . A steam humidifier is then used to increase the moisture content (with potentially a small increase in air dry bulb temperature) from  $g_p$  (the same as  $g_{OW}$ ) to  $g_{SH}$  with the process  $P \rightarrow S_H$ .

By examining the psychrometric requirements determined for summer and winter operation, the initial schematic of a basic full fresh air, constant volume conditioning system can be sketched out as in Figure 3.

### Calculating the loads

The loads may be readily established from the chart where Power (kW) = mass flow rate ( $\text{kg}\cdot\text{s}^{-1}$ ) x enthalpy change ( $\text{kJ}\cdot\text{kg}^{-1}$ ) =  $\dot{m}\Delta h$  and so, for example, the summer cooling coil design load is  $0.62 \times (57.0-32.5) = 15.2\text{kW}$ .

The summer afterheater load =  $0.62 \times (35.0-32.5) = 1.55\text{kW}$ , and so the total plant load is thus  $15.2 + 1.55 = 16.8\text{kW}$ . This compares with the room cooling load of  $5.2\text{kW}$  sensible +  $1.2\text{kW}$  latent =  $6.4\text{kW}$ ! However, it is not correct to simply compare the two values as the plant load includes:

- The power to cool the outdoor air (that will be providing necessary ventilation fresh air to the room) down to the room condition;
- The power to ‘overcool’ the air dry bulb temperature so that condensation takes place to dehumidify the air; and
- Reheat power to bring the air dry bulb temperature from the lower dehumidifying temperature back up to the supply air temperature.

The load in winter will comprise the heater load,  $0.62 \times (17.0 - 1.0) = 9.9\text{kW}$  and

the humidifier load,  $0.62 \times (33.0-17.0) = 9.92\text{kW}$  giving a total plant load of  $18.8\text{kW}$ . The significant difference between the plant and the room loads is by virtue of the need to increase the temperature and moisture content of the cold, dry outdoor air before it can be heated to provide any useful room conditioning.

### Year round operation

The modes of operation for this simple system are shown in Figure 4. This diagram (after Legg [3]) indicates the operating modes for the system for the annual range of outdoor conditions.

The preheater is likely to be controlled using feedback from a downstream duct sensor and is set to maintain a minimum temperature (likely to be between  $5\text{C}$  and  $8\text{C}$ ) when the system is in operation – this will only operate in winter. The humidifier should only operate when the outdoor air has a low moisture content – this is predominantly when the outdoor air is cooler (tables of percentage frequencies of occurrence of outdoor conditions may be used to determine the actual periods).

For this simple example system a room dry bulb temperature sensor could provide the information to the controller to modulate both the afterheater and the cooling coil in sequence. However the cooling coil will also be controlled from the feedback from a room humidity sensor – if the room humidity rises the cooling coil will be actuated. This will override the requirement for dry bulb temperature control and so, if the resulting room temperature is too cool, the afterheater

will also be actuated to reheat the air. This is, alongside the humidification load, a potential profligate use of energy that, with appropriate system design, may be substantially reduced – this will be discussed in later articles.

A graphical interpretation of operating regimes (preferably combined with frequency based climate data) provides an accessible tool to assist the designer in examining and optimising the all-year system operation.

### Further reading

*Air Conditioning Engineering*, Jones WP, Butterworth 2001, Chapter 3  
*CIBSE Guide B2 2001/5*, Section 4.20

### References

1. *CIBSE Guide B – Heating, ventilating, air conditioning and refrigeration*. CIBSE, 2005.
2. *CIBSE Guide A – Environmental Design*. CIBSE, 2006.
3. *Air Conditioning Systems – Design, Commissioning and Maintenance*. Batsford, 1991. RC, Legg

### Symbols

- $\Delta$  = difference
- $\beta$  = contact factor
- $C_p$  = air specific heat capacity
- $g$  = moisture content  $\text{kg}\cdot\text{kg}^{-1}_{da}$
- $h$  = enthalpy  $\text{kJ}\cdot\text{kg}^{-1}$
- $h_{fg}$  = latent heat of evaporation (approx  $2450 \text{kJ}\cdot\text{kg}^{-1}$ )
- $\dot{m}$  = mass flowrate,  $\text{kg/s}$
- $\Phi$  = load watts
- $P$  = power watts
- $\theta$  = dry-bulb temperature deg C

# Module 14

March 2010

1. If a low level supply had been used for this example what would the supply mass flow rate have been?

- A 0.69 kg·s<sup>-1</sup>       D 0.99 kg·s<sup>-1</sup>  
 B 0.79 kg·s<sup>-1</sup>       E 1.09 kg·s<sup>-1</sup>  
 C 0.89 kg·s<sup>-1</sup>

2. Which of these is most true about the Room Ratio Line when drawn through the Room point?

- A It provides the supply temperature and associated moisture content  
 B The gradient is determined by the latent heat given off by the occupants in the room  
 C It allows the calculation of the air mass supply rate  
 D It shows whether humidification is needed  
 E It indicates a range of supply temperatures and associated moisture contents

3. In the example what would have been the moisture content at the coil ADP if the cooling coil contact factor was 1?

- A 8.0g·kg<sup>-1</sup><sub>da</sub>  
 B 8.5g·kg<sup>-1</sup><sub>da</sub>  
 C 7.4g·kg<sup>-1</sup><sub>da</sub>  
 D 1.0g·kg<sup>-1</sup><sub>da</sub>  
 E 11.4g·kg<sup>-1</sup><sub>da</sub>

4. Which of these is not a reason why the calculated plant load in the example is different from the room load?

- A The winter outdoor air is much colder than the design room condition and heating is required  
 B The COP of the cooling plant has not been included  
 C The outdoor air in the summer design has a higher moisture content than the room air and there is a room dehumidifying need  
 D To adequately dehumidify the summer air the air needs to be cooled down below the required supply temperature.  
 E In winter, outdoor air has a very low moisture content

5. Which of these plant operating regimes should never happen?

- A heating and humidification  
 B preheating and dehumidification  
 C cooling with dehumidification  
 D sensible heating only  
 E sensible cooling

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# Events & Training

## NATIONAL EVENTS/ CONFERENCES

- **09 Mar 2010 RICS: avoiding and resolving disputes in engineering and construction contracts conference** London  
*Practical advice to help prevent and avoid litigation.* [www.rics.org](http://www.rics.org)
- **09 Mar 2010 41st cooling prize competition** Dundee  
*Awards for young geotechnical engineers.* [James.Mitchell@ice.org.uk](mailto:James.Mitchell@ice.org.uk) [www.ice.org.uk](http://www.ice.org.uk)
- **11 Mar 2010 Lighting Design Awards 2010** London  
*Architectural lighting competition awards.* [www.lightingawards.com](http://www.lightingawards.com)
- **11 Mar 2010 Building operational management – FM fact or fiction?** Location tbc  
*Joint meeting with CIBSE FM group and IMechE GLR.* [timdwyer@lsbu.ac.uk](mailto:timdwyer@lsbu.ac.uk)
- **14-17 Mar 2010 CIE 2010 conference – lighting quality and energy efficiency** Austria  
*New solid state lighting and other developing supporting technologies.* [www.ile.org.uk](http://www.ile.org.uk)
- **16 Mar 2010 Trotter Paterson lecture: mesopic vision** London  
*Speaker: John Barbur.lpeck@cibse.org*
- **22 Mar 2010 District heating systems** London  
*An Energy Institute event.* [www.energyinst.org.uk](http://www.energyinst.org.uk)
- **25 Mar 2010 Zero carbon buildings – how low can you go?** London (see box, right)  
*Is zero carbon achievable?* [eventbookings@cibse.org](mailto:eventbookings@cibse.org)
- **14 April 2010 Engineering the UK's prosperity – ACE annual conference 2010** London  
*Business issues affecting the industry.* [www.acenet.co.uk](http://www.acenet.co.uk)
- **14 Apr 2010 Engineering Excellence Awards 2010 – gala dinner** London  
*ACE awards ceremony.* [www.acenet.co.uk](http://www.acenet.co.uk)
- **13-14 Apr 2010 FM in a changing world: the BIFM annual conference 2010** London  
*Exploring the political, economic, technological, environmental and social challenges facing FM.* [www.bifmconference2010.com](http://www.bifmconference2010.com)
- **20-22 Apr 2010 Sustainability Live!** Birmingham  
*Seminars and conference on creating a more sustainable future.*

## How low can zero carbon go?

The government has an ambition for all new non-domestic buildings to be zero carbon from 2019, with the public sector leading the way with schools by 2016 and other central government estate from 2018.

*Zero carbon non-domestic buildings – how low can you go?* is a one-day CIBSE conference being staged in London that aims to answer whether this zero-carbon aim is achievable, and what the term actually means. It will also muse over the cost of achieving it, and whether the industry actually has the skills to succeed.

Also, this conference sets out to address how the next 10 years' trajectory, working towards this goal, will unfold.

Speakers include: Phil Jones, chairman of CIBSE Energy Performance Group, who will chair the event and introduce the topics; Claire Brialey, of the sustainable buildings division at the Department of Communities and Local Government, who will give the keynote presentation; Ashley Bateson, a partner at Hoare Lea, who will question whether zero carbon is achievable and examine what zero carbon actually is; Chris Twinn, a director at Ove Arup and Partners, who will look at what the

The City Academy, in Hackney, will feature as a case study during the event.



industry needs to do both on and offsite to achieve zero carbon; and Dave Farebrother, environmental director at Land Securities, who will provide a commercial property company's perspective on the costs associated with zero carbon.

The conference is aimed at

building services engineers, designers, architects, property owners and occupiers, facilities managers, property developers and environmental organisations.

The event will be held at CIBSE headquarters in London on 25 March. [www.cibsetraining.co.uk](http://www.cibsetraining.co.uk)

[www.sustainabilitylive.com](http://www.sustainabilitylive.com)

- **21 Apr 2010 World cup charity golf day** Manchester  
*A charity event supporting the Everyman Male Cancer charity, and the CIBSE Benevolent Fund.*
- **27-28 April 2010 CIBSE national conference** London  
*A two-day conference discussing the top building services issues.* [www.cibse.org/nationalconference](http://www.cibse.org/nationalconference)
- **29 Apr 2010 FETA annual lunch** London  
*An informal gathering for members.* [hjames@datateam.co.uk](mailto:hjames@datateam.co.uk)
- **06 May 2010 ICOM Energy Association AGM & annual luncheon** London  
*Annual general meeting and luncheon with guest speaker.* [www.icomenergyassociation.org.uk](http://www.icomenergyassociation.org.uk)
- **12 May 2010 Green buildings or green wash?** London  
*The success and value of building*

labels. [timdwyer@lsbu.ac.uk](mailto:timdwyer@lsbu.ac.uk)

- **12-13 June 2010 Building services world cup and summer ball** Liverpool  
*A charity football event in aid of Everyman Male Cancer charity, and the CIBSE Benevolent Fund.* [www.cibse.org](http://www.cibse.org)
- **23-24 June 2010 'Energy in the City', a Solar Energy Society conference** London  
*A two-day conference celebrating the opening of the Centre for Efficient and Renewable Energy in Buildings (CEREB).* [info@uk-ises.org](mailto:info@uk-ises.org)

## SOCIETY OF LIGHT AND LIGHTING

Visit the SLL pages via [www.cibse.org](http://www.cibse.org)

- **17 Mar 2010 Ready steady light** Kent  
*Teams compete to design an exterior lighting scheme.* [aperry@cibse.org](mailto:aperry@cibse.org)

- **23 Mar 2010 SLL sessional meeting** Derbyshire  
*Three topical areas will be presented.* [mark.lowe@derbyshire.gov.uk](mailto:mark.lowe@derbyshire.gov.uk)
- **25 Mar 2010 SLL masterclass – lighting for the future** Oxford  
*Four speakers talk lighting.* [jrussell@cibse.org](mailto:jrussell@cibse.org)

## CIBSE REGIONS

For more visit [www.cibse.org/regions](http://www.cibse.org/regions)

- **08 Mar 2010 Energy metering and controls** Belfast  
*A Northern Ireland event.* [admin@cibseNI.org](mailto:admin@cibseNI.org)
- **08 Mar 2010 BREEAM** Cardiff  
*Review of the current requirements of BREEAM assessment.* [jno@neiloliver.plus.com](mailto:jno@neiloliver.plus.com)
- **09 Mar 2010 Sustainable refurbishment of buildings** Dublin  
*The issues surrounding refurbishing*

buildings sustainably.  
www.cibseireland.org

● **09 Mar 2010** Combining CHP and heat pumps Edinburgh  
The latest thinking in optimising systems.

rod.manson@burohappold.com

● **10 Mar 2010** Daylighting and compliance with guidelines Manchester

The development of better metrics.  
r.gordon@tace.co.uk

● **17 Mar 2010** Pressure control in tall buildings Manchester  
Regional SoPHE event with Arnd Buerschgens and Andrew Stokes Roberts (Honeywell).

Paul.Angus@WSPGroup.com

● **26 June 2010** The southern region low carbon yacht rally Portsmouth

A competition to round the Nab Tower using only renewable energy.  
d.pope@popeconsulting.co.uk

#### CIBSE/OTHER TRAINING

● **08 Mar 2010** Building integrated photovoltaics (PV) London

All things PV. www.r-e-a.net

● **09 Mar 2010** Energy Management London

How to reduce energy costs in buildings.

www1.isbu.ac.uk/cereb/courses

● **10 Mar 2010** CDM regulations for mechanical engineers London

IMechE CPD class. www.imeche.org

● **11 Mar 2010** I'm a control engineer: ask me what I do London

Focusing public interest on controls.  
events.imeche.org

● **16 Mar 2010** Combined heat and power London

An introduction to CHP.

www1.isbu.ac.uk/cereb/courses

● **18 Mar 2010** Developing an energy statement to meet planning requirements London

For developers and design teams.

www1.isbu.ac.uk/cereb/courses

#### CPD TRAINING

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

**MECHANICAL SERVICES**

● **17-19 March 2010** Mechanical services explained (three days) Birmingham

● **23 March 2010** Lifts: equipment features and engineering design London

● **24 March 2010** Lifts: moving people and traffic design and control London

● **13 April 2010** Air conditioning basics one: comfort, climate and heat gains London

● **14 April 2010** Air conditioning basics two: the air conditioning process London

● **21 April 2010** Introduction to building services London

● **27-29 April 2010** Mechanical services explained (three-day) Loughborough

#### FIRE SAFETY

● **9 Mar 2010** Fire doors, fire doors and more about fire doors London

#### PUBLIC HEALTH AND WATER

● **25 March 2010** Auditing for legionella control London

#### BUILDING REGULATIONS AND ENERGY EFFICIENCY

● **10 March 2010** Gas safety regulations explained and designing for compliance London

● **16 March 2010** Introduction to BS 7671: 2008 London

● **16 March 2010** The Carbon Reduction Commitment (CRC) London

● **18 March 2010** Building Regulations Part G (2009) explained Bristol

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

● **13 April 2010** A522 Smart metering London

● **14 April 2010** Energy surveys London

● **15 April 2010** Introduction to sustainability London

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

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

#### BUSINESS MANAGEMENT

● **10 March 2010** Practical project management London

● **11 March 2010** Report writing London

● **12 April 2010** Customer care: the key to profitability London

#### LIGHTING

● **15 March 2010** How to specify lighting: office lighting London

● **17 March 2010** Lighting basics three: interior lighting applications London



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ecobuild Stand 356  
2-4 March 2010

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building sustainability

## Integrated Solutions Sustainable Environments

hurleypalmerflatt is a leading international multi-disciplinary consultancy providing high quality solutions to global companies. Our experts are based in London, Dubai, Dublin, Glasgow, Hong Kong, Mumbai, New York and Sydney with projects across Europe and Asia Pacific.

### Technical Directors - M&E

### Associate Directors -M&E

#### Technical Directors M&E (London & Surrey)

We are looking to appoint highly experienced Mechanical and Electrical Technical Directors. To qualify for these roles you should have chartered engineer status and a proven track record with a similar consulting organisation. You should also have knowledge of current legislation, low energy design and mission critical engineering.

#### Associate Directors M&E (London & Surrey)

We are also looking to appoint experienced mechanical and electrical engineers at Associate Director Level. Ideally you should have a degree and chartered engineer status, together with a proven track record in the design of high quality, technical buildings. Knowledge of mission critical engineering would also be an advantage.

We offer an excellent package including a non-contributory pension scheme, private healthcare, interest free season ticket loans and a generous leave entitlement.

To apply send your CV and a covering letter with salary expectations, quoting ref CIBSE TECH to [recruitment@hurleypalmerflatt.com](mailto:recruitment@hurleypalmerflatt.com).

*Image courtesy of Willis*

# Opportunities in Australia

**Great Career and lifestyle opportunities for Senior Building Services Engineers at Arup in Australia.**

Due to our growing influence and position in the consulting market we are looking to reinforce our current leadership teams across our region. Potential exists in our offices in Sydney, Melbourne, Brisbane and Perth.

We are seeking to fill a range of positions at Senior Engineer, Associate, Senior Associate or Principal level. Candidates should be degree qualified, possess relevant experience working at the top end of the industry in the built environment, and should demonstrate aptitude in design, team and project leadership with excellent communication skills and a willingness to come and experience the Australian lifestyle and culture.

If you have the relevant experience and ready to experience a lifestyle change please forward your resume to [aust.recruit@arup.com.au](mailto:aust.recruit@arup.com.au) quoting reference: CIBSE01



ARUP

## Chief Engineer

Circa £55,000 (higher salary negotiable for exceptional candidates)

Brunel University is a confident and dynamic University which for more than 40 years has successfully delivered a mission to combine academic rigour with a practical, entrepreneurial and imaginative approach. With a turnover of more than £150m Brunel is home to a thriving community of more than 14,000 students and in excess of 2,500 staff from over 100 countries.

An exciting new post has been created within the Estates Department. Reporting to the Director of Estates, the Chief Engineer will lead and manage Building Services Engineering across a 240,000m<sup>2</sup> estate. The Chief Engineer will provide high level professional and technical oversight, strategic direction and operational advice ensuring the most cost efficient delivery of engineering services projects and maintenance across a large varied Estate.

The successful candidate will be a Chartered Building Services Engineer (CIBSE) with a relevant degree. You will have strong strategic planning, problem solving and negotiating skills, with substantial experience of managing Building Services on a multi-functional complex Estate along with the associated strong financial planning skills.

For a confidential discussion and/or to apply, please contact our advisor Michael Hewlett at The Management Recruitment Group on 020 8892 0115 or [michael.hewlett@mrgpeople.co.uk](mailto:michael.hewlett@mrgpeople.co.uk)

All direct and third party applications will be forwarded to MRG.

## Mechanical & Electrical Project Design Engineer

£35,765 – £46,006 plus excellent benefits

The University is also seeking to appoint a Mechanical & Electrical Design Engineer as part of a restructure of Estates. Candidates will possess demonstrable post-qualification experience gained in a Building Services design and project management environment.

Please apply initially by email to [ben.duffill@mrgpeople.co.uk](mailto:ben.duffill@mrgpeople.co.uk) including a covering letter and CV. All applications will be passed directly to the University.

The Management Recruitment Group, 3rd Floor, Regal House, 70 London Road, Twickenham, Middlesex TW1 3QS Tel. 020 8892 0115.

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In order to support our continuing growth and success we are currently looking for engineers at the following level:

**Senior Engineer**





If you wish to work within a challenging and rewarding environment, please email a CV and covering letter to [srecruitment@skellyandcouch.com](mailto:srecruitment@skellyandcouch.com)

Closing date: 30th March 2010

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**Building Services Vacancies**  
Not just any recruitment.

**Intermediate / Senior Mechanical Design Engineer (TAS)**  
**Ref 11078** **London from £40,000**  
Long established leading consultancy, offering a wide range of consulting and design services including Building Services, require a Senior Mechanical Project Engineer with expertise in DSM software particularly TAS, also skilled in Hevacomp, with HND/HNC or Degree in Mechanical Engineering or similar.

**Senior BMS Control Systems Engineer**  
**Ref 11088** **Kent £30,000-£40,000**  
Client requires senior Trend engineer, duties include BMS conceptual design documentation, testing and systems development. Cost estimation, development of control strategies, specifying hardware, providing instruction to sub-contractors, inspecting the installation. Fault finding, producing schematics and developing operator interface. 5 yrs exp in HVAC and BMS Design Projects. Trend expert, good BACnet knowledge, experienced in writing and commissioning BMS software.

**Business Development Consultant - Building Services**  
**Ref 11085** **Birmingham £Neg**  
Rapidly expanding company offering M and E engineering services during the planning and execution of installation projects seeks BDM with all round Building Services and Asset Management knowledge to develop the companies client base. Your role will be to secure new contracts and develop business with existing clients. Salary is entirely dependent on experience and sales record, very lucrative commission package on offer.

**Electrical Technical Director - Building Services**  
**Ref 11084** **Surrey £55,000**  
Client providing building services consulting focusing strongly on sustainable, practical solutions, reducing costs and carbon footprints requires an Electrical Technical Director to join the practice and take on the Electrical lead role within the Building Services Division. You will focus on senior client management, management of projects within the division and support of the team technically and in the role of line manager.

**Team Manager - Building Services**  
**Ref 11072** **Berkshire £Neg**  
Team Manager required to lead the Building Services team with strong engineering and construction industry knowledge. Main roles are project engineering, resource / commercial management and client relationships. Ideal candidate should have working knowledge of CDM, CEng status and be an accredited low carbon consultant with a genuine interest in sustainability and renewable technology.

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CIBSE JOBS

The official magazine of the Chartered Institution of Building Services Engineers

The home of building services vacancies in print and online






## KTP Research Associate

University of Oxford; School of Geography and the Environment  
Environmental Change Institute  
UK Climate Impacts Programme

A challenging and exciting opportunity has arisen for an enthusiastic recent graduate to work on a two-year project as a KTP Research Associate (Climate Data for Building Services Design), with the University of Oxford's UK Climate Impacts Programme (UKCIP) in conjunction with CIBSE.

The overall aim of the project is to develop design proposals and technical specifications for the refurbishment of building services and building fabric in existing non-domestic buildings in response to changing weather and climate in the UK.

The successful candidate will have minimum of a 2:1 degree (or equivalent) in building services design and engineering, or related disciplines with 2-3 years post graduate experience.

The role is based at CIBSE, in Balham, but be expected to travel regularly to UKCIP offices in Oxford.

For full job details, application instructions and remuneration package visit: [www.geog.ox.ac.uk/news/jobs/](http://www.geog.ox.ac.uk/news/jobs/)

To discuss the role please contact: Gerry Metcalf at UKCIP on 01865 285716, or Anastasia Mylona on 020 8772 3690.

Closing date: 29 March

CUNDALL

# Newchallenge.

Cundall is a multidisciplinary practice of Consulting Engineers, with a strong reputation built on providing excellent service and sustainable high quality design solutions. We are looking to strengthen our team further, and have the following opportunities for passionate Engineers:

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INVESTOR IN PEOPLE

## CIBSE Technical Manager



Ref: TECH/01/10

An exciting new opportunity has been created for an experienced Technical Manager. The CIBSE Technical Manager will be responsible for co-ordinating the various technical activities, and for managing the office based technical work of the department. They will provide a central point of contact between the department and other CIBSE staff. They will also co-ordinate technical and policy related liaison with SLL, SOPHE, SFE, Patrons, specialist interest groups and other internal stakeholder groups on technical matters, and manage communication with members of CIBSE Technical Forum. The job holder will be reporting directly to the Technical Director.

The successful candidate will have a minimum of a graduate degree in Engineering or Science with experience managing small teams and good communication skills.

To apply for this role:

Please send your CV, with cover letter, and your current remuneration package to [loluborode@cibse.org](mailto:loluborode@cibse.org) marked for the attention of Lammy Oluborode. For any queries or for further information call 020 8772 3682.



Specialists in Building Services Recruitment

We are now experiencing an increase in both contract and permanent positions from our clients. If you are looking for a new role or have been struggling to find a new position call us today!

**Electrical Associate | London | to £55K++ | ref: 0680**

Our client is a blue chip multi-disciplinary consultant. They are looking for an experienced Electrical Associate, ideally Chartered, who has a solid building services background and some rail project experience. Career opportunity!

**M&E Design Manager | East Midlands | to £70k | ref: 0072**

Our client is looking for an M&E Design Manager within their rail division. You will be Chartered and have a solid M&E background, with significant experience within a rail environment! Experience with NR and LUL standards is essential!

**Mechanical Associate | Midlands | to £55K++ | ref: 0541**

Our client, a national practice, is looking for an experienced Mechanical Associate to help build a new team at their established Midlands office. Experience of client liaison, building a team and bidding are desirable.

**Senior Electrical Design Engineer | East Midlands | to £65K | ref: 0073**

We are looking for Chartered Electrical Design Engineers with significant experience within rail. You will be familiar with LUL and NR standards and have a solid building services background! Excellent opportunities!

**Mechanical and Electrical Associate x2 | South Coast | to £50K++ | ref: 0086**

Our client, an international practice, is currently expanding its South coast office. We are actively recruiting a Mechanical and an Electrical Associate. You will ideally be Chartered, along with solid experience at senior level. Opportunity!!

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)  
E3 & E5 Heritage Business Park, Heritage Way, Gosport, Hampshire PO12 4BG

# Exciting times

Not since the industrial revolution transformed western life has there been such an exciting time to be an engineer. **James Warne**, of BDP, explains

BDP's James Warne may claim he 'fell' into engineering more than 20 years ago, but he now believes there's never been a more exciting time to be involved in the sector.

The engineering director was just 16 when he started working for Pipex, a chemical pipework subcontractor, where he experienced every trade and profession, both on-site and in the drawing office. He rapidly worked his way up the engineering ladder and within a year he'd filled every role within the company – from tea boy through to site manager, estimator and design engineer.

His career has taken him through Arup and Cundal's doors, but it is at architectural and engineering practice, BDP, where he finally settled in 2002.

Now, as BDP's engineering director, the 38-year-old's role is varied in the extreme, but he describes it as 'finding a balance between design and analytical engineering solutions' to help create places for people, combining the talents of a wide spectrum of specialisms, from environmental engineering to lighting and security.

'There is no typical or average day or week, variety being the spice of life,' says Warne. 'Last week involved visiting a school for the final defects to be cleared and to see how things are running; presenting an exciting opportunity for a highly sustainable civic building; as well as a bit of post-occupancy evaluation and feedback.'

Much of his time is spent communicating and meeting with people, which can see him spending most of his days in boardrooms, coffee houses, site offices, airports and across any number of cities. But it's worth it, according to Warne: 'Given the sustainability and climate change agendas, right now must be one of the most exciting times in the history of engineering – if only we



**“ It's one thing to see a bad idea – it's another to see good potential going to waste ”**

rise to the challenge. Not since the industrial revolution has there been a greater need for our profession to really challenge fundamental design principles and evolve to a whole new level across every aspect of engineering. It needs ingenuity to find some remarkable solutions, both locally and globally.

'As an engineer I feel well placed to take a part in finding these solutions: practical, pragmatic, real solutions.'

Warne has worked on a number of varied projects, from spy headquarters and airports, to television studios and research laboratories. Now he's even started a little lecturing and tutoring with the Centre of Alternative Technology in Wales.

And, while most people may balk at the thought of a deadline, Warne revels in the thrill of it, and in seeing finished projects used as they were designed. But he despises it when a good idea is badly executed: 'It's one thing to see a bad idea; it's another to see good potential going to waste.'

Email your latest people appointments and role profiles to [cbailey@cibsejournal.com](mailto:cbailey@cibsejournal.com)

## Movers & Shakers



**Peter Ball** has been announced as strategic research director of BRE's Building Technology

business. Ball joins previously worked at Costain and has experience in contactless, mobile and sensor technologies – knowledge he will use in his new role.



**Daniel Labbad** has been announced as the new chairman of the UK Green Building Council.

The chief executive of Europe Lend Lease has been on the advisory board since the launch of the organisation in 2007. He replaces former chairman Peter Rogers.



Multidisciplinary engineering consultancy Buro Happold has appointed **Dan Phillips** as its

new sustainability director. Phillips joins from design and innovation consultancy SEA, which he founded in 1998.



**Allan Cook** CBE has taken over as chairman of engineering design group Atkins. Cook

was previously chief executive of Cobham PLC. In his new role he will support chief executive Keith Clarke and the board as it steers Atkins into the next decade.



**Andrew Crosbee** has been announced as bid manager at Powerminster Gleeson Services.

In his new role he will work alongside the business development team to respond to tender requests, as well as putting together proposals from both private and public sector clients for Powerminster's building maintenance, facilities management services, and gas and electrical repair and maintenance services.



Energy Efficiency Partnership for Homes has appointed Professor

**David Strong** as

its new chairman. Strong is chief executive of sustainability consultancy Inbuilt and also chairs DIAG, the group that advises on the implementation of the EU Energy Performance of Buildings Directive in the UK. He will be working to build the partnership's profile at government, civil service and industry level.



**Carl Devlin** has become the first person appointed to multi-disciplinary consultancy

Capita Symonds' new programme delivery team. Devlin joins from Laing O'Rourke where he was director of work winning. At Capita he will be director of programme management within the new team, which aims to contribute 40 per cent to the organisation's bottom line by 2013.



**Martin Stone** has joined asset and facilities management specialist, the Kinetics Group, as

its pre-construction director. Stone's remit is to grow the construction division nationally. Stone has several years' experience as business development director with the Apollo Group.

**James Wates** has been appointed to the Construction Industry's Training Board (CITB-ConstructionSkills). Wates has been a CITB-ConstructionSkills board member for seven years and will take over the role at the end of March. CITB-ConstructionSkills helps industry in all aspects of recruiting, training and qualifying the construction workforce.

**David Fitzpatrick** has been recruited as sales and marketing director for Actionair, Air Diffusion and Naco, the three brands within Ruskin Air Management. He will co-ordinate a strategy to expand these in the UK and Europe.

Conference sponsors:



**Promotional opportunities available:**

Please contact **Shona Grace** on

**020 8772 3630** for further information

# CIBSE NATIONAL CONFERENCE 2010

27th – 28th April 2010 at The British Museum

## Resilience and Building Services: How to secure the future

### Topics include:

- Design resilience
- Energy resilience
- Technology resilience
- Business opportunities from forthcoming legislation
- Risk management

**CIBSE National Conference dinner & debate 27th April 2010**

Hosted by the Young Engineers Network

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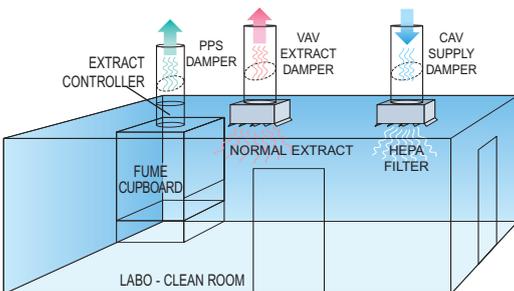


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### AIR MANAGEMENT SYSTEM

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



### PRECISION COMPONENTS FOR VENTILATION AND PROCESS CONTROL

# CMR CONTROLS

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

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### DPC CONTROLLER

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

### CAV AND VAV DAMPERS

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

Metal Damper



### PPS EXTRACT DAMPER

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

PPS Damper

