

# CIBSE

JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

April 2012



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# Lessons in honesty from ... a minister?

Government pronouncements are usually so full of self-serving puffery that they wouldn't normally make the quote of the month in this publication. But this time we're more than willing to make an exception with Andrew Stunell, the Communities Minister, whose responsibilities include the Building Regulations. He told the recent Ecobuild conference that 'British houses are still a joke because they leave the factory broken' (see News, page 6).

Stunell went on to admit that getting low-carbon homes to work in practice 'is a difficult job that needs to be tackled on several different levels, including making sure that when we say we've built something, we actually have, and that we come back and take a look at it again'.

The minister (excuse the pun) has hit the nail on the head. The housebuilding industry – which has been so successful in influencing

the coalition government's policies on the built environment – cannot sidestep its responsibilities to produce properties that are fit for the low-carbon purpose for which they were designed. But those involved in the process of design, specification and commissioning of low-carbon properties all need to be signed up to revisiting the buildings to check and rectify their performance – and to help occupants understand how to get the best out of living in a low-carbon property.

It was also refreshingly honest of the minister to admit that he could not say whether the target for all new homes to be 'zero carbon' by 2016

would actually be met. This would depend, he suggested, on whether the gap between design intentions and performance outcomes of new homes could be closed. The new 'quality assurance' regime envisaged for new homes will undoubtedly help to bridge this gap.

But it's no good ministers and civil servants – as they did at Ecobuild – looking to the Green Deal as a panacea for all these ills. The Deal could help with making the existing housing stock a little more energy efficient, but there is a growing number of experts predicting that it could well turn out to be a damp squib.

So the whole government needs to take a lesson in honesty from Mr Stunell and not let up on its drive to get the construction supply chain in tune with the zero carbon agenda, and with the immense challenges this still poses.

**Bob Cervi, Editor**

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## In Brief

### INDUSTRY LEADERS RIDE HIGH IN SUSTAINABILITY TOP 50

Several figures in the building services engineering sector are among the '50 most influential people in UK sustainability', says a new list compiled by architectural magazine *Building Design*. The top place goes to Paul Morrell, the government's Chief Construction Adviser. Paul King of the UK Green Building Council is at number three in the list; engineering consultancy founder Max Fordham is at nine; Professor Doug King, who has compiled the recent Masterclass series in the *Journal*, is at 11; Bill Bordass of the Usable Buildings Trust, is at 12; Patrick Bellow of Atelier Ten, a former CIBSE awards winner is at 19; consultant Adrian Leaman is at 24; Arup director Chris Twinn is at 27; and Andy Ford, CIBSE president and technical director of Mott MacDonald Fulcrum, is at 36. [www.bdonline.co.uk](http://www.bdonline.co.uk)

### COST REVIEW FOR RHI

A consultation on the costs of the Renewable Heat Incentive (RHI) is to be launched soon, the government has announced. Climate Change Minister Greg Barker said: 'We will ask industry for its views in the summer, and in the meantime will arrange for interim measures to be in place to manage the scheme's budget.' The Renewable Energy Association said such an interim plan would be 'unnecessary and unhelpful'. [www.decc.gov.uk](http://www.decc.gov.uk)

### PLANNING CHANGE DUE

The new National Planning Policy Framework (NPPF) was due to be published by the government as the *Journal* went to press. The NPPF will bring in changes aimed at favouring 'sustainable development', say ministers.

## Stunell lambasts quality of 'zero carbon' homes

● Andrew Stunell tells Ecobuild conference that new homes, unlike new cars, 'leave the factory broken'

Building Regulations minister Andrew Stunell has questioned whether all new homes can be zero carbon in 2016 without a much better quality assurance and energy performance.

During a question session at last month's Ecobuild conference in London, Stunell was asked whether the UK would meet the target for all new homes to be zero carbon by 2016.

Stunell replied that compliance with standards would be a key factor in whether the target would be met.

He said: 'We can set regulatory requirements for zero carbon homes [to meet the 2016 target] but if there is a gap in performance, we have to close that gap.'

Stunell was also outspoken over the quality of new homes. He said: 'Twenty years ago, British cars were a joke because they left the factory broken. Well, British houses are still a joke because they leave the factory broken.'

A new quality assurance regime has already been proposed as part of the government's consultation on changes to the Building Regulations next year.

Stunell said this assurance scheme would be aimed at 'avoiding overdesign [of new homes], that actual performance will match design expectations'.

Climate Change Minister Greg Barker revealed to the conference that a new ombudsman service would be set up for consumers who take advantage



Andrew Stunell: highlighting the building performance gap

of schemes under the government's flagship energy efficiency initiative, the Green Deal, due to launch in October.

He added that 10 regional events would be held later this year to provide advice to companies on the Green Deal.

Separately, a top government official told the conference that details on plans for the Green Deal are expected 'after Easter'.

Moirá Wallace, permanent secretary at the Department for Energy and Climate Change (DECC), said: 'We know how important these decisions and announcements are to those of you who are building the supply chain.'

**For more Ecobuild reports, including CIBSE sessions, see next month's *Journal***

## Ministers concede defeat in solar tariff fight

Energy ministers have finally thrown in the towel in their legal battle to enforce their timetable for cuts to feed-in tariffs.

They had asked the Supreme Court to hear an appeal against a High Court judgement that plans to cut the tariff for photovoltaic (PV) panels was unlawful.

But last month the Supreme Court refused to hear the case, which means that the tariff cut will now only apply to PV

installations completed up to 3 March this year.

Ministers had wanted the cut to apply to installations made up to 12 December last year, but the High Court ruled that this was unlawful because it would take place before the end of a consultation on the changes.

Following the Supreme Court's rejection of the case, Secretary of State for Energy and Climate Change Ed Davey said the ruling

'draws a line under the case'.

He said: 'We will now focus all our efforts on ensuring the future stability and cost effectiveness of solar and other microgeneration technologies for the many, not the few.'

Under the new regime for solar installations, those completed before 3 March will attract the higher 43p per kWh rate, with the new, lower 21p rate applying to installations made after this date.



# Over-bureaucratic CRC scheme could be scrapped, suggests Chancellor

● Budget also confirms loss of levy exemption for combined heat and power schemes

The Chancellor has pledged to simplify the Carbon Reduction Commitment Energy Efficiency Scheme (CRC) following criticism by leading companies affected by the scheme.

In his Budget statement last month, George Osborne also indicated that the CRC could be replaced by another scheme.

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

The scheme was originally designed to recycle revenues, gathered through the purchase of emission allowances, to reward those organisations most improving their performance.

But since the removal of this aspect of the scheme, which turned the CRC into a revenue generator for the Treasury, the Chancellor said the scheme could be replaced by an environmental tax instead.

The Budget statement said of the CRC: 'Should very significant administrative savings not be



Combined heat and power schemes are to lose their Climate Change Levy exemption. Pictured is an Olympic Park energy centre

deliverable, the government will bring forward proposals in autumn 2012 to replace CRC revenues with an alternative environmental tax.'

The Chancellor also confirmed plans for a boost to gas, which his statement recognised 'will continue to play a major role in UK energy supplies over the next decade and beyond'.

Osborne added: 'Renewable energy will play a crucial part in Britain's energy mix, but I will always be alert to the costs we are asking families and businesses to bear.'

The Budget also confirmed plans to remove combined heat and power plants' Climate Change Levy (CCL) exemption.

The statement says: 'As announced at Budget 2011, the CCL exemption for electricity from CHP plants supplied indirectly to business energy consumers will be removed from 1 April 2013.'

For more information visit:

[www.hm-treasury.gov.uk/budget2012.htm](http://www.hm-treasury.gov.uk/budget2012.htm)

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Innovation & Expertise

## In Brief

### CARBON CAPTURE FUNDING ON OFFER FOR FIRMS

The UK has launched a £20m competition for innovative carbon capture and storage (CCS) technologies. The funding will be available for feasibility studies and actual components and systems that can be used in CCS pilots, according to the Department for Energy and Climate Change. [www.decc.gov.uk](http://www.decc.gov.uk)

### NEW RIBA ECO-DESIGN GUIDE FOR ARCHITECTS

The Royal Institute of British Architects (RIBA) has launched a guide aimed at helping practices to integrate sustainability into their daily work. The guide also looks at strong business cases for, and the benefits of, sustainability for clients. RIBA president Angela Brady said the guide would 'encourage more in our profession to consider all aspects of a building's lifecycle when they are at the early design stages'. [www.architecture.com](http://www.architecture.com)

### DAVEY PLEDGES ACTION ON FUEL POVERTY

Energy Secretary Ed Davey has pledged a consultation this summer 'to improve the framework for tackling fuel poverty'. The statement follows a report from the London School of Economics, which argued that fuel poverty has become a serious issue for the UK. Those affected by fuel poverty could rise to as much as 6.6m, up from the 5.5m estimate in 2009, the report says. [www.lse.ac.uk](http://www.lse.ac.uk)

### HOARE LEA

Hoare Lea consulting engineers would like us to point out that they are part of the project team for the Birmingham New Street scheme (February *Journal*, page 24), and has been involved in developing the concept and strategic design for a range of services.

# Extra £3.5m funds provided for Green Deal skills training

## ● Training is to be administered by the skills council for the Green Deal Alliance

The government has set aside £3.5m in funding to help train 'hundreds of people' to support delivery of the Green Deal.

This follows a coalition pledge to establish 1,000 Green Deal apprenticeships as part of a strategy for creating 65,000 new jobs in the sector by 2015.

The Green Deal is the government's flagship energy efficiency scheme aimed at renovating millions of energy-inefficient homes and office buildings.

The scheme is due to start in October, but some in the engineering and energy professions have been calling for a delay as too many details are still not known about how it will operate.

## 'Trained, skilled professionals in assessing home energy efficiency and installing insulation are crucial'

The large energy firms said they would not be in a position to provide the finance packages for the Green Deal projects until 2013, and there is confusion about training for assessors and systems of accreditation of firms looking to carry out the work.

'Trained, skilled professionals in assessing home energy efficiency and installing insulation are crucial for getting the Green Deal off the ground,' said a Department for Energy and Climate Change (DECC) statement.

The new training will be administered by the sector skills councils on behalf of the Green Deal Alliance.

'Training shortfalls have been identified as one of the main barriers to the success of the scheme,' said CITB-ConstructionSkills chief executive Mark Farrar.

'We have invested funds to tackle training shortages and unlock commercial opportunities for SMEs and we welcome DECC's commitment to skills



Skilful installation of insulation will be crucial to the future success of the Green Deal, says government

and training by doing the same thing. We are now calling on employers and the supply chain to also invest in sustainable skills training for their workforce, so they too can capitalise on the Green Deal.'

DECC has also announced a £10m competition, to be launched in early May, to support the use of innovative technologies, including microgeneration, that can achieve significant energy savings in existing non-domestic buildings.

For more information visit:  
[www.decc.gov.uk](http://www.decc.gov.uk)

# Scotland could decarbonise by 2020

Scotland could have a totally decarbonised electricity supply by 2020, according to the Scottish government.

The use of renewables, combined with thermal generation and carbon capture and storage, makes this target achievable, according to Energy Minister Fergus Ewing.

He admitted there was widespread scepticism, but said

the government's Electricity Generation Policy Statement (EGPS) showed how current energy policies could create new jobs and deliver lower domestic energy bills.

The Scottish government has also announced a £6.9m investment in 43 community group projects in a bid to shrink carbon footprints and contribute to the country's ambitious

climate change goals.

Schools, youth organisations, and local community groups will receive support from the Climate Challenge Fund (CCF).

And in Wales, the renewable and low-carbon sector could produce 250,000 new jobs in the coming years, according to the Welsh Assembly. Currently 29,000 people work in the sector.



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## In Brief

### BINDING TARGETS ADOPTED

The European Parliament's Energy Committee has voted to put binding energy efficiency targets into the Energy Efficiency Directive, which is due to be adopted in July. This would require companies to make annual energy savings equivalent to 1.5% of their sales, and public bodies to retrofit 3% of public building floor space each year. This brings energy efficiency into line with the binding 20% renewables target by 2020, but the Directive faces opposition from some member states.

### INSULATION LEVELS LAGGING

The latest statistics released by the Department for Energy and Climate Change (DECC) show that, while more homes are being insulated, not enough solid wall insulation is being carried out. Around 55,000 properties install cavity wall insulation every month and more than 100,000 install adequate levels of loft insulation, but only around 2,000 adopt solid wall measures. Nearly 9m homes still need loft insulation, while more than 11m require cavity wall insulation. However, DECC said the 7.7m homes with solid walls are more difficult and expensive to treat.

### BUSINESS BACKS LOW CARBON ECONOMY

The chief executives of major UK businesses have written to Chancellor George Osborne urging him to commit to a low-carbon economy. They said that it was both a necessity and an economic opportunity. Bosses from many of the country's largest firms, including EDF Energy, Lloyds, Kingfisher, Unilever, Shell and Tesco, said they supported the Climate Change Act and the EU Emissions Trading System. The business chiefs said they were committed to 'effective action on climate change' but also wanted the government to commit funding for a carbon capture and storage demonstration project, and to give the Green Investment Bank (GIB) borrowing powers.



Major improvements to Britain's existing housing stock is key to cutting global greenhouse gases, says a new report

# EU urged to speed up energy cuts

## ● Too many barriers to low-energy buildings remain, says Build with CaRe

Local authorities and academics have called for the timetable for cutting energy demand across Europe to be speeded up.

Researchers from the Build with CaRe consortium have proposed a new EU target of a 40% reduction in primary energy demand by 2050, with particular emphasis on buildings.

The existing target is a 20% improvement in energy efficiency by 2020, but the EU is currently on track to achieve just half of this.

The report by Bruce Tofield and Martin Ingham, associate consultants at the University of East Anglia's Adapt Low Carbon Group, concluded that radically improving the energy efficiency of new and existing buildings is key to reducing global greenhouse gas emissions.

The new Energy and Climate Change Secretary Ed Davey has also called for a cut in UK energy use of between a third and a half by 2050.

'Buildings are responsible for 40% of Europe's energy-related greenhouse gas emissions, so overhauling their energy efficiency represents the greatest opportunity for energy saving and greenhouse gas reduction,' said Tofield.

'By making its building stock energy efficient, the EU can demonstrate that economic growth is consistent with reduced energy demand and lead the transition to a sustainable world. A long-term target of 40% would galvanise the near-term action on energy efficiency that is essential if action to tackle potentially dangerous climate change is to succeed.'

The researchers said the many remaining barriers to low-energy buildings include: lack of political will to incentivise energy efficiency; insufficient ambition for new build; and the slow rate of building refurbishment.

The Build with CaRe consortium of local authorities and universities from five countries aims to make energy-efficient building design the mainstream. A key strategy is the promotion of the Passivhaus concept, which it says can reduce energy use for heating and cooling buildings by 90%.

# Europe backs renewables

The European Parliament has voted in favour of setting a binding renewable energy target for 2030 despite opposition from the UK, which had called for a 'technology neutral' approach. The target may be as high as 45% of total energy demand.

Currently, the EU is committed to generating 20% of energy from renewable sources by 2020 with the UK tasked with reaching 15%

by that date under the terms of the European Renewable Energy Directive (RED).

The Renewable Energy Association (REA) welcomed the parliament's decision and urged the UK government to recognise the role renewables could play in delivering energy security. 'Arguing for a technology-neutral target suggests that government is only thinking about carbon,' said REA

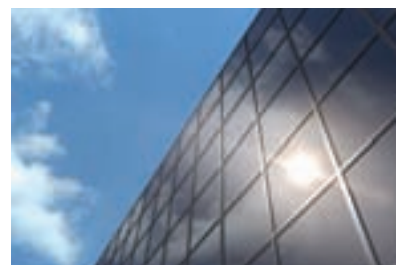
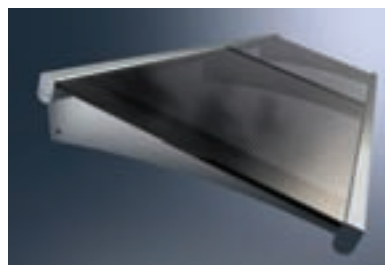
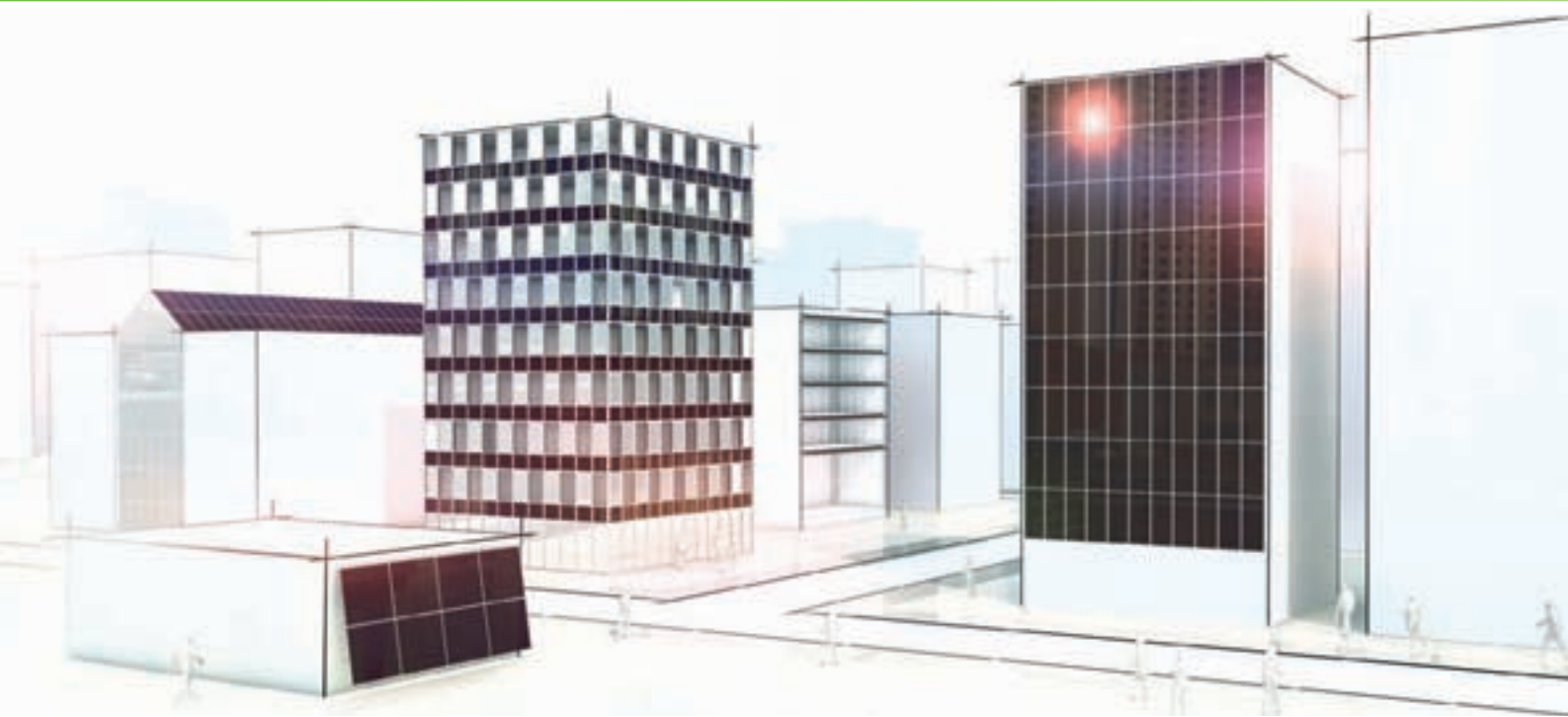
chief executive Gaynor Hartnell.

'This blinkered approach ignores the risks of locking the UK into a future where we forever import our energy.'

However, UK Energy Secretary Ed Davey said that the UK supports technology neutrality because it would allow member states to determine 'the most cost-effective mix for their constituents'.



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# SCHÜCO

## In Brief

### GUIDANCE ON MAKING BOILERS MORE EFFICIENT

Simple, low-cost actions could save UK businesses £400m a year in hot water running costs, according to the Carbon Trust. Heating and hot water accounts for more than one third of UK organisations' energy consumption, but better maintenance and low cost improvements, including controls, would reduce costs by 30% the Trust's 'Expert in Energy' guidance explains.

[www.carbontrust.co.uk](http://www.carbontrust.co.uk)

### LOW CARBON FUND OFFERS BILLIONS FOR CLEANTECH

GE and the Carbon Trust have launched a \$5bn incubation fund for new low carbon technologies across Europe. This follows the news that Europe has seen its share of investment in clean energy fall by 40% since 2007.

### CORE PRINCIPLES FOR 'SOFT LANDINGS' NOW AVAILABLE

Twelve Core Principles that define a Soft Landings project have been published by BSRIA. These were developed in conjunction with the Soft Landings User Group. They have been written for construction clients and their professional teams to inform project processes, BSRIA said.

[www.bsria.co.uk](http://www.bsria.co.uk)

### US 'COULD SAVE \$1 TRILLION IN ENERGY SAVINGS BY 2020'

Retrofitting US buildings could produce \$1trillion in energy savings by 2020, according to a report by Deutsche Bank Climate Change Advisors (DBCCA) and The Rockefeller Foundation. A national retrofit programme would cost around \$279 billion, but it would cut US carbon emissions by almost 10% and energy spending by 30%, while creating 'much needed' work in the construction sector.

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

# Climate change 'will cost firms £355m'

## ● RICS points to much higher energy charges for firms in the next 20 years

UK companies have been warned to brace themselves for dramatic rises in electricity charges to deal with the effects of climate change.

A report produced by the Royal Institution of Chartered Surveyors (RICS) suggests that annual energy charges for business operating warehouses will be £355m higher by 2030. The retail sector and offices will also be hit hard with additional costs estimated at £250m per annum as summers become hotter and winter weather more extreme.

RICS said that buildings relying on air conditioning for cooling would be 'more vulnerable to price

increases' and urged firms to invest in 'cost effective' cooling upgrades. Heating costs will come down as global temperatures rise, but these will be offset by the rise in electricity use for cooling.

The survey of more than 60,000 commercial properties, undertaken by Sturgis Carbon Profiling, was based on data gathered for their Display Energy Certificates (DECs).

This also revealed that the average commercial property is not set up to cope with summer temperatures predicted to be up to two degrees higher by 2030. By 2030 a commercial property of around 2,500 sq m in London can expect to pay more than £5,000 per year in electricity alone, the RICS said. London's commercial properties will incur the largest increase in electricity demand, with the

subsequent cost expected to rise to an additional £3.20 per sq m, compared with £2.87 in Newcastle. However, after 2030 the operating costs of buildings are expected to start falling again as the effect of energy efficiency improvements takes effect.

This will not apply to all existing commercial buildings, the report pointed out, and many will become obsolete because the refurbishment cost for those least adaptable to climate change will be prohibitive. This should be taken into account when valuing buildings now, said Martin Russell-Croucher, RICS director of sustainability.



Energy charges are set to rise

Shutterstock / Janel

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

## Davey denies dropping of renewables target

Energy Secretary Ed Davey has denied suggestions that the government wants to scrap its renewable targets and give greater prominence to nuclear power.

Under EU legislation, the UK is committed to sourcing 20% of its energy demand from renewable sources by 2020. However, *The Guardian* newspaper published

an article suggesting that secret moves were afoot to drop that ambition in favour of a new 2030 target, which also includes nuclear and other sources of low carbon energy.

Davey described the newspaper's article as 'misleading' and said the government was '100% committed to the 2020 EU

renewable energy target'.

He said that the renewable energy roadmap was in place and was focused on driving 'delivery up and costs down'.

He also denied that the government was seeking to have nuclear power reclassified as a renewable.

'Nuclear is not a renewable – fact,' he said.





## Welcome to the era of the SEER

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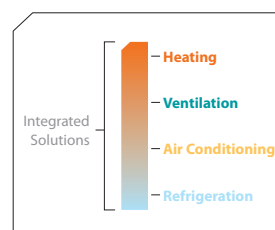
It's not often you can see into the future. Now you can. From 2013, all low efficiency products will be banned and air conditioning products under 12kW must display the new Seasonal Energy Efficiency Ratings (SEER).

SEER energy labelling gives a more accurate view of real-life performance, taking into account the local climate zone and temperature differences through the year. It also reflects partial load efficiency and energy consumption in auxiliary modes.

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## Last call for Part L input

A consultation looking at whether consequential improvements should be introduced when a home is extended, a loft or garage converted, or windows or boilers replaced, closed on 27 March. The CIBSE response is on the Consultations section of the website, at [www.cibse.org](http://www.cibse.org)

However, the consultation on the other proposed changes to the Building Regulations are still open, with a deadline of 23 April for CIBSE to respond.

There are proposals to require new, non-domestic buildings to be designed to a 20% more stringent carbon emissions target, with an 8% tightening for new homes. There are also proposals relating to self certification of building works, and for the creation of 'appointed persons' to oversee works covered by the Building Regulations. The consultation documents can be found at [www.cibse.org/partl](http://www.cibse.org/partl)

Contributions from members to the CIBSE response are welcome, and should be sent to [technical@cibse.org](mailto:technical@cibse.org)

A half-day workshop to explain the proposed changes will also be held in Birmingham on 11 April. Further details, including a full agenda for the workshop, can be found at [www.cibse.org](http://www.cibse.org)

We look forward to hearing from you about the proposals, or seeing you at the workshop.

## AGM planned for 10 May

The 2012 CIBSE annual general meeting will be held on 10 May 2012 at Imperial College London in the Skempton Building. It will be followed by incoming president David Fisk's presidential address. The calling notice, which contains further details, will be circulated shortly.

# New Institute for LEV engineers created

## ● New voice for local exhaust ventilation

A fourth specialist division representing exhaust ventilation engineers has been created within CIBSE.

The Institute of Local Exhaust Ventilation Engineers (ILEVE) has more than 120 registered members, but it hopes to increase this to 250. It was formed to significantly reduce deaths and ill health caused by poor air quality in the workplace.

On 24 January ILEVE held an information day, attended by more than 100 delegates, to review progress in its development, state its objectives, explain the benefits of membership and provide a forum for members and other interested parties to discuss future proposals for the Institute.

The day began with Bud Hudspith, health and safety adviser for the Unite Union, explaining how important the work of ILEVE will be in creating healthy working conditions. Organisations such as Unite and the Health and Safety Executive (HSE) have worked hard to explain and promote the need for local exhaust ventilation (LEV), but there

are still instances to be found where people work in unsatisfactory conditions.

Wally Gilder, chairman of the ILEVE steering committee, summarised the beginnings of ILEVE and how it became a division within CIBSE. He explained how it evolved from an initial idea voiced at a presentation to the industry – gaining strong support from the HSE, which recognised that serious problems existed – to becoming a representative voice with firm plans to develop a professionally-led institute.

Dean Greer, chairman of the membership and grading subcommittee, explained how the grading structure already used by CIBSE is to be adopted. All registrants have initially been made affiliate members. A detailed application form to identify qualifications and experience has been produced to allow a 'grandfather' route to other grades, while each application will be individually assessed by the steering committee and given the appropriate grade. This route will only be open for a limited period (to December 2012).

In parallel with this, there will be a route via training and an examination for members to

## Project calls for member input

The Urban Climate Project – part of an engineering doctorate sponsored by CIBSE at University College London (UCL) – is calling for input and contributions from members.

The project, which is being spearheaded by the UCL's Virtual Environments, Imaging and Visualisations Centre, will produce design guidance and knowledge resources for CIBSE members on the effect of building design in urban areas; increasing urbanisation and projected climate change will exacerbate climatic effects on buildings.

Previous guides by the Institution have provided a useful treatment of urban heat island effects, but this needs to be updated and expanded to include a wider

range of microclimatic effects. The research will analyse how land-use changes in urban environments can have an impact on the surrounding climate, and show the effect that microclimates can have on the performance of buildings.

The resulting guidance could include how changing a building's physical characteristics could impact the local climate, as well as the effect of microclimates on performance criteria, such as energy use, sizing and thermal comfort, leading to design strategies that create more comfortable, passive and sustainable design.

The above research will feed into the revision of *CIBSE Guide A*, as well as other current and future resources published by the Institution. The effectiveness of

the guidance will depend on its applicability to industry practices. The following questions need to be answered in order to achieve this:

- Are urban environmental effects currently considered in a planning or design process? If so, how are they treated? What are the current industry drivers?
- How useful is current CIBSE guidance on urban environmental effects? How could it be improved? and
- What would CIBSE members need in terms of practical tools and guidance on the treatment of urban environments when designing buildings?

To find out more about this research project and to get involved, please contact Dane Virk on [dvirk@cibse.org](mailto:dvirk@cibse.org)

advance through the membership grades.

In terms of training, Tony Gardner, from the training and technical sub-committee, explained that many ILEVE programmes will be based on existing, recognised courses that are accepted within industry. It is hoped a comprehensive package of training courses will be available for members and non-members by mid 2012.

James Wheeler, HSE liaison officer for LEV, reminded the audience of the issues relating to LEV, which had first been raised as part of the HSE's roadshows staged around the UK. The roadshows had a significant and effective impact, raising awareness about LEV among manufacturers.

Wheeler also introduced the Lord Mayor of Sheffield, Councillor Dr Sylvia Dunkley, who made a special presentation to Phil Hydes after his story of ill health was featured in a HSE video on the consequences of ineffective LEV; he was left severely incapacitated after suffering from a lack of proper ventilation during his time as an industrial welder.

Jane Bastow, ILEVE steering committee member, then explained the changes to *HSG 258 Controlling airborne contaminants at work: A guide to local exhaust ventilation*. This is a concise document supplemented by a simple guide, *INDG408 Clearing the air: A simple guide to buying and using local exhaust ventilation (LEV)*, and *INDG409 Time to clear the air! A workers' pocket guide to local exhaust ventilation (LEV)*. These can all be obtained from the HSE website, at [www.hse.gov.uk/lev](http://www.hse.gov.uk/lev)

Gary Sprawling continued with the theme of important industry guides by introducing the new HVCA guide, the *TR/19 HVCA guide to good practice: Internal cleanliness of ventilation systems*.



The Lord Mayor of Sheffield, Councillor Dr Sylvia Dunkley, with Phil Hydes and Wally Gilder



The information day saw more than 100 delegates attend



Delegates assemble for ILEVE's first information day

## Climate change to be hot topic at symposium

CIBSE's second annual Technical Symposium, being held in conjunction with ASHRAE, takes place at Imperial College, London, on 18 and 19 April.

A broad range of papers and posters will be presented, covering subjects of interest to both practitioners and researchers.

One of the topics to be covered is understanding climate data in the latest UK climate projections (UKCP09).

The results of a Knowledge Transfer Partnership (KTP) project between CIBSE and the climate change body UKCIP, which is based at the Environmental Change Institute, University of Oxford, will be on display in a symposium poster and in an accompanying paper. They include easy-to-understand graphical representations of climate change and a methodology for the selection of future weather files.

It is hoped that these outputs from the KTP will help design professionals to make the UK's buildings more resilient to a changing climate.

Further information on the symposium can be found at [www.cibse.org/symposium2012](http://www.cibse.org/symposium2012). The registration fee includes lunches, refreshments and digital papers, as well as an informal reception at the Natural History Museum. Attendees must book in advance.

## ANZ celebrates silver anniversary

The Australia and New Zealand (ANZ) region of CIBSE is holding a gala evening in Sydney on Friday 8 June at the Park Royal Hotel, Darling Harbour, to celebrate the 25th anniversary of its inauguration.

This provides the ANZ region with the opportunity to stop, review and reflect on just what has happened over this period. Any CIBSE members who would like to join in the celebrations are assured of a warm welcome.

To attend, or to send messages of support, email [secretary@cibse.org.au](mailto:secretary@cibse.org.au). More details will be available soon at [www.cibse.org.au](http://www.cibse.org.au)

## Deadline for women's awards draws near

Nominations are now open for the First Women Awards, which celebrates pioneering women and their achievements in the business world. Now in its eighth year, the awards will feature a 'Built Environment' category for the first time, reflecting the groundbreaking work performed by women in the sector.

Nominations are open to

women in all areas of construction and the built environment, including architects, contractors, lawyers, consultants, engineers, quantity surveyors, project managers and others working both directly in the industry and providing services to the industry.

CIBSE president Andy Ford said: 'This is a great opportunity to recognise the accomplishments

of our female members and the steps that the sector is taking to become more diverse and inclusive.'

The deadline for entries is Friday 13 April. The awards ceremony will be held on 28 June at the Connaught Rooms in London and hosted by sports personality and presenter Clare Balding.

[www.fwa.realbusiness.co.uk](http://www.fwa.realbusiness.co.uk)

## BIM CONFERENCE TO BE STAGED

CIBSE's upcoming Building Information Modelling (BIM) Conference on 15 May in London will explore the opportunities and the risks for the unprepared.

BIM requires innovative thinking, new working relationships and a creative approach to implementation. BIM is rapidly changing all stages of building services design, construction and operation, from conceptual building optimisation to driving integrated project delivery, leading the occupier to a new era of sustainable whole-life operation.

This upcoming event will cover:

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

For more visit [www.cibsetraining.co.uk/conferences](http://www.cibsetraining.co.uk/conferences) or call the events team on 020 8772 3672.



## RIGHT SOLUTION

District heating systems can and are delivering low carbon solutions and should not be dismissed by engineers, argues **Paul Woods** in response to an article in the *Journal*

James Thonger makes a number of valid points in his article on combined heat and power (CHP)/district heating (DH) (*CIBSE Journal*, March, page 55) – such as the importance of including all DH energy uses in any calculation. However, in relation to electricity emission factors, there appears to be confusion between the *relative* savings of new gas-fired power stations and gas-fired CHP with the *actual* CO<sub>2</sub> savings that CHP will deliver.

It is important to understand whether gas-fired CHP is more energy efficient than separate heat and power from gas-fired boilers and gas-fired power stations, so that we can establish the best use of a scarce fossil fuel and reduce CO<sub>2</sub> savings. The paper I presented to the CIBSE Technical Symposium last year (December 2011 *Journal*, page 28) clearly shows that there is still a saving in CO<sub>2</sub> compared with gas-fired boilers when the electricity emission factor is

around 400g/kWh – the best that is likely to be achieved from gas-fired combined cycle gas turbine (CCGT) power stations. But when a gas-fired CHP system is installed it will, in practice, deliver greater savings as it will be displacing a mix of power stations, including some coal-fired plant.

If James Thonger's analysis was correct, then new gas-fired CCGT power stations would not save CO<sub>2</sub>, which is clearly false given that the main reason we met our Kyoto obligations was the construction of CCGT power stations in the 1990s. Gas-fired CHP benefits from displacing older coal and gas power stations, as does new CCGT plant.

His article also discussed the long-term position of gas-fired CHP in a decarbonised grid and suggested that DH networks would become redundant. There will certainly come a point when the use of gas-fired CHP without carbon capture and storage (CCS) should be curtailed at times when

there is surplus wind energy on the system. Initially this will occur at times of low demand and high wind speeds. During these periods the DH network should be supplied either from a thermal store using surplus heat from gas-fired CHP operating at other times, or from an alternative low carbon source. There are many options here for DH – larger networks, for example, could use heat extracted from steam turbines in gas or coal power stations fitted with CCS.

Large-scale heat pumps could also be used. Thonger asks what the benefits might be when compared with using air-source heat pumps (ASHPs) in dwellings. There are several advantages: lower capital costs for the heat pump; the potential for using low-grade heat sources not available to dwellings (the sea, rivers, waste effluent and industrial waste heat); combining heat production with the provision of district cooling; the lower price of electricity supplied in bulk at HV; the ability to use

larger-scale, more efficient heat stores to operate at night using off-peak power; and the potential to operate alongside CHP to deliver a smarter grid. Above all, the use of DH will avoid the need to reinforce the local electricity grid to supply the peak power needed for ASHPs. These advantages will need to be sufficient to outweigh the additional heat losses and pumping energy required for DH networks and the likely use of higher supply temperatures from the heat pump.

For the next 15 years or so DH networks can be developed using gas-fired CHP systems or local waste to energy or biomass power stations, but in the longer term we will need to adapt to make optimal use of other low carbon heat sources, including heat pumps and, preferably, heat from major power stations fitted with CCS. The locations of new power stations should be planned so that low carbon heat can be readily supplied to DH networks in the future.

## MANUFACTURER'S VIEWPOINT

We should not underestimate the value of social media for our sector, writes **Martin Fahey** of Mitsubishi Electric

Anyone witnessing last year's 'Arab Spring' cannot have failed to notice the significance of social media in helping empower individuals and convey a mood swing in popular opinion. Now I am not suggesting we adopt a similar approach to politics here in the UK, nor making any comment on the democratic process, however, the phenomenal influence of Twitter and other social media channels does

highlight how important they can be in engaging anyone and everyone in a debate.

As a central part of the built environment, anyone involved in building services – whether designing, manufacturing, specifying, installing, operating, using or maintaining – can play an important individual role in helping reduce energy consumption.

We realised this more than five years ago when we embarked on our

Green Gateway process, and this has already led to some important carbon reduction milestones for both ourselves and some of the partners and companies we work with.

Green Gateway is designed to highlight the discussions we need to be having so that we as an industry can address the triple challenges of fuel poverty, fuel security and emissions targets.

Now we are inviting everyone and anyone to join in the debate on both Twitter and LinkedIn so that we can all promote sustainable thinking. We see this as a straightforward way to generate a lively ongoing debate that involves as many people as possible.

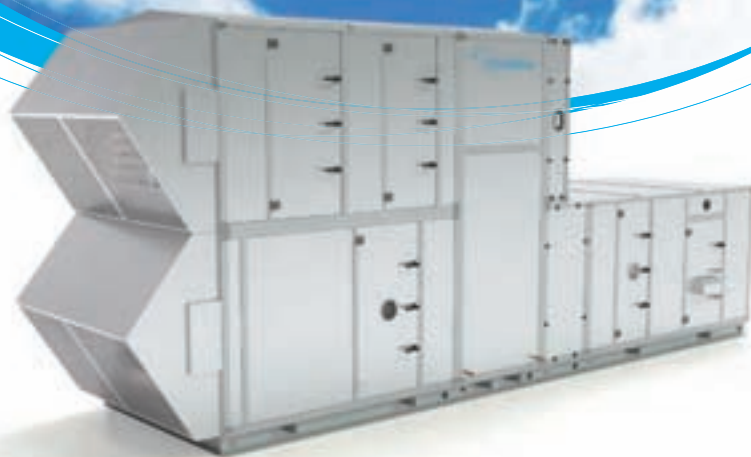
Visitors to the Green Gateway LinkedIn group will be able to view

the latest thoughts of group members from across the UK building industry and contribute to the on-going discussion. The new Twitter account (@green\_gateway) will offer followers a chance to receive up-to-the-minute news and views from those within and outside the industry, including key opinion leaders.

We know that no one person or company has all the answers but, as an industry, we do have the technology and the expertise to really make a difference if we can find ways of getting our heads together.

Further details on Green Gateway and the company's approach to renewable energy can be found by visiting [www.greengateway.mitsubishielectric.co.uk](http://www.greengateway.mitsubishielectric.co.uk)

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# RHETORIC OR REALITY?



Energy is a big issue for industry, consumers and government. **Hywel Davies** looks at what is happening to turn policy rhetoric into practical action



At work or home we take heat and light for granted. But with energy demand and dependence on energy imports growing, an affordable, secure energy supply is a major concern to both the EU and national governments. 'Energy 2020' is the EU strategy for 'competitive, sustainable and secure energy'. It highlights the need to act on energy efficiency, infrastructure, choice and security for consumers, energy technology and the internal energy market.<sup>1</sup> It draws attention to the mismatch between words and actions, saying: 'Despite the importance of energy policy aims, there are serious gaps in delivery.' In other words, there is lots of talk about energy policy, but a lack of practical day-to-day implementation.

Late last year the European Commission adopted the 'Energy Roadmap 2050'<sup>2</sup>, setting out how to

reduce greenhouse gas emissions by 80-95% of 1990 levels by 2050. It 'explores the challenges posed by delivering the EU's decarbonisation objective while at the same time ensuring security of energy supply and competitiveness', and is stated to be the basis for developing 'a long-term European framework together with all stakeholders'.

Meanwhile our own government is negotiating with the European Commission and Parliament on the proposed Energy Efficiency Directive<sup>3</sup>; it is actively pursuing a review of the UK energy market<sup>4</sup> and has recently launched the 'Energy Efficiency Deployment Office'. Speaking at its launch on his second day as Energy Secretary, Ed Davey said<sup>5</sup>: 'I could hardly pick a better place to get started ... I'm hugely enthusiastic about energy efficiency. It's the cheapest way of cutting carbon: and cutting

The UK government is negotiating with the European Parliament on the proposed Energy Efficiency Directive

bills for consumers. It has to be right at the heart of what we do.

'...to help us deliver our existing policies, and find new ways to save energy, right across the economy. We need this expertise now more than ever. Not only do we face a growing gap between energy supply and demand. By 2050, we'll need to cut our energy use by between a third and a half. And we're about to begin the biggest energy efficiency drive this country has ever seen.'

That seems a clear commitment to making energy efficiency happen.

The Department for Energy and Climate Change (DECC) is hard at work preparing the Green Deal for introduction in October 2012. The Department for Communities and Local Government (DCLG) is now consulting on changes to Building Regulations, and by July must tell the European Commission how it will implement the recast Energy Performance of Buildings Directive (EPBD).

But this is where we begin to see the gap between the policy talk and reality. The recast Directive was adopted on 19 May 2010, published on 18 June 2010 and came into force on 8 July 2010. As of 1 February 2012 it replaced the original EPBD in EU law [see box]. Article 28 sets the timetable for implementation, although a much more readable table describing what must be done, by whom, and when appears in the Scottish Government's October 2011 consultation on the recast. It highlights two key dates.

By 30 June 2011, EU member states had to draw up 'a list of existing and, if appropriate, proposed measures ... (other than those required by this Directive) which promote the objectives of this Directive [and] shall communicate these lists to the Commission, which they may

do by including them in the Energy Efficiency Action Plans referred to in Article 14(2) of Directive 2006/32/EC.'

Surprisingly the updated UK National Energy Efficiency Action Plan issued in July 2011<sup>6</sup> made no reference to Article 10 of the recast EPBD, and no amount of searching can yet find the UK's list. Meanwhile, for Scotland, reference can be made to 'Conserve and Save: Energy Efficiency Action Plan (EEAP)'<sup>7</sup>, published in October 2010, which identifies Scottish Government policies and options on energy efficiency.

Secondly, by 9 July 2012, member states must adopt and publish the 'laws, regulations and administrative provisions necessary to comply with Articles 2 to 18, and with Articles 20 and 27. According to Article 21, they shall 'consult the stakeholders involved, including local and regional authorities'. Whilst Scotland consulted last October, DCLG has yet to do so, although on 3 February last year<sup>8</sup> Andrew Stunell assured Green Party MP Caroline Lucas: 'We will consult on its implementation in due course'. With the July deadline looming, there cannot be much time left for DCLG to satisfy Article 21 or do as the minister promised, or for the reality of EPBD implementation to catch up with the rhetoric.

Finally, Article 27 of the recast requires that 'penalties provided for [infringements against national provisions] must be effective, proportionate and dissuasive. Member states shall communicate



There cannot be much time left for DCLG to satisfy Article 21 or do as the minister promised, or for the reality of EPBD implementation to catch up with the rhetoric

those provisions to the Commission by 9 January 2013 at the latest.' We are well aware of the 'one in, one out' policy of this administration. But it does not give them an out when it comes to implementing EU Directives, especially not when it is a Directive that addresses a priority of coalition policy, as well as an EU Directive, at the start of 'the biggest energy efficiency drive this country has ever seen.'

#### References

1. The Communication *Energy 2020 – A strategy for competitive, sustainable and secure energy* calls for action on emerging challenges. Available from [http://ec.europa.eu/energy/energy2020/index\\_en.htm](http://ec.europa.eu/energy/energy2020/index_en.htm)
2. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions *Energy Roadmap 2050*. Available from [http://ec.europa.eu/energy/energy2020/roadmap/index\\_en.htm](http://ec.europa.eu/energy/energy2020/roadmap/index_en.htm)
3. The proposed Energy Efficiency Directive advocates measures to increase Member States' efforts to use energy more efficiently from generation to distribution, including a

legal obligation to establish energy saving schemes in all Member States, requirements for the public sector to lead by example and major energy savings for consumers. For more information go to: [http://ec.europa.eu/energy/efficiency/eed/eed\\_en.htm](http://ec.europa.eu/energy/efficiency/eed/eed_en.htm)

4. *Planning our electric future: a White Paper for secure, affordable and low-carbon electricity*. For more information and the latest documents, see: [www.decc.gov.uk/en/content/cms/consultations/emr/emr.aspx](http://www.decc.gov.uk/en/content/cms/consultations/emr/emr.aspx)
5. Full speech by Energy and Climate Secretary Edward Davey on the launch of the Energy Efficiency Deployment Office is available at [www.decc.gov.uk/en/content/cms/news/eedolaunch/eedolaunch.aspx](http://www.decc.gov.uk/en/content/cms/news/eedolaunch/eedolaunch.aspx)
6. UK Report on Articles 4 and 14 of the EU End-use Efficiency and Energy Services Directive (ESD) Update on progress against the 2007 UK National Energy Efficiency Action Plan, July 2011, available from [www.decc.gov.uk/assets/decc/.../2289-uk-report-eu-enduse-esd.pdf](http://www.decc.gov.uk/assets/decc/.../2289-uk-report-eu-enduse-esd.pdf)
7. *Conserve and Save: Energy Efficiency Action Plan (EEAP)*, October 2010, available from [www.scotland.gov.uk/Publications/2010/10/071423010](http://www.scotland.gov.uk/Publications/2010/10/071423010)
8. Hansard, 3 Feb 2011: Column 883W, Public Sector: Carbon Emissions, available at [www.publications.parliament.uk/pa/cm201011/cmhansrd/cm110203/text/110203w0001.htm](http://www.publications.parliament.uk/pa/cm201011/cmhansrd/cm110203/text/110203w0001.htm)

● **HYWEL DAVIES** is technical director of CIBSE [www.cibse.org](http://www.cibse.org)

## What is the status of the recast EPBD?

The Energy Performance of Buildings Directive (EPBD) was repealed and replaced by the recast Directive as of 1 February 2012. References to the original Directive are now to be read as references to the recast Directive. Member States must now implement the recast as set out by Article 28.

The following is the text of Hansard's report of a question from Caroline Lucas MP to Communities Minister Andrew Stunell, along with his answer; the latter clearly offers a consultation that has not, as yet, been published:

*Hansard, 3 Feb 2011: Column 883W*  
**Public Sector: Carbon Emissions**

**Caroline Lucas:** To ask the Secretary of State for Communities and Local Government what his policy is on the EU target for all new buildings occupied and owned by public authorities to be near-zero carbon from 31 December 2018; what assessment he has made of UK progress toward the target; and if he will make a statement. [37909]

**Andrew Stunell:** The recast of the energy performance of buildings directive includes a requirement that all new buildings occupied and owned by public authorities after 31 December 2018 shall be nearly zero energy buildings. The recast must be implemented by 8 July 2013 and we will consult on its implementation in due course.

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*a new brand; a new HVCA*





The time has come for engineering professionals and institutions to pull together to create a joint 'buildings engineering industry' – it's the only way to effect real reform of the construction sector, argues **Terry Wyatt**

**B**ack in 1994, in a report to government, Sir Michael Latham described the UK construction industry as being 'fragmented', 'adversarial' and 'ineffective'. It was, he suggested, an industry represented by a diverse collection of bodies working with scant collaboration, resulting in great waste of materials and manpower. Another report that was critical of the construction industry, by Sir John Egan, was published in 1998.

The Latham report's findings led to the Construction Act 1996. Despite the Act being regularly updated since, the industry in the UK remains much as Latham found it. However, fresh impetus for reform has come from Paul Morrell, who was appointed to the new post of chief construction adviser to the government in 2008.

Morrell has highlighted the 'growing need for a general upskilling of people in all parts of the supply chain to address the design, construction and operation of low carbon, energy efficient buildings'. This presents a colossal challenge to the construction sector as a whole. It surely also requires the different engineering professions and institutions involved in the built environment to look beyond their own boundaries and to seek to create a single 'buildings engineering industry'.

Although improvements have been made in the relationships between the various professional bodies and groupings in the built environment, they must all open the barriers and pull together. At present the industry's designers, contractors and manufacturers are a disjointed bunch – as Figure 1 illustrates. When it comes to individual projects, these professionals lack an effective connection to the eventual operation and management of the building's facilities – a connection that is essential for achieving the successful fulfilment of the project's purpose.

Our sector remains far too confrontational



and wasteful. Some suggest that this is because main contractors like to keep it that way. But whoever is to blame, it is up to all of us in the industry to reform our own discordant practices.

We urgently need to harmonise our working practices so that initial design development takes on board feedback from facilities management, which assumes the role of 'operational engineering'. Research and development must also become embedded in design to receive and process operational outputs to best effect.

Similarly, advances in manufacturing innovation and methods need to be fed to designers. Design thereby becomes intrinsically determined by what works in practice and the improvements that are available. In turn this will lead to designs being aimed at maximising offsite factory pre-construction and incorporating operational engineering requirements. As a result, the project's construction is largely a process of logistics for the timely onsite assembly of pre-tested modules of the systems and their commissioning in collaboration with operational engineering

Figure 2 helps to illustrate this process.

Three developments not currently in general use, or even in the teaching and training in our industry, are essential for reform to take place. These are: to introduce 'design for manufacture'; to promote the appreciation and skills of operational

engineering; and, crucially, to adopt building information modelling (BIM) at the heart of the whole process.

Achieving an effective, joined-up sector, when progressed into the creation of a new buildings engineering industry (BEI), would enable us not only to

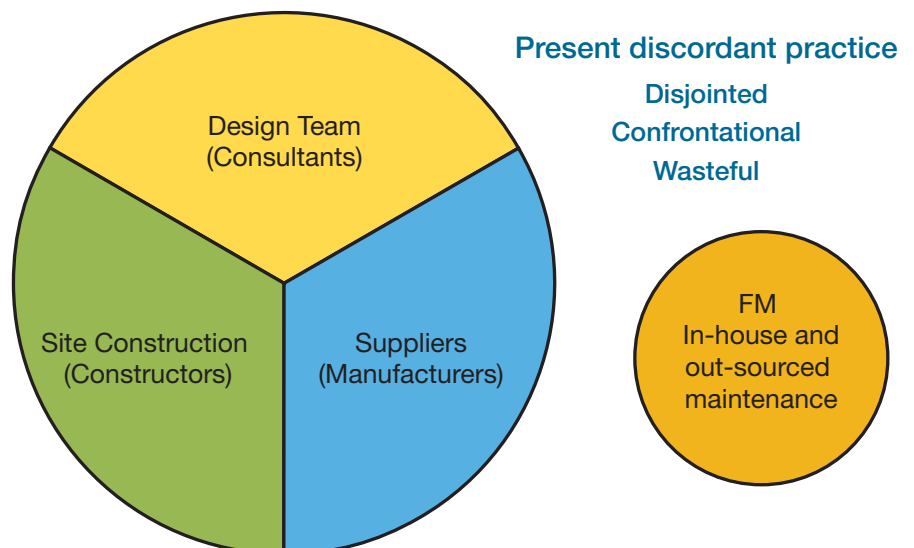


Figure 1



**CIBSE and other similar organisations are already exploring the possibility of a closer link at an institutional level**

meet our obligations to clients and the nation, but also to compete worldwide and so help to deliver Latham and Morrell's proposals for the construction industry as a whole. However, a fully functioning BEI would also need to incorporate the other engineering aspect of construction – structural engineering – which, in the present fragmented state of the industry, stands separate.

Structural engineering design has long been directly concerned with 'buildability', and has close collaboration with manufacturing and offsite pre-construction. Harmonising the structurals with our industry would pose far fewer problems for them, and could help us resolve ours. And there is immense scope for joint innovation on current design issues – such as low carbon, façade

engineering, structurally-incorporated heating, ventilation, and air conditioning (HVAC) systems, offsite pre-construction and BIM implementation.

Meanwhile, many major clients, no doubt longing to see reform of construction, have already alerted the larger firms in our industry to a preference for a single, more effective 'one-stop' engineering engagement, so that even the largest building services engineering (BSE) organisations are under pressure to re-examine the business rationale of remaining solely BSE companies. As a result, we are beginning to see the formulation of strong associations and partnerships between BSE and structural engineering firms and individuals.

Circumstances for our industry and its professional institutions have dramatically changed, and there is an urgent need to cut waste and trim overheads for efficiency and effectiveness. The time has arrived to go beyond establishing closer institutional ties; we need to move rapidly from BSE to BEI, encompassing the harmonised practices of both building structures and services engineering. Figure 3 illustrates the process.

CIBSE and other similar organisations are already exploring a wide range of partnership opportunities at an institutional level. The main drivers at present are to increase the 'value for money' of member subscriptions and (responding to advice from Michael Latham) to jointly locate.

'Sharing facilities, improving utilisation, combining back-office functions and achieving economies of scale, could make significant savings very quickly,' says CIBSE chief executive Stephen Matthews. He adds that a 'fit-for-purpose London

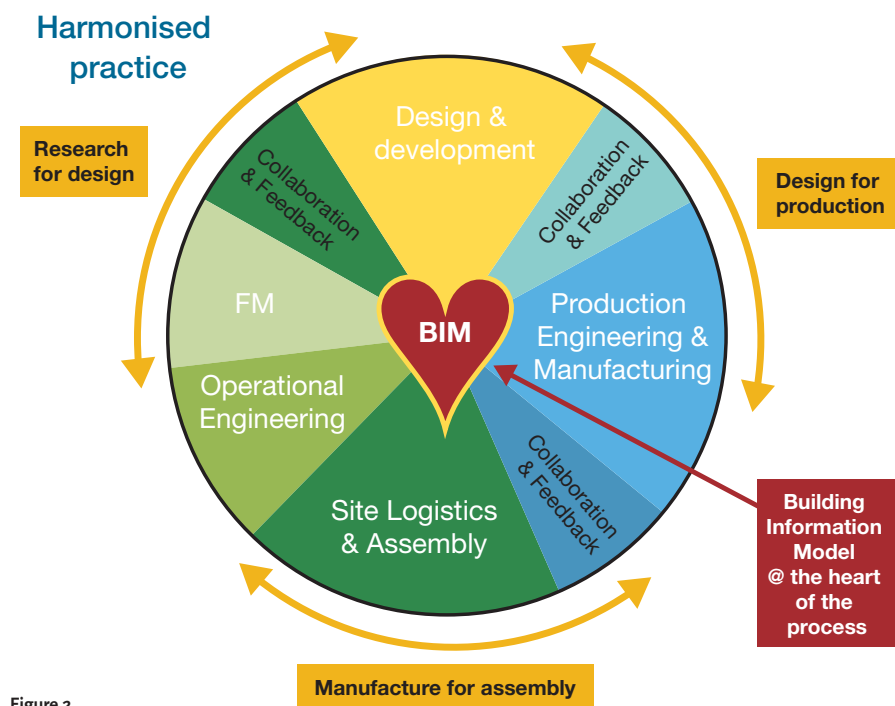


Figure 2

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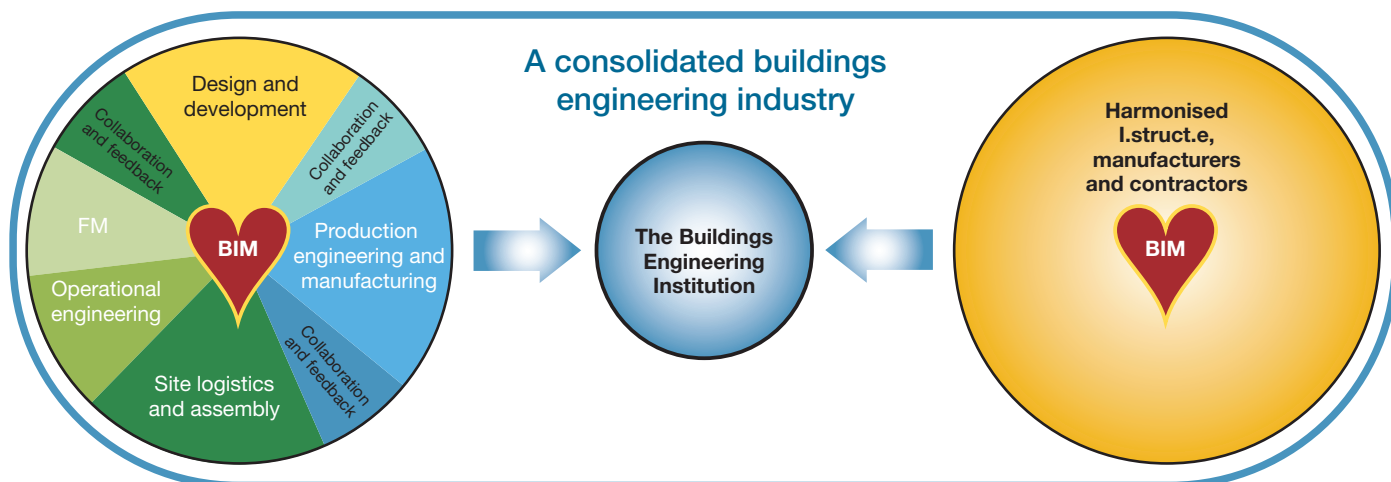


Figure 3

headquarters for CIBSE would enhance considerably the perception of our industry by national government and media, and their ability and preparedness to seek our reference and advice’.

Such a cohabitation in central London would decidedly ‘set the stage’ for the formation of a consolidated buildings engineering industry.

We cannot, of course, expect this to happen overnight; but we should now be investigating and establishing a mission statement and draft charter for a buildings engineering institution. And we need to include the wider engineering sector in this process of consolidation – in particular the Construction Industry Council, the Royal Academy of Engineering, and Morrell and Latham themselves.

We can also get to work towards some concrete outcomes that include:

- Establishing the means and methods of education and training for ‘buildings engineering’. This must extend from schooling through colleges and

universities to employment training and CPD;

- Setting up joint task groups for complementary subjects, initially BIM, façade engineering, structurally-incorporated HVAC systems and offsite pre-construction;
- Determining a programme of necessary research and development, working with universities, research organisations and manufacturers to pursue buildings engineering innovations;
- Ensuring that there are several MPs, peers and government officials joining/backing this new profession; and
- Deciding the nature and scale for the new HQ and securing suitable premises. Preparing for a national and European launch (including having it welcomed in parliament and the EU), immediately followed by a first national conference over at least two days and preferably at the new London premises.

The proposition being made here is for the establishment of the title, profession and

“We need to move rapidly to establish a buildings engineering industry, encompassing the harmonised practices of both building structures and services engineering

industry of ‘buildings engineering’. CIBSE and IStructE would take the leading roles in this, and would involve a range of bodies and manufacturing associations to create the Chartered Institution of Buildings Engineering (CIBsE), or, more simply, the Buildings Engineering Institution.

Such a change would undoubtedly significantly help to push forward the sort of construction reforms that Latham, Egan and Morrell have been seeking, and that will surely help us all to prosper. **CJ**

● **TERRY WYATT** is a consultant to Hoare Lea and past-president of CIBSE [www.cibse.org](http://www.cibse.org)

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# Lab

## EXPERIMENTS

A unique research centre opened by the Prime Minister in 2008 has undergone a detailed performance assessment. **Julie Godefroy** and **Ashley Bateson** report on how well it is performing – and key lessons learnt that can benefit future projects



**T**he International Digital Laboratory (Digital Lab) is one of the University of Warwick's high-profile buildings. It was formally opened by then Prime Minister Gordon Brown in July 2008, and was a finalist in the 2009 RIBA Awards. It received a number of other prizes, including the ACE Annual Engineering Excellence Award.

Staying involved in the building after completion and carrying out a post-occupancy evaluation was a rewarding opportunity for consulting engineers Hoare Lea. The work has highlighted very high user satisfaction with the building, very good comfort levels, and relatively good energy performance. These results were presented to the university on the day that it launched its Carbon Management Implementation Plan.

The discussion generated between the parties involved in procuring, managing and designing the building is an example of the careful evaluation and management measures that will be required for the higher education sector to achieve its ambitious carbon reduction targets.

### The building

The Digital Lab is a research facility that cuts across academic disciplines and seeks to facilitate collaborative research opportunities between university researchers and industry. It is part of WMG (also known as Warwick Manufacturing Group), which undertakes research into innovative technologies.

The design brief for the Lab required a flexible, energy efficient, BREEAM Excellent flagship building that would offer an inspiring research base for teams in areas as diverse as manufacturing and healthcare. The building is largely open plan and naturally ventilated, and incorporates a number of low energy features from passive design to low carbon district energy.

The design team was led by Edward Cullinan Architects, with MEP design carried out by Hoare Lea. The architects' appointment formed part of the masterplan, of which the Lab was the second building they designed. As such, the university and the designers were keen to incorporate lessons learnt from the previous building into the design of the Digital Lab.



The Digital Lab at Warwick University was created to foster joint working between research and industry

The previous building designed by Edward Cullinan Architects for the university experienced summer overheating in south-facing rooms, and as a result the architects were particularly careful to control solar gains through passive means at the Digital Lab. The building is set along an east-west axis, with an open-plan layout and spaces on each side of an atrium spanning the length of the building. The southern elevation is largely glazed to let in useful winter gains and incorporates external overhangs for summer overheating protection. Offices expected to be of higher occupancy density are located along the northern elevation, in order to minimise the risk of overheating.

### Energy saving measures

After these measures to carefully control solar gains, a holistic approach was applied to reduce energy use and carbon emissions through a range of low energy features. The building includes a mix of office, exhibition, laboratory and teaching spaces. The relatively low density of internal gains from occupants and equipment allowed the

designers to meet the university's desire for a naturally ventilated building, with displacement ventilation in areas of higher density (eg, meeting rooms, lecture theatre).

Exposed thermal mass seeks to maximise the benefits of the natural ventilation strategy. Night-time ventilation is used to purge heat absorbed during the day and assist in pre-cooling the structure.

North-facing rooflights along the atrium let light into the central space, complementing the glazed elevations. A sophisticated lighting control strategy seeks to maximise the benefits of natural light with substantial use of zoning and daylight sensors, coupled with occupancy sensors in circulation and occupied spaces.

The building has no on-site heating plant and has only localised cooling units in the server rooms, thanks to a connection to the campus district heating and cooling scheme supplied by a combined heat and power (CHP) plant and absorption chillers.

An innovative environmental feature of the building is the earth labyrinth located underneath the building (see Figure 1).

The principle is that, as outside air is

The discussion generated between the parties involved in procuring, managing and designing the building is an example of the careful evaluation and management measures that will be required for the higher education sector to achieve its ambitious carbon reduction targets





The post-occupancy evaluation aimed to provide an overall view of the Digital Lab's energy performance

➤ drawn through the labyrinth's concrete duct, it receives useful heating (in winter) or cooling (in summer) from the ground, which is at a relatively constant temperature throughout the year. This allows the air to be pre-heated or pre-cooled before going through local air handling units and being introduced into the meeting rooms. This relatively simple solution was considered ideal for the small proportion of spaces which could not be

Pre-cooled air at outlet of labyrinth before the air handling unit was installed

Air inlet

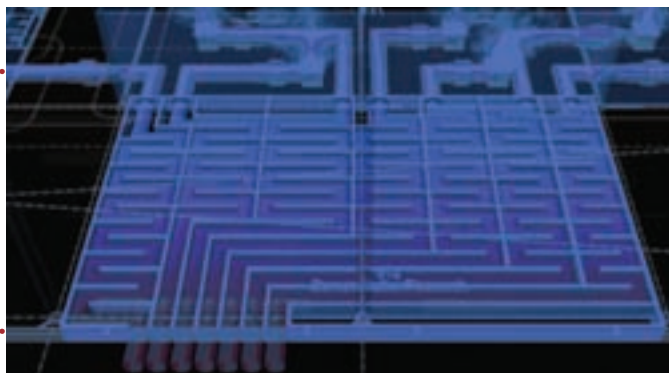


Figure 1: Illustration of the earth labyrinth, with gradual tempering of the supply air before the air handling unit was installed



## Key lessons learnt

- The building's very good response to the users' needs indicates that the architectural design process has been successful in consulting with users. This could inform the services design process in future projects to improve usability by general users and management staff – for example, the Soft Landings approach.
- Initial observations indicate that the earth labyrinth offers benefits in reducing heating and cooling consumption.
- The building systems, and their controls, should be kept as simple as possible to facilitate maintenance and respond to user expectations.
- Importance of handover, including commissioning at completion, seasonal commissioning beyond handover, and training of the facilities manager and general users.
- Importance of users' engagement and helpful facilities managers in allowing post-occupancy evaluation. This was extremely useful in this study.
- The building's score for overall satisfaction is among the best 20% in its category (see Figure 2a). In particular, this is achieved through very good satisfaction levels with the building's image, good natural daylight levels, and the building's success at meeting the users' needs (Figures 2b and 2c), highlighting the success of the design process in establishing the brief and consulting with users; and
- The open-plan and spacious nature of the building is generally viewed extremely positively by users, contributing to the building's 'wow factor' and being well used for public events and informal gatherings. This is all the more notable,

served by natural ventilation only, and the university is keen to use lessons learnt to inform their future buildings.

Finally, the design allows the future incorporation of a large array of photovoltaic panels, thanks to pre-wiring and south-facing features at an optimum angle. In addition, the building incorporates a number of 'sustainable' design features such as water-efficient appliances, a run-off trench, and a sedum roof to slow down water run-off, provide additional insulation, protect the waterproof roof membrane and add to the local biodiversity.

## Methodology

The post-occupancy evaluation aimed to provide an overall view of the building's performance, and as such considered user satisfaction, energy performance, and the performance of the earth labyrinth.

User satisfaction was mostly assessed through formal occupancy surveys carried out in September 2010, using the BUS Methodology (the widely-used building occupancy survey method developed by the Usable Buildings Trust). Informal feedback was also gathered through site visits, interviews with university staff (facilities management and procurement side), and a 'Likes/Dislikes' survey carried out by the architect using the in-use stage of the design quality indicator (DQI) as part of the briefing process for their next building with the university.

## Overall user feedback

Feedback from WMG staff who occupy the building has overall been very positive, particularly on the architecture of the building, with high satisfaction levels on a number of important points:

- The building's score for overall satisfaction is among the best 20% in its category (see Figure 2a). In particular, this is achieved through very good satisfaction levels with the building's image, good natural daylight levels, and the building's success at meeting the users' needs (Figures 2b and 2c), highlighting the success of the design process in establishing the brief and consulting with users; and
- The open-plan and spacious nature of the building is generally viewed extremely positively by users, contributing to the building's 'wow factor' and being well used for public events and informal gatherings. This is all the more notable,



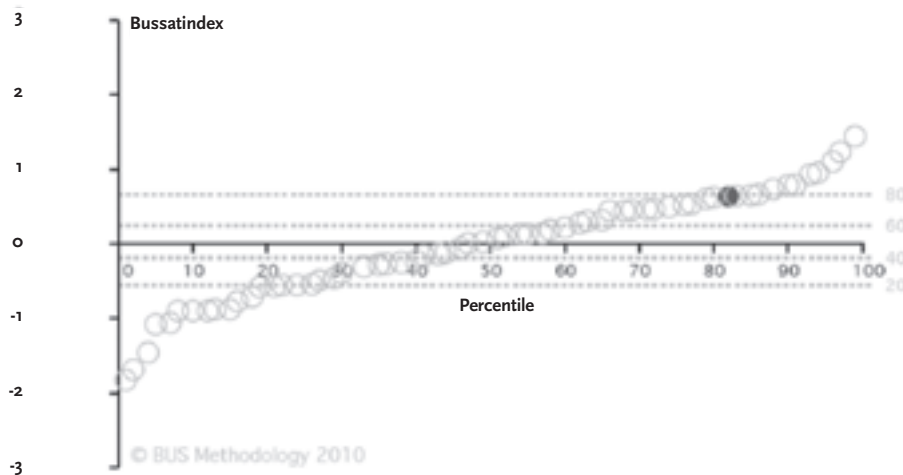


Figure 2a: Overall user satisfaction

given the building's success at attracting public events in the central atrium, which can be perceived as disruptive to office users when the general background is very quiet.

Feedback on overall comfort, including air temperature and perception of 'freshness', is very positive. Summer conditions are rated particularly well, with overall comfort (taking account of temperature, air quality, and air movement) in the top 20% of BUS-surveyed buildings (Figures 3a, 3b and 3c). Comfort will be monitored if occupancy and equipment levels increase, but it is currently a success of the architectural and environmental strategy, achieved with little mechanical ventilation and with cooling in only three spaces, and in contrast with the tendency of modern offices to overheat.

### Controls

While users are overall satisfied with environmental conditions, they have expressed a desire for more control over their surroundings, particularly lighting. This is a recurrent design dilemma between automated and manual controls when trying to create comfortable environmental conditions while limiting energy consumption. A review of these results with the university concluded that future design briefs would likely keep the same limited level of user control on heating, ventilation, and cooling, but would aim to provide a higher level of manual control over lighting.

### Energy

Energy consumption data was gathered quarterly over a two-year period and compared with industry benchmarks (*CIBSE Guide F*). In order to make an appropriate comparison, an average of

Naturally Ventilated Open Plan Office and Higher Education Sciences Lecture Room benchmarks were used.

As the building receives hot and chilled water from the campus energy scheme, notional consumption figures for gas (for heating) and electricity (for cooling) were derived from the meter readings of heating and cooling received from the energy scheme. It should be noted that this study focused on the performance of the building itself, without taking account of the university's district CHP scheme. The CO<sub>2</sub> savings offered by CHP are therefore not reflected in the analysis.

Heating consumption levels are good, being 20% below 'Good Practice' benchmarks and 50% below 'Typical' benchmarks. Electricity consumption is approx 50% above 'Good Practice' benchmarks and 10% above 'Typical' benchmarks (Figure 4). This pattern is representative of modern buildings, which tend to have good insulation and air tightness levels, but higher equipment levels than was the case when industry benchmarks were gathered. This can also be explained by the specific characteristics of the Digital Lab, including some high electricity consumption items as part of research activities, and the fact that the building is open 24/7. The comparison nonetheless reinforces the fact that *CIBSE Guide F* benchmarks, widely used in the industry, are still robust energy demand prediction tools.

Part L model results are available for the building, but these are meant as a Building Regulations compliance tool using theoretical set assumptions, and are therefore not appropriate to compare with actual energy use.

Electricity for cooling represents only a very small part of overall energy



Figure 2b: Image to visitors

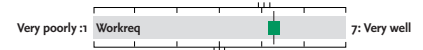


Figure 2c: Do facilities meet needs?



Figure 3a: Overall summer comfort



Figure 3b: Summer temperature

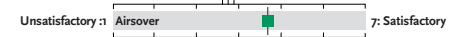


Figure 3c: Air in summer

Figure 3: User satisfaction survey (BUS methodology). Green squares show where average scores are significantly better than benchmark; the orange circle indicates averages that are similar

The post-occupancy evaluation of the Digital Lab has highlighted a number of lessons that should be valuable for the university's future buildings and for designers of buildings with low carbon aspirations

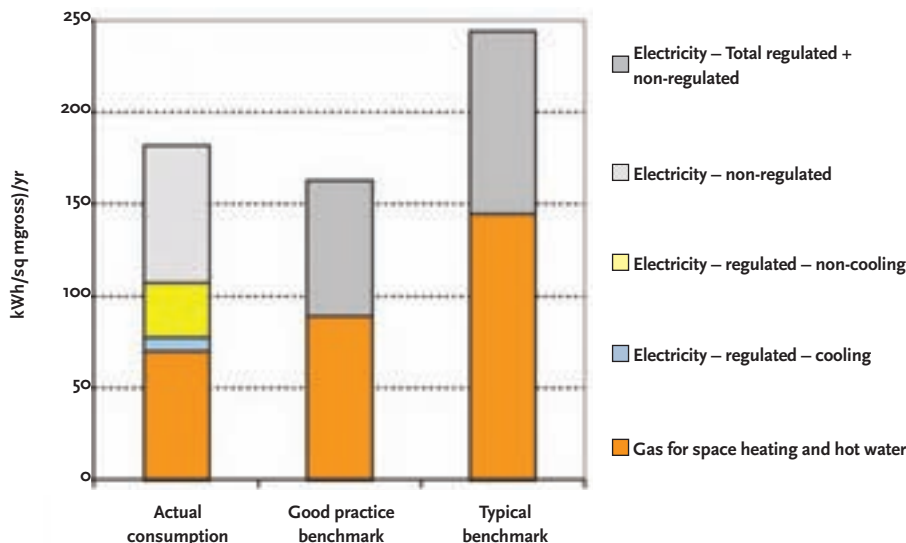


Figure 4: Comparison of actual energy use with industry benchmarks

➤ consumption (<5%). This is remarkable given the high levels of user satisfaction with summer comfort, and demonstrates that natural ventilation can work well in office buildings with suitable environments. At the Digital Lab this is allowed by a combination of passive design to reduce summer solar gains, narrow plan with central atrium (22m plan depth and 6m atrium), location of offices of higher occupancy density along the northern elevation, and reasonable occupancy levels.

Electricity consumption related to process loads (that is, significant IT equipment for research purposes, lifts and small power uses) represents the majority (~60%) of the electrical consumption. In future building, the university will look at analysing this in more detail, for example, with sub-metering of lighting and small power, rather than by areas, such as floor-by-floor distribution boards, as this would help assess the impact of users equipment or quantify the energy savings allowed by fine-tuning the controls strategy. For example, incidental observations indicate that a certain level of manual control over lighting could create opportunities to reduce electricity consumption where lighting is currently controlled by occupancy sensors.

#### Earth labyrinth

Temperature sensors were installed at two inlets and two outlets of the earth labyrinth to assess its performance, and temperatures were recorded for a year. This allowed the following observations:

- In winter, the temperature at the outlet of the labyrinth mostly varied between 12 and 17°C;

- In summer, the temperature at the outlet of the labyrinth mostly varied between 14 and 20°C.

This analysis therefore indicates that the labyrinth has an important stabilising effect on the supply air, pre-heating it in winter and pre-cooling it in summer and therefore reducing energy consumption for space heating and mechanical cooling. The university is likely to conduct more detailed monitoring in the future, since this is potentially seen as a useful feature in low carbon office buildings.

#### Realising the design intent

The innovative nature of the building explains the learning curve experienced in the early stages of occupation. The university has shown a keen interest in using lessons from this study to influence their future procurement process, with more emphasis on the final stages before occupation and possibly the adoption of Soft Landings principles (see [www.softlandings.org.uk](http://www.softlandings.org.uk)).

One factor that should help the university to implement careful handover procedures is the use of BREEAM: the BRE now require a post-construction review before certifying a building, which means that construction teams need to provide evidence that the commitments made at design stage, such as following best practice commissioning procedures or issuing a simple building user guide, have been implemented.

#### Conclusions

The post-occupancy evaluation of the Digital Lab has highlighted a number of lessons that should be valuable for the university's future buildings and for designers of buildings with low carbon aspirations. The design has proved highly satisfactory in creating a pleasant environment, achieved at good energy consumption levels. Interestingly, the success of the building's architectural and environmental strategy already offers an example of a feedback loop, as Edward Cullinan Architects and Hoare Lea have put forward a similar concept in their proposals for the Institute for Sustainability, in the London Thames Gateway.

Furthermore, revisiting the building has contributed to raising awareness and identifying key areas of focus for a long-term management programme by the university, rather than being seen as an end in itself. **CJ**

● **JULIE GODEFROY** is an executive sustainability consultant, and **ASHLEY BATESON** a partner at Hoare Lea [www.hoarelea.com](http://www.hoarelea.com)



#### PROJECT TEAM

**Client:** University of Warwick

**Architects:** Edward Cullinan Architects

**MEP consulting engineers:** Hoare Lea

**Structural engineer:** Arup

**BREEAM assessor:** Hoare Lea

**Quantity surveyors:** Jacobs

**Main contractor:** Norwest Holst Construction Ltd

**Project manager:** University Estates Office

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# FLOW OF INCENTIVES

Systems for producing hot water are becoming greener, with more manufacturers producing technologies that can use a variety of energy sources. **Tim Dwyer** looks at the issues around making storage as efficient as possible

Solar thermal panels with close coupled direct water storage can provide a renewable source of hot water for non-freezing climates



**W**ith the planned rollout of Renewable Heat Incentive (RHI) payments for single domestic premises just a few months away, the interest in alternative renewable and low carbon methods of providing heat for domestic hot water is set to rise. While the RHI is unlikely to provide the rush of installations that accompanied the introduction of the feed-in tariffs (FiTs) for photovoltaic (PV) solar systems producing electricity, the RHI could focus the public's attention on the potential of other sources to provide domestic hot water.

Technologies included in the RHI scheme are those fuelled by biomass and biogas, heat pumps and solar thermal collectors. The RHI is already available to provide funding for metered non-domestic installations of up to 8.5p/kWh for solar thermal systems. However, at the time of writing, very few installations have been registered by the regulator, Ofgem, as being eligible for RHI payments.

The complementary Renewable Heat Premium Payments (RHPP) that were available as one-off payments for domestic installations expired at the end of March this

Whatever the motivation for using a low carbon source for heating hot water, the utilisation of the systems will be dependent on being able to make the greatest use of the hot water



6 The amount of heat that can be exchanged from the store into the potable water will be limited by the heat transfer effectiveness of the coil running through the centre

year, but systems that attracted a RHPP will be eligible for continuing payments based on the measured heat produced when the RHI is introduced this autumn as part of the expected rollout of the government's Green Deal.

Whatever the motivation for using a low carbon source for heating hot water – financial or environmental – the success of the systems will be dependent on being able to efficiently utilise the hot water. As testified by the plethora of exhibits at last month's Ecobuild exhibition in London, many of the major manufacturers who have previously been recognised for traditional water heating have developed integrated systems that can accept other heat sources (frequently solar thermal). An effective store should:

- Have a high thermal capacity – as water has a reasonably high specific heat capacity and is the most common storage medium;
- Effectively transfer heat between the primary and secondary systems – this will often include enhanced heat transfer surfaces on coils and externally attached high efficiency plate heat exchangers;
- Maintain stratified temperatures – allowing proper discrimination in the

temperature differences between the store and the primary and secondary thermal loops. In practical terms, this leads to taller, narrower storage vessels. Some vessels incorporate devices to assist in the stratification process. The high temperature water is drawn off at the top of the vessel to supply the hot water load, and the cold feed water enters at the bottom;

- Be able to operate safely at system pressures – whether vented or unvented the vessel must withstand the pressure exerted by the head of water above the vessel or the mains/pumped inlet pressure; and
- Minimise losses – this will be both thermal losses (requiring effective insulation and smallest external surface area) and loss of water pressure in the primary and secondary circuits. The requirements of stratification mean that there is a compromise between minimising heat loss surface and having a tall narrow vessel.

Stores may be used with bivalent (two energy source) systems such as in Figure 1 and Figure 2. These typically employ a hot water cylinder that, through the primary

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heat sources – for example solar heated primary water/glycol in the bottom coil and, typically, gas heated water in the top coil – provide a store of hot water that is used directly to supply the domestic hot water system. The top coil is used to increase the water temperature to the required temperature when the heat from the lower coil is inadequate.

Since this is a store of potable hot water it must have appropriate legionella control (as required by HSE ACOP L8) that would normally require regularly heating the whole cylinder of water to 60°C. If this 'pasteurisation process' is not carefully controlled it can reduce the potential heating that can be utilised from the low carbon source, as the water may have already been heated by the fossil fuel as part of the legionella-prevention cycle. It can also lead to longer periods of stagnation for closed loop solar collectors that can reduce the effective life of both the collectors and the glycol protected heat transfer fluids. The examples shown are all unvented systems, so they will provide hot water at near mains water pressures. This can be beneficial – particularly where the water is supplying

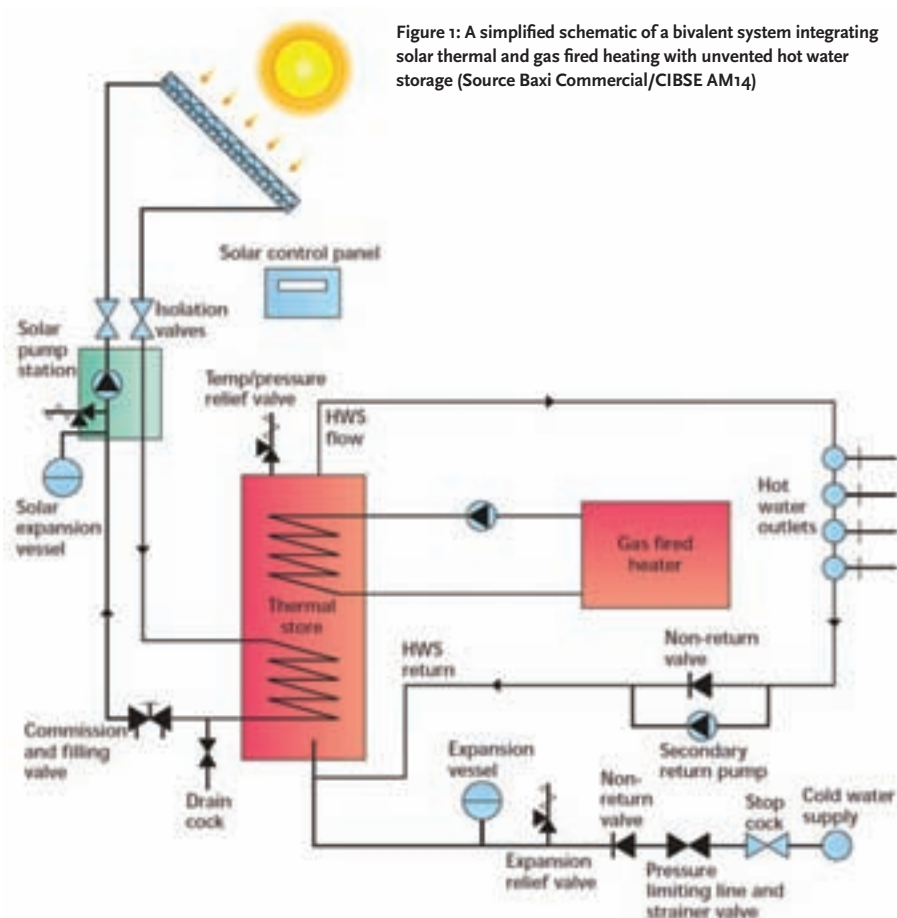


Figure 1: A simplified schematic of a bivalent system integrating solar thermal and gas fired heating with unvented hot water storage (Source Baxi Commercial/CIBSE AM14)

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► showers. But, of course, the flow rate will be limited by the flow capacity of the mains supply.

Using an indirect central thermal store such as that shown in Figure 3 provides opportunities to utilise several heat sources (both fossil-fuelled and low/zero carbon) in a multivalent system. In this example the heat is stored in the primary water – the store being designed to maintain a temperature gradient with the coil from the solar thermal source positioned at the bottom of the cylinder where the store's temperature will be lowest. The potable water is not stored, and so is not subject to the same pasteurisation requirements as in the system in Figure 1.

However, the amount of heat that can be exchanged from the store into the potable water will be limited by the heat transfer effectiveness of the coil running through the centre.

More manufacturers are producing systems that can use alternative energy sources – but many systems continue to rely on conventional electricity sources







Figure 2: An unvented twin coil hot water cylinder designed for solar thermal (bottom coil) and traditional heat source (top coil)  
(Source: Kingspan)

➤ To increase the transfer of heat, this type of store can utilise an external high efficiency plate heat exchanger (that will require an additional circulation pump).

Separating the potable water from the storage medium provides opportunities to use lower pressure vented thermal stores that will not fall under the auspices of the Pressure Systems Safety Regulations.

The flow through the primary coils – and so the charging of the store – can be successfully controlled by an integrated multivalent controller that will optimise the flows from heat sources, attempting to make maximum use of the lowest cost (and lowest carbon) source. In many cases the most beneficial heat source is likely to be solar thermal collectors.

So, for example, in such an application the temperature is compared in the solar collectors to that in the base of the thermal

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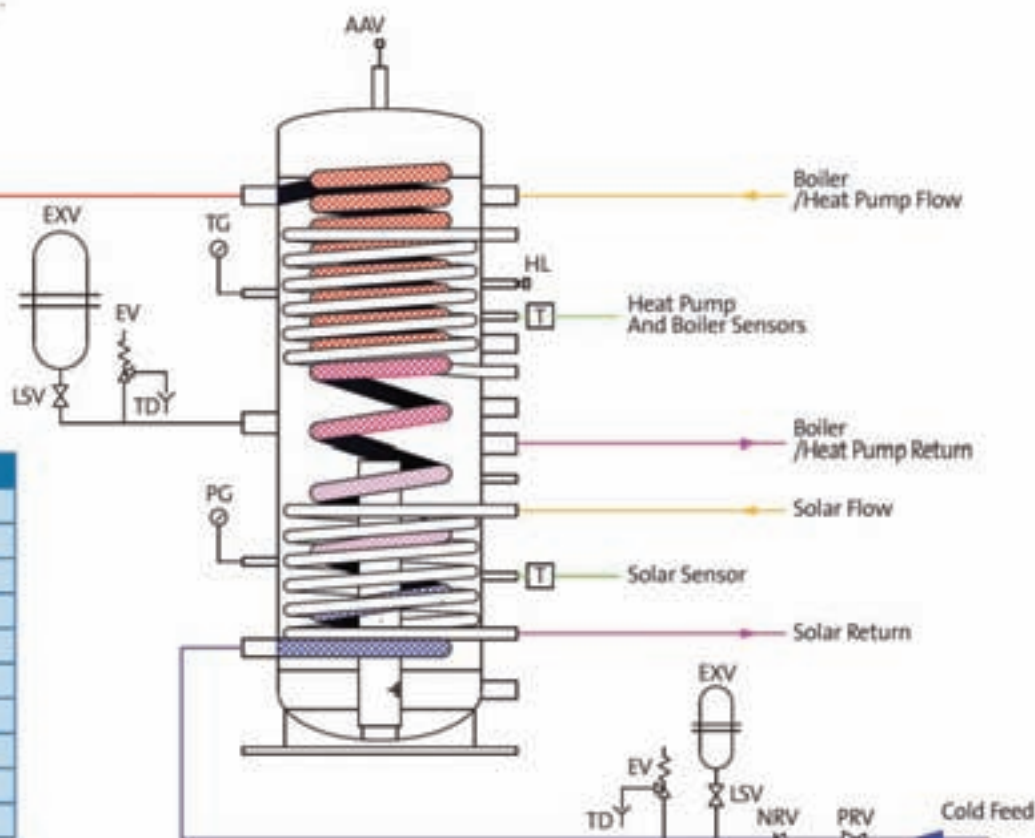
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Figure 3: Example of multivalent thermal store – this store provides indirect, low-volume flow instantaneous hot water or larger volumes of an indirect preheated domestic hot water feed. (Source Lochinvar)

LEGEND	
EXV	Expansion vessel
EV	Expansion valve
NRV	Non-return valve
AAV	Automatic air vent
T	Temperature sensor
HL	High limit stat
TD	Tundish
PRV	Pressure-reducing valve
TG	Temperature gauge
PG	Pressure gauge



➤ store. The differential temperature controller will actuate the solar circuit pumps when the temperature in the collectors is sufficiently high to economically add heat to the thermal store (typically when the collectors are around 8K higher than the store), and then cease when the coolest water in the store approaches the collector temperature (typically at a temperature difference of 4K) or the water in the store has reached a maximum limiting temperature.

The thermal hierarchy for the supply of primary heat to the store will depend on the application – and the order is by no means certain. Potentially if local micro-hydro is available, then electrical heat sources (such

as heat pumps) could provide an all-year low carbon source feeding heat into the thermal store.

Energy Minister Greg Barker declared at its launch that the intent of the RHI was ‘making renewable heat not just an environmentally sound decision, but also a financially attractive one’.

The application of properly integrated thermal stores to multivalent systems provide an essential element to help this worthy expectation to succeed. **CJ**

● **TIM DWYER** is technical editor of the *CIBSE Journal* and teaching fellow at University College London. Details of the rates and eligibility for the RHI can be viewed at [www.decc.gov.uk/rhi](http://www.decc.gov.uk/rhi)

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# INTO THE COLD

Data centres can waste a lot of energy through overcooling. **Sophia Flucker** and **Robert Tozer** describe how 'air performance metrics' can help increase efficiency

**D**ata centre energy consumption has grown significantly in recent years, much of it being used in cooling systems.

By understanding air management performance and applying air flow metrics, energy use can be significantly reduced. There is also scope for preventing 'overcooling'.

'Air management performance' describes how effectively conditioned air is employed to cool IT equipment in a data centre. By understanding this, inefficient operation can be identified, quantified and targeted.

Data halls are typically arranged with cabinet rows placed front-to-front (cold aisle) and back-to-back (hot aisle). Vented floor tiles or floor grilles are placed in the cold aisle to deliver cold air to the front intake of the cabinets and IT equipment; hot exhaust air is rejected into the hot aisle.

Some of the air supplied by the cooling unit reaches the IT equipment, while some bypasses it (that is, returns to the cooling unit without passing through the IT equipment, providing no useful cooling). Where bypass (BP) is high, this prevents the full capacity of the cooling units from being realised – the air available to cool the IT equipment may be insufficient for the load (see Figures 1a and 1b).

Sources of bypass flow include:

- Floor grilles in the wrong place i.e. in the hot aisle, not in the cold aisle;

● The costs from overcooling often do not impact on the IT department budget, so the incentive to operate with better energy efficiency is not there

Data halls are typically arranged with cabinet rows placed front-to-front (cold aisle) and back-to-back (hot aisle)





- Excess air supply through floor grilles;
- Open cable cutouts (in the floor beneath cabinets towards the rear); and
- Gaps in the raised floor (bottom of empty racks, power distribution units).

Bypass can be minimised by ensuring appropriate floor grilles are located where needed and by sealing gaps in the floor.

Recirculation flow is where IT equipment draws in warm air from IT equipment discharge due to lack of cool air being supplied as a result of negative/low static pressure or bypass air. Recirculation flow occurs both inside cabinets (particularly if there are no blanking plates) and outside: over the top of racks and around the end of a row of racks. Solutions include installing blanking plates, replacing solid rack doors with a perforated type and ensuring sufficient cold air is supplied to the IT equipment inlet.

Negative pressure flow occurs when high underfloor air velocities cause the Venturi effect and air is drawn down into the raised floor via the floor grilles, rather than the reverse. When total pressure is less than the velocity pressure (proportional to the square of the velocity), static pressure is negative. This may be observed in data halls with high air velocities at the cooling unit supply, with floor grilles placed close to these cooling units.

More commonly observed is low pressure, where high velocities under the



Air performance metrics are a useful tool to assist operators in their understanding of the effectiveness of their data centre cooling system

floor reduce the static pressure, resulting in a reduced volume of air delivered through the floor grilles. This may mean that insufficient air is provided to meet the local cooling demand. This can easily be checked on site by placing a sheet of paper above the floor grilles and observing how high this floats or whether it is drawn down on to the floor grilles.

Figure 2, on the facing page, illustrates the behaviour of the air pressures below the floor in a cold aisle at increasing distances from the cooling unit and the impact on velocities, volumes and temperatures. At the first floor grille, closest to the cooling unit, velocity pressure is very high and static pressure is negative, causing air to be drawn down into the floor. Resulting air supply temperatures are high, as these are from recirculated warm air. Velocity and velocity pressure reduce as the distance from the cooling unit increases, hence static pressure and air volume increase, delivering air at the design supply temperature.

High dynamic pressures can be reduced by decreasing the air velocity, for example by reducing the flow rate, redistributing flows, installing baffle plates and removing restrictions such as cable trays.

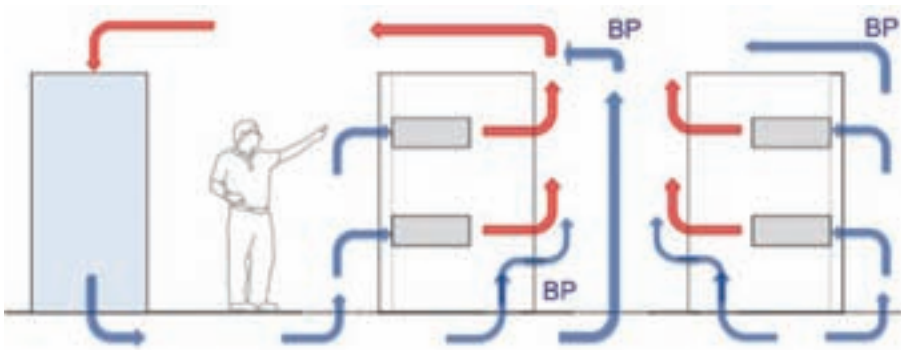


Figure 1a: Data hall air bypass

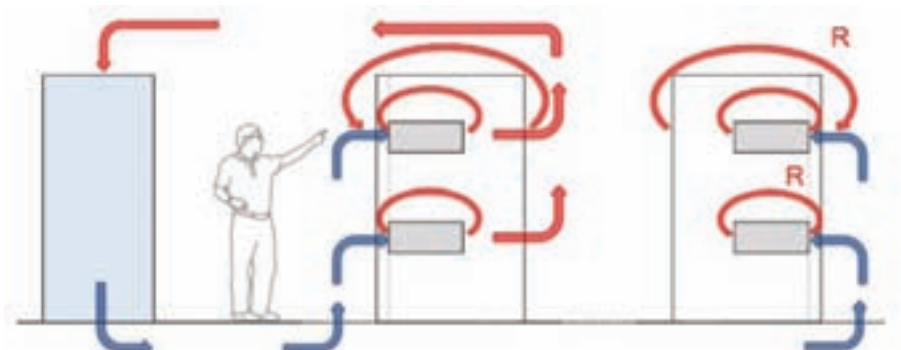


Figure 1b: Vertical recirculation of air



## Metrics

Air performance metrics are a useful tool to assist operators in their understanding of the effectiveness of their data centre cooling system. They can be used to quantify inefficiencies and to benchmark improvements and may be considered as a first step towards optimisation.

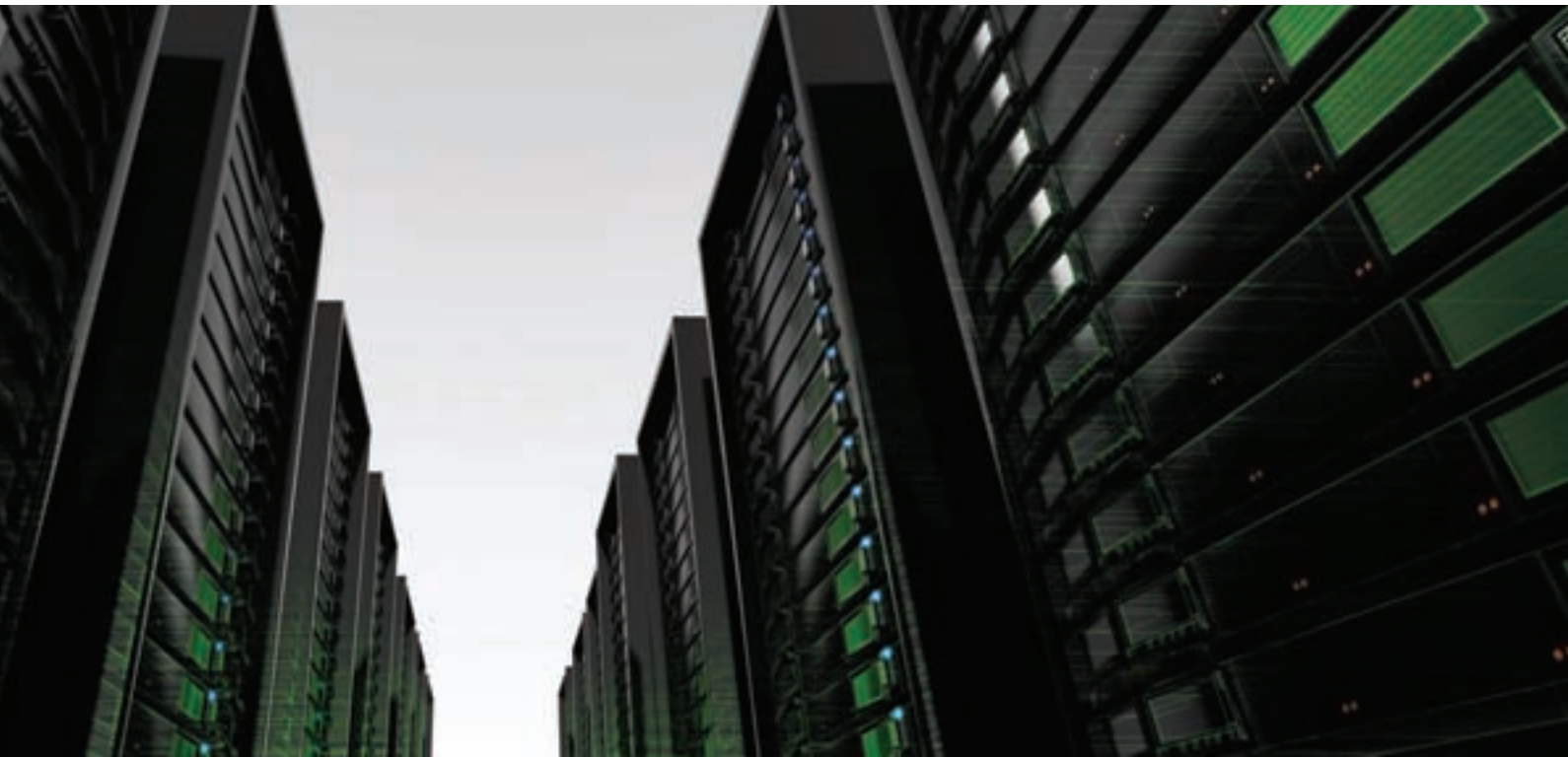
The box on page 44 sets out the metrics that characterise the air flows within a data centre, and how well these serve the cooling demand. The metrics may be determined by making a series of temperature measurements in various locations within the space. Measured performance can be compared with optimal/ideal performance and action taken – such as installation of air containment – to improve the effectiveness of cooling delivery.

## Overcooling

Traditionally, a data centre cooling system design comprises computer room air conditioning and/or computer room air handling (CRAC/CRAH) units located around the perimeter of the data hall. The units supply cooled air under the raised floor. This air emerges from open floor grilles placed across the floor area. Each cooling unit contains one or more cooling coils/fans. The compressor may be in the unit in the case of a direct expansion (DX) system or found in a chiller located externally to the data hall in the case of a chilled water system.

The cooling units typically control to a set point of around 22C, 50% relative humidity (RH) on return temperature to the unit, at high level. The use of narrow control bands led to the use of the term 'close control





unit'. The delta temperature ( $T$ ) across the cooling unit is normally designed to around  $10^{\circ}\text{C}$ , hence the air temperature supplied from the unit is  $12^{\circ}\text{C}$  to  $14^{\circ}\text{C}$  at full load.

The cooling requirement is to control the conditions of the air at the inlet to the IT equipment, which can vary greatly from the temperature observed at the CRAC unit return. This is often not well understood in the industry. The data centre IT staff are responsible for the ongoing availability of the IT services running on the IT equipment; and these staff are dependent on the electrical and mechanical infrastructure and facilities management (FM) team to provide continuous power and cooling.

Overheating can cause failures of IT equipment, so IT staff often react to this risk by trying to run the data hall at very cold temperatures. The rationale for this is that, in the event of a cooling interruption such as a power cut, these low temperatures will help to increase the time buffer before unacceptably high temperatures are reached.

This unnecessary overcooling of the room has a high energy penalty. However, in many organisations the FM or estates department pays the energy bill, which means the cost does not impact on the IT department budget, so the incentive for them to operate the system with better energy efficiency is not there.

Figure 3 shows that, while the cooling units are working as designed, there is a wide range of air temperatures observed at the inlet to IT equipment. Ten per cent of the sample size is receiving air that is colder than required, representing an

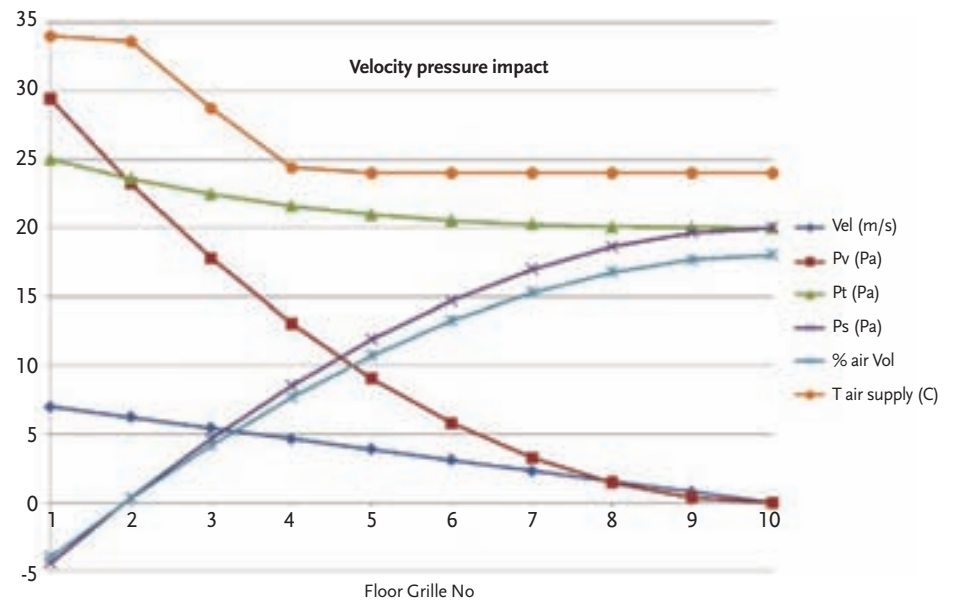


Figure 2: An example of air pressures and their impact in a cold aisle

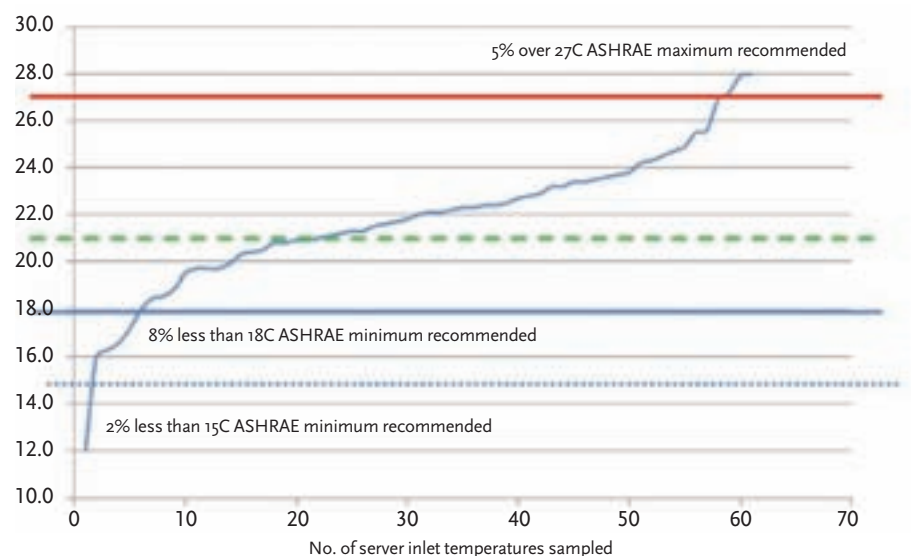


Figure 3: An example range of measured server inlet temperatures



Energy prices are predicted to continue to increase, which puts more pressure on data centre operators to reduce their energy consumption

➤ energy-saving opportunity; 5% of the sample is receiving air hotter than the upper allowable limit, which potentially increases the risk of failures due to overheating.

The *Rack Cooling Index*, published by the American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE), provides users with a measure of the spread of server inlet temperatures ([www.ashrae.org](http://www.ashrae.org)).

### Conclusions

Energy prices are predicted to continue to increase, which puts more pressure on data centre operators to reduce their energy consumption. There are huge energy savings to be made in data centre cooling systems.

Data centre cooling design is driven by the IT hardware it serves. It is difficult to predict how this will change, but trends suggest that densities and exhaust temperatures will continue to increase, resulting in even hotter temperatures in the hot aisle.

Air performance metrics are a useful tool to assist operators in their understanding of the effectiveness of their data centre cooling system. They can be used to quantify inefficiencies and to benchmark improvements, and may be considered as a first step towards optimisation. **CJ** ➤

● **SOPHIA FLUCKER** and **ROBERT TOZER** work for Operational Intelligence Ltd. [www.dc-oi.com](http://www.dc-oi.com) This is an edited version of their paper presented to the CIBSE Technical Symposium. [www.cibse.org](http://www.cibse.org) Sophia Flucker and David Cameron of OI will be presenting at the CIBSE data centre event on 26th April



## Best-practice air management

Where IT equipment receives higher temperature air, a commonly applied solution is to decrease the cooling unit set point. This does not deal with the root cause of the problem and contributes to additional energy wastage, making the overcooling issue worse.

By minimising bypass and recirculation, the range of temperatures supplied to the IT equipment is reduced. This can be achieved through separation of hot and cold air streams by using containment. There are various containment types, including:

- Cold aisle containment: This is the most common

type, and is where the cold aisle is closed with a roof and doors, normally fabricated from flame-retardant plastic. The rest of the data hall is at the same temperature as the hot aisle.

- Semi-containment: This is a variation on the above, where curtains (again in flame-retardant material) are fitted above the cold aisle, blocking the air path from the hot aisle. This works well as a retrofit option, particularly where there are cabinets of different heights.
- Hot aisle containment: This ducts the air from the hot aisle back to the

cooling units, usually by way of a ceiling plenum. The rest of the data hall is at the same temperature as the cold aisle. This works best for a new build as it requires coordination with other overhead services, such as cable trunking.

- Direct rack containment: This employs special deeper cabinets, which include a chimney at the back to duct hot air back to the cooling units. This method keeps the hot air outside of the room and may become more widely adopted as hot aisle temperatures increase due to increasing IT equipment exhaust

temperatures and air supply temperatures. Controlling on-return air temperature at the cooling unit, even with the measures above in place, can still result in a range of temperatures delivered to the IT equipment. This is due to the non-uniform nature of load distribution in most data halls; each cooling unit will deliver a delta T proportional to its load, and thus supply a different temperature. Changing the cooling unit temperature control strategy to supply air control allows this range to be minimised. This can be retrofitted on many cooling units with an additional sensor.

These best practices and others can be found in the EU Code of Conduct for Data Centres, version 3.0.8, 2011.

The improvement of air performance can be quantified by conducting a survey collecting sample temperatures before and after these recommendations have been implemented. The characteristic point on the flow and thermal performance plot should move toward the top right of the chart; with flow and thermal performance values of above 0.9 achievable where best practice measures are fully implemented.



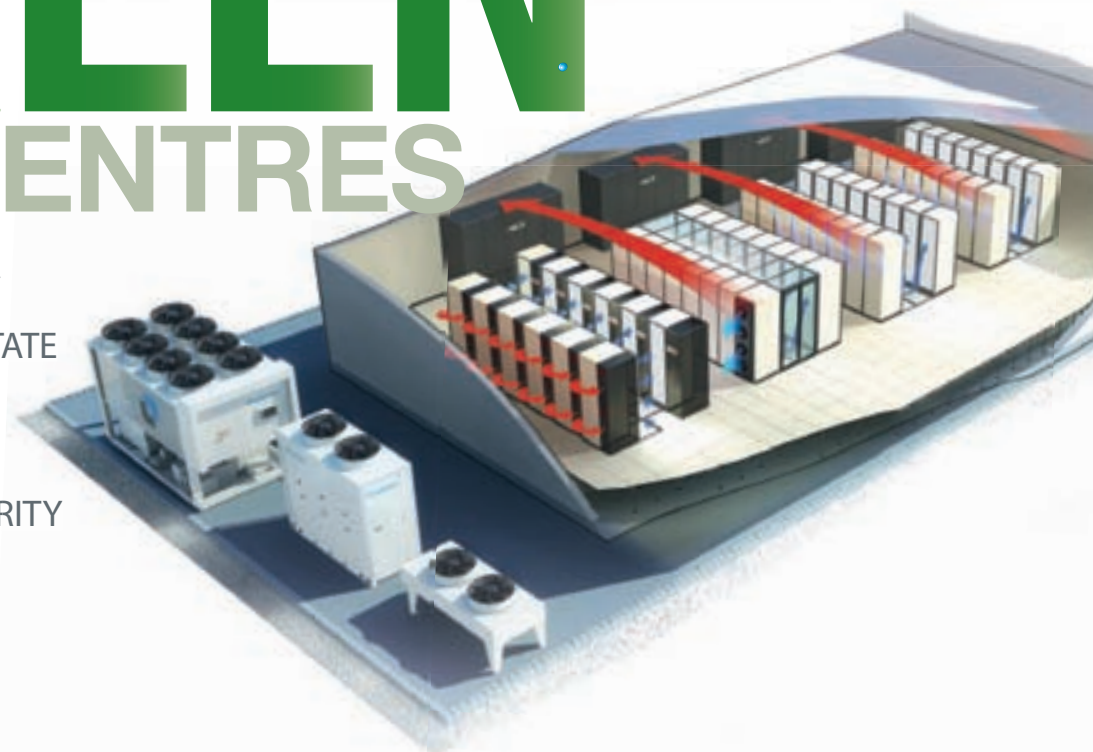
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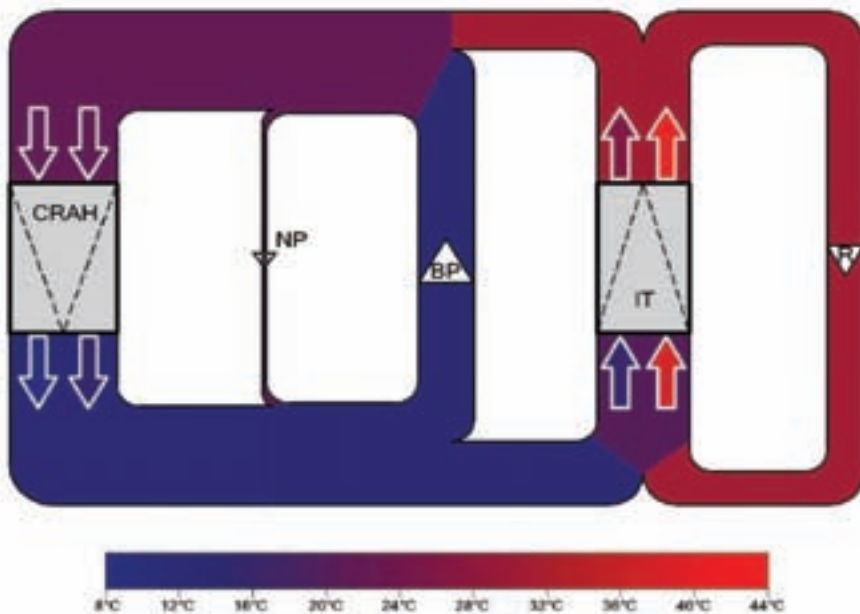
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## Air performance Metrics



Section of data hall air flows

CRAH = computer room air handling unit; BP = bypass air; NP = negative pressure; IT = computer racks

The first diagram represents typical legacy data hall air flows shown in section, with temperature indicated on the colour scale and the relative air volumes represented by the thickness of the lines.

Air performance metrics of a data hall are based on the four characteristic weighted average temperatures which are:

- T<sub>ci</sub>** Temperature cooling unit (CRAH) in (example 22°C)
- T<sub>co</sub>** Temperature cooling unit (CRAH) out (example 17°C)
- T<sub>ii</sub>** Temperature IT equipment in (example 21°C)
- T<sub>io</sub>** Temperature IT equipment out (example 27°C)

By considering the CRAH and IT loads to be equal, neglecting NP, and working with mass and heat equations, the following relationships are derived:

Flow performance, also equal to 1-BP, defines how much cooled air is actually being used by IT equipment:

$$\eta_{flow} = \frac{m_f}{m_c} = \frac{T_{ci} - T_{co}}{T_{io} - T_{co}}$$

$\eta_{flow}$  = flow performance

$m_f$  = air mass flow rate from cooling units supplied to IT equipment

$m_c$  = air mass flow rate through cooling units

$T_{ci}$  = temperature entering cooling unit (in)

$T_{co}$  = temperature leaving cooling unit (out)

$T_{ii}$  = temperature entering IT equipment (in)

$T_{io}$  = temperature leaving IT equipment (out)

Thermal performance, also equal to 1-R, defines how much of the air used by IT equipment actually comes from the cooling units (CRAHs):

$$\eta_{thermal} = \frac{m_f}{m_i} = \frac{T_{io} - T_{ii}}{T_{io} - T_{co}}$$

$\eta_{thermal}$  = thermal performance

$m_i$  = air mass flow rate through IT equipment

Flow availability, ratio of CRAHs to IT equipment air volumes:

$$A_{flow} = \frac{m_c}{m_i} = \frac{T_{io} - T_{ii}}{T_{ci} - T_{co}} = \frac{\eta_{thermal}}{\eta_{flow}}$$

$A_{flow}$  = flow availability

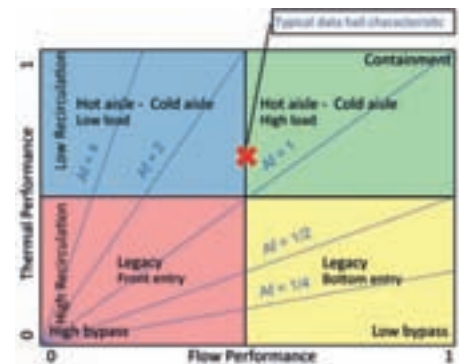
There is one characteristic point for each data hall. For the example of weighted average temperatures provided above, the following air performance metrics result:

Flow performance (1-BP) = 0.50

Thermal performance (1-R) = 0.6

Availability of flow = 0.6 / 0.50 = 1.20

This unique point for each data hall can be represented on the following figure:



Thermal and flow performance

The results shown are typical for a legacy facility:

- Half of all cold air supplied by the cooling units reaches the IT equipment, while the other half is wasted as bypass; and
- 60% of the air entering the IT equipment comes from the cooling units; the other 40% is recirculated warm air.

The ideal case is with flow performance and thermal performance equal to one, at the top right hand side of the diagram; it is possible to make improvements towards this ideal by implementing best practice.

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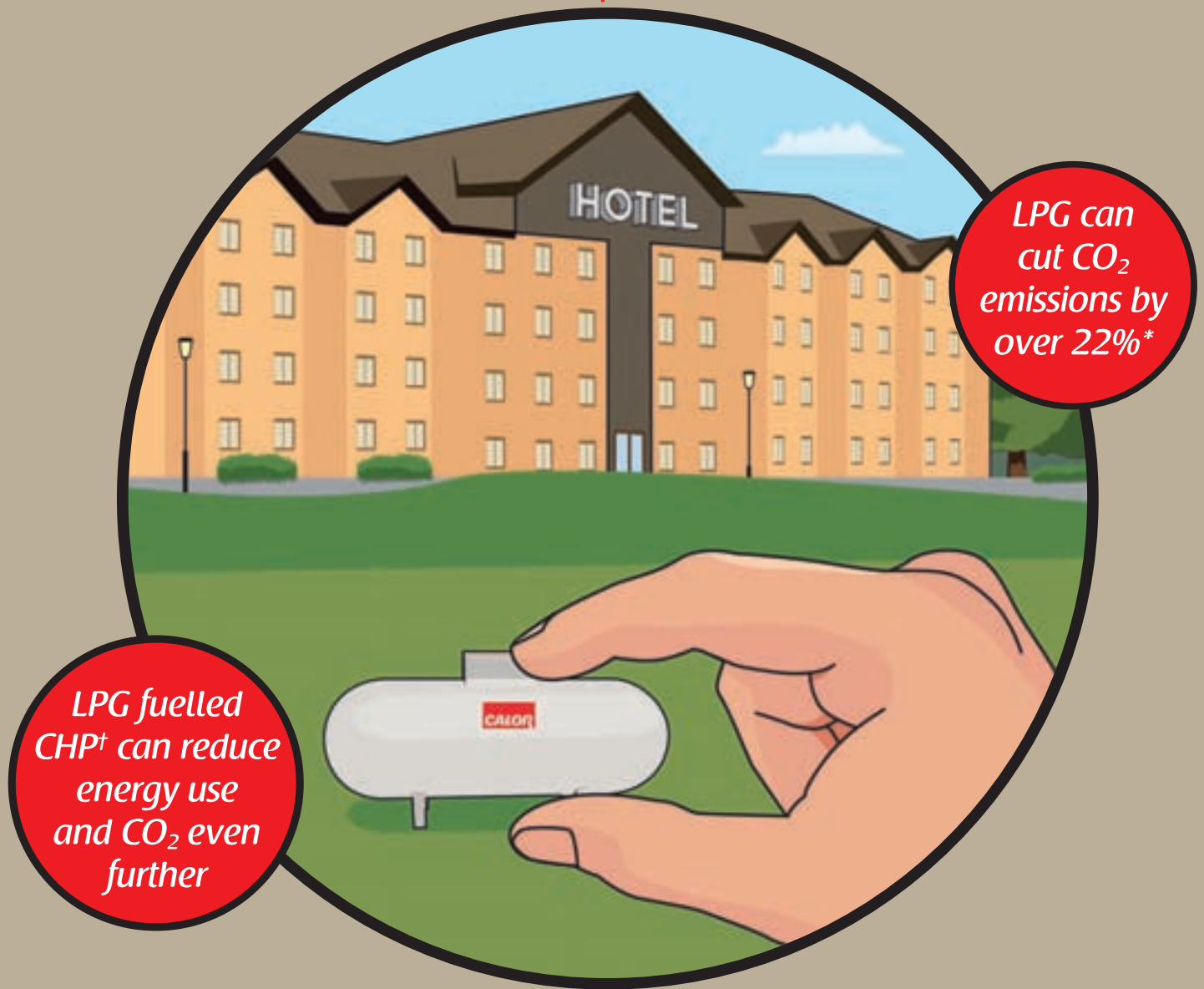


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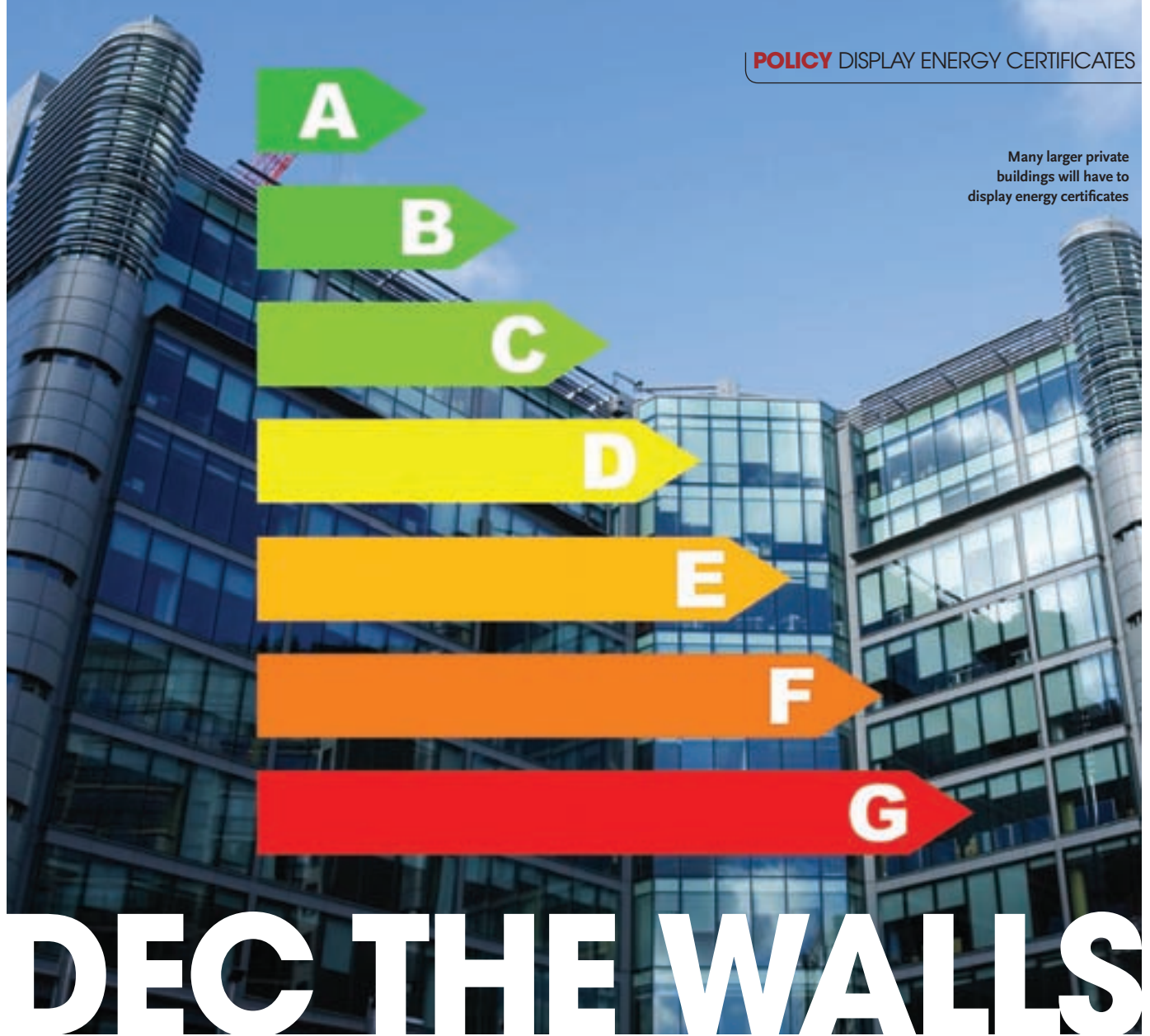
\*Quoted figures are based on specific circumstances. Further information is available at [www.calor.co.uk/nifes](http://www.calor.co.uk/nifes) \*\*NIFES is a consultancy specialising in energy efficiency, [www.nifes.co.uk](http://www.nifes.co.uk).  
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Many larger private buildings will have to display energy certificates



# DEC THE WALLS

Clients are prepared to accept the wider use of Display Energy Certificates, but will insist on improvements.

**Ewen Rose** reports from a CIBSE seminar

**T**he extended scope of Display Energy Certificates (DECs), announced as part of the 2010 'recast' Energy Performance of Buildings Directive (EPBD), has received a qualified welcome from building clients. They like the concept, but insist that what they regard as serious flaws in the current arrangements are ironed out.

Under the EPBD, the size threshold for public buildings that must display a DEC will be reduced from 500 sq m from July 2013. Many larger private buildings will also have to display certificates. The new rules demand that each individual building over the size threshold has its own certificate. This could require a substantial increase in the number of energy meters deployed. The CIBSE Benchmarks Committee feels that this is not necessary.

Clients who attended a CIBSE seminar

on the topic: 'All Hands on DEC', did not appear daunted by the requirements of the recast, but they now expect something in return; namely, a better class of DEC.

They questioned the 'robustness' of the current system and called for more consistent results to make it easier for property professionals to compare buildings. They also set engineers the challenge of closing the gap between DECs and Energy Performance Certificates (EPCs) – that is, making buildings perform closer to their design intent.

Most clients prefer an actual rating based on energy use, rather than sustainability or carbon, because cost is the main driver for prospective tenants.

The seminar heard that eventually tenants will refuse to take on a building if it does not have a DEC rating of C or above. However, that day is still some way off because of the

DECs are driving the installation of meters so we are all getting a better handle on energy data



## CIBSE VIEWPOINT

CIBSE supports the wide-spread application of DEC's, which can make energy and carbon performance visible and spur action.

With RIBA, CIBSE is also supporting Carbon Buzz, which allows design and building teams to understand actual performance in use and bridge the gap between DEC's and EPC's.

CIBSE would like to see a simpler entry level to DEC's, with automatic updates from the utilities, together with a more advanced level for those who can afford to go into extra detail.

CIBSE assisted the British Property Federation in developing the Landlord's Energy Statement (LES) in preparation for DEC's in commercial buildings, which at the time did not happen. The LES can now be revisited.

In the 1990s, the government's £200m Energy Efficiency Best Practice programme included a wide range of energy consumption guides, which CIBSE drew upon for *Guide F* and the *TM46* benchmarks. These are now long out of date.

There needs to be a major government effort on updating benchmarks to provide effective drivers towards the step-change government policy now envisaged for the energy and carbon performance of the building stock.

The benchmarking work needs to be well coordinated. The CIBSE Benchmarks Group is here to help, but the magnitude of the task needs much more than our volunteer resources.

perceived limitations of the current DEC's.

Justin Snoxall, head of the business group at British Land, said DEC's were a 'great management tool' that prove you can make major cost savings by managing building systems better without having to invest in new equipment. However, he said the current DEC's were 'not fit for purpose. The calibration has not been assessed against private buildings'.

'DEC's are driving the installation of meters so we are all getting a better handle on energy data,' he added. 'We look for a 5% energy reduction year-on-year, but we also need to be able to compare results with other buildings and, crucially, compare design with operation – that's what we are looking for from DEC's.'

A £1m investment in meters produced payback in three years across the group's property portfolio because the data gathered allowed for better energy management, he said.

As a result, Snoxall believes DEC's will have an increasing influence on property transactions. However, he said there was a need for the system to provide more specific information for landlords.

'We have whole-building DEC's and occupier ones; now we need landlord DEC's to illuminate the full energy picture,' said Snoxall. 'This would allow landlords to improve management of the services they provide in multi-let office buildings.'

Across British Land's office portfolio, shared services account for 36% of CO<sub>2</sub> emissions, common parts 14% and tenant energy use the other 50%, he said.

Bill Bordass of the Usable Buildings Trust said: 'Unfortunately, the government sees DEC's as red tape; they don't understand their value in making performance visible, and so the system is not properly underpinned. Achieving a DEC rating is often seen as an end in itself; people are too busy filling in surveys to actually do anything about the waste in building operation.'

The seminar considered the example of Australia, where rents are now being linked directly to energy ratings, so that tenants are encouraged to put a value on better energy performance.

This prompted Paul Edwards, head of sustainability at the developer Hammerson, to challenge engineers to ensure performance ratings recorded in DEC's

matched the design ratings stated on Energy Performance Certificates (EPC's).

'Come on building services engineers; we need to get DEC's to equal EPC's – if you deliver that we will pay you – and if you don't we will penalise you. If you deliver an A-rated building I will give you a bonus,' he said. 'I don't need to know how it is done; I just need to achieve it and be able to hold people to account.'

'DEC's are good for the private building sector because they create value by making your building look better than others. No-one wants a G-rating in their lobby,' added Edwards. 'We won't necessarily get more rent, but we will have fewer empty buildings.'

The legislators were also accused of getting hung up on carbon savings, when the key driver for commercial property investors was energy used and costs. Andy

Stanton, head of sustainable buildings at Transport for London (TfL), said his organisation had adopted DEC's voluntarily and

used them to create internal competition to improve energy savings.

As a result, TfL has increased the number of energy meters it used from 30 to 900 and has improved its ratings by 10% across its estate. It has also reduced the number of G-rated properties by 50%.

However, he said that managing the data from the meters 'has been very difficult, and converting it into something useful was challenging'. He said some things remained frustrating, including the amount of energy used in buildings when they were unoccupied.

Conference chairman Phil Jones of CIBSE's Energy Performance Group concluded that DEC's had proved themselves an extremely useful tool. Sub-metering has become much more common and the cost has fallen. However, there needed to be a big investment in benchmarking.

He added that compliance rates were disappointing and too many DEC's were set at a 'default' rating of G, which meant the building had not actually been assessed – the owners had simply met their legal obligation to have a DEC. Under the new rules, he pointed out, that will no longer be allowed. **CJ**

Unfortunately, the government sees DEC's as red tape – they don't understand their value in making performance visible



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KLIMA-THERM

A growing influence in workplace climate control

## Cooling options for data centres

This module considers the low energy cooling options currently available to help reduce the energy consumption and carbon footprint of data centres

The challenge to reduce mechanical cooling and carbon footprint has led to further developments in free cooling and adiabatic cooling. This article specifically looks at high energy use data centres, and at the evolving recommendations to reduce their energy consumption both by the use of free cooling equipment on mechanical cooling systems and by the introduction of adiabatic cooling equipment. The article follows a previous CPD in the July 2010 *Journal*, titled *Evaporative cooling enhancement on air cooled chillers*. However, one of the driving forces to develop lower energy consumption cooling systems has been the white paper prepared by the ASHRAE Technical Committee 9.9, 2011 *Thermal Guidelines for Data Processing Environments*. The principal elements of this paper will be considered, followed by the low energy cooling options that are currently available to meet the recommendations of the white paper.

### ASHRAE TC 9.9, 2011 *Thermal Guidelines for Data Processing Environments*

The first edition in 2004 sought to bring some recommendations for data centre environmental conditions. It was upgraded in 2008, with the aim of producing an environmental envelope that would lead to high reliability and energy efficiency, and then further upgraded in 2011. The main

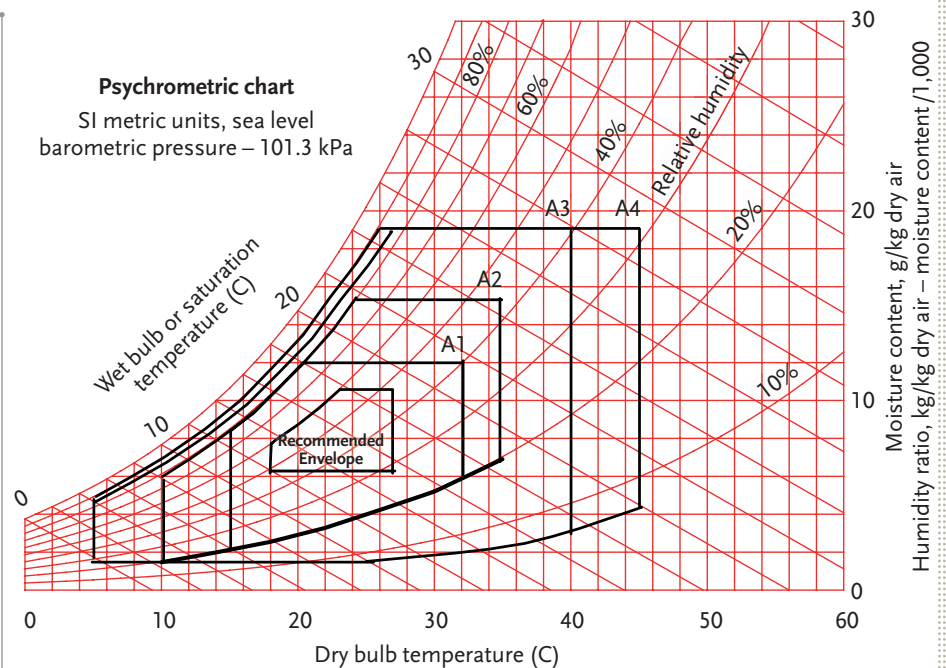


Figure 1: ASHRAE environmental classes for data centres

emphasis of the latest edition is to extend the recommended envelope to provide more options for the type and use of data centre server equipment, and to take into account the effects of different environmental conditions on server equipment. For example, the higher the selected room temperature, the greater power is required to operate the server equipment and the lower its reliability. This has to be balanced

against the requirement for smaller size cooling equipment, free cooling and/or adiabatic cooling enhancement. Figure 1 shows the recommended envelope and the allowable envelopes for the different data centre classes developed.

The 'allowable' limits expressed in Figure 1 are described as being acceptable to operate at for short periods of time, without affecting the overall reliability and operation



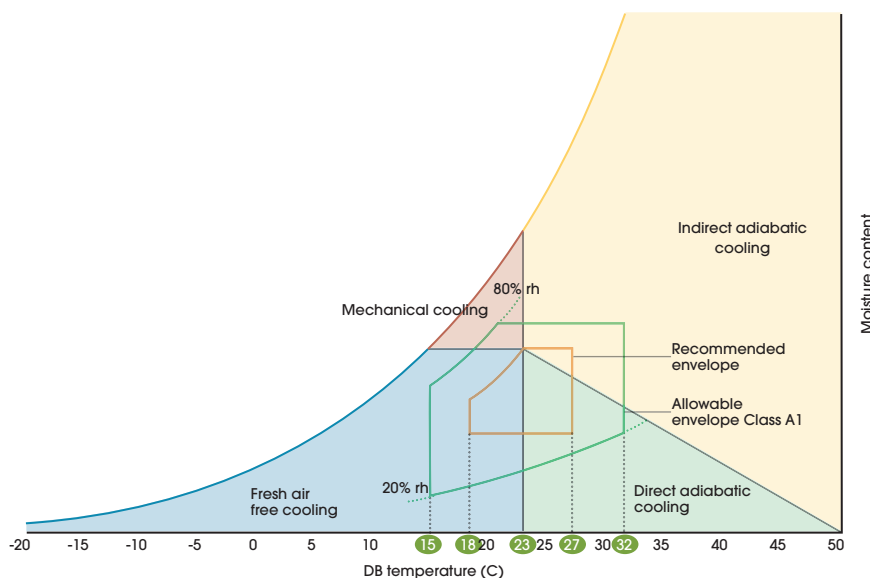


Figure 2: Free cooling options to meet the required environmental envelope

of the IT equipment. This presents a client with two options regarding reliability of IT equipment and energy savings, both in the IT equipment and the cooling plant:

- Option 1: use IT equipment that is optimised predominantly for reliability; and
- ▮ Option 2: use IT equipment that is optimised predominantly for energy saving and compressor-less cooling.

The ASHRAE white paper suggests that the industry requires both options, but also needs to avoid having option 2 inadvertently increase the purchasing cost of option 1 through mandatory requirements not desired or used by the end user. For example, expanding the temperature and humidity ranges can increase the physical size of the IT equipment and its required air flow (fan size). This can affect the embedded energy costs and power consumption, with the end result of increased cost of the IT equipment.

The principal design goals to be considered in the light of the recommendations from the ASHRAE 2011 paper<sup>2</sup> are:

- Reliability of the IT equipment;
- ▮ Low power usage effectiveness (PUE) (the ratio of power delivered to the site to the power used by the IT equipment);
- ▮ Adequate ventilation;
- ▮ Maximising the use of ambient conditions; and
- ▮ Minimising the use of mechanical cooling.

With the recommended environmental envelope from the ASHRAE white paper, the possibilities are great for reducing mechanical cooling for large energy users such as data centres. Based on the psychrometric chart analysis in Figure 2,

however, while the majority of cooling can be achieved without mechanical cooling, the need for reliability is one of the dominant factors, as the right weather and operating conditions cannot be completely guaranteed. Therefore, a system with mechanical cooling will normally be installed.

The expansion of the possible environmental operating area for data centre cooling has spawned a revolution in the approach to cooling design and a new challenge to the equipment manufacturers to innovate and design suitable new solutions for low energy equipment.

Where mechanical cooling is incorporated into the system, it must also maximise its efficiency, and this suits the centrifugal, oil-free, magnetic bearing, low starting/running current range of compressors. Energy efficiency ratios (EERs) of these machines actually improve at part load, which is ideal for applications like data centres, since the compressors may run unloaded for long periods when adiabatic cooling and free cooling are meeting the majority of the cooling demands.

The cooling options for data centres are:

- Direct cooling with an economiser;
- ▮ Indirect cooling with an economiser;
- ▮ Adiabatic cooling; and
- ▮ Mechanical cooling.

An air-side economiser simply uses the outside ambient air for cooling when its temperature is low enough to meet the space cooling demand within the recommended

environment envelope. Figure 2 shows this as the blue area. This free cooling can be tempered with recirculated air from the space when the outside temperature is too low.

Water-based economisers use the outside air to cool a fluid-based (water or glycol solution) system through a heat exchanger in the fresh air supply duct. The fluid is pumped to a second heat exchanger in the space supply air to provide the required cooling. These are not as efficient as air-side economisers, because they require a water-to-air temperature difference for the heat exchange at both ends, but they may be the preferred – or only – option where supply and extract ducts are not close together. There will be some energy consumption with both these systems, in the form of additional fan and pump power.

### Maximising efficiency using adiabatic cooling<sup>3</sup>

The free cooling range of operation can be extended by using adiabatic cooling. This is the evaporation of water in either a fine spray or an air washer method. Every litre of water evaporated requires about 2,500 kilojoules (kJ) of energy, and this energy is taken directly from the air, cooling it to a temperature close to the air wet bulb temperature. This is most effective in high dry bulb temperature, low humidity conditions. Control limits are set to avoid the humidity rising above the recommended environmental envelope. In Figure 2, the green area indicates the extended area of free cooling possible.

Additional energy savings can be made by installing a secondary air- or water-based heat exchanger, with adiabatic cooling in the extract air from the conditioned space. The cooling of the extract air, in turn, provides more cooling to the incoming fresh air. Since the adiabatic cooling takes place in the extract air side of the heat exchanger, there is no restriction on the humidity level. This further free cooling appears in Figure 2 as the pink area.



Figure 3  
Hybrid air cooled chiller

### Free cooling hybrid chillers

There are a number of free cooling and adiabatic chillers on the market today (including the one illustrated in Figure 3). Some have screw compressor technology and inverter drives with electronically controlled heat rejection fans, to try to reduce the high start up currents and high part load running currents, while others incorporate the centrifugal, oil-free, magnetic bearing compressor package already mentioned. These have a combination of both free cooling for low ambient operation and adiabatic cooling for high ambient scenarios (hence, 'hybrid'). The compressors have particularly low starting currents of about 5 amps per 350 kW cooling capacity. Seasonal EERs greater than 12 are easily achievable with these chillers, plus the higher chilled water temperatures allowed with the environmental envelope recommended for data centres. Table 1 gives an indication of the performance for the different options in which the chiller can operate.

A further development to this hybrid chiller is the addition of an actively managed evaporative system. Water is absorbed by a porous natural-fibre honeycomb array in the direct air path of the coils. The adiabatic cooling effectively reduces ambient temperatures in the immediate vicinity of coils by up to 10°C, lowering condensing temperatures and significantly improving the chiller's energy performance. The adiabatic advantage also increases chiller capacity at peak load conditions, enabling it to cope with high ambients that might otherwise overwhelm a standard chiller. The system can be set to activate automatically at a pre-determined external temperature. Water consumption is low. In UK conditions, £600 worth of water consumed a year results in energy savings worth some £8,000. In summary, the energy savings and improved performance also provide the following benefits:

- Extended working life due to reduced compressor run-time;
- Reduced service and maintenance, due to reduced run-time;
- Payback time further reduced; and
- Extended chiller capacity at peak load, enabling it to cope with extreme ambients that would defeat other chillers.

### Floating head pressure

The system operates with a floating head pressure, providing opportunities for savings not available to conventional

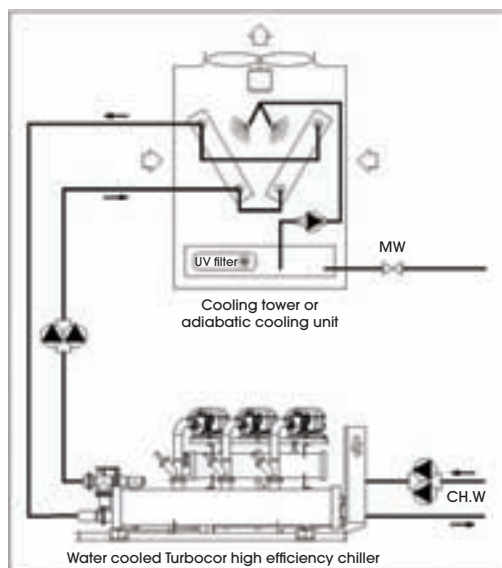


Figure 4: Water cooled Turbocor chiller with adiabatic cooler

designs. Unlike standard chillers that have fixed head pressure, this centrifugal compressor package constantly self-regulates and optimises its performance in response to ambient conditions and load.

### Water cooled options

Where internal plant room space permits and/or noise design criteria is exceptional,

water cooled versions of these low energy chillers can be used, matched with closed circuit cooling towers or adiabatic coolers. Figure 4 illustrates a typical system. Although doubling up on plant items, water cooled versions of the oil-free technology can achieve ESEERs (European Seasonal Energy Efficiency Ratio) in excess of 10, while using the higher allowable chilled water temperatures and capitalising on adiabatic cooling at higher ambient conditions. Centrifugal, oil-free chiller packages up to 2.4 megawatts (MW) are available. Lower condensing water temperatures can be achieved with this equipment and will produce a very efficient overall cycle. Lower starting and running currents for this type of equipment can also reduce infrastructure cabling cost and maximum demand charges, as well as running cost.

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### References

1. ASHRAE TC 9.9 white paper 2011 *Thermal Guidelines for Data Processing Environments*
2. Fresh Approach, *CIBSE Journal* April 2011, Marcus O'Brien
3. Klima-Therm 2011 *Adiabatic Free Cooling Options for Data Centre*

TMA 3A900B EC FC – Adiabatic system and free cooling					
Duty (kW)	Free cooling (kW)	EER (-)	Input (kW)	Ambient temp. (°C)	Working condition
900	0	4.8	187.4	35	Evaporative cooling
900	0	5.45	165.2	30	Evaporative cooling
900	229.6	8.73	103.1	26	Evaporative cooling
900	460.6	12.33	73	22	Evaporative cooling
900	870.8	22.96	39.2	15	Evaporative cooling
900	900	22.96	39.2	12	Dry mode
900	900	28.32	31.78	10	Dry mode
900	900	75.63	11.9	5	Dry mode
900	900	142.86	6.3	0	Dry mode
900	894.6	257.14	3.5	-5	Dry mode
TMA 3A900B EC FC – Adiabatic/dry mode only and free cooling					
Duty (kW)	Free cooling (kW)	EER (-)	Input (kW)	Ambient temp. (°C)	Working condition
900	0	4.43	203	35	Dry mode
900	0	4.8	187.4	31	Dry mode
900	0	5.45	165.2	26	Dry mode
900	344.4	10.39	86.6	20	Dry mode
900	694.4	16.95	53.1	15	Dry mode
900	900	28.32	31.78	10	Dry mode
900	900	75.63	11.9	5	Dry mode
900	900	142.86	6.3	0	Dry mode
900	900	257.14	3.5	-5	Dry mode
TMA 3A900B EC FC – Spray/dry mode without free cooling					
Duty (kW)	Free cooling (kW)	EER (-)	Input (kW)	Ambient temp. (°C)	Working condition
900	0	4.43	203	35	Dry mode
900	0	4.8	187.4	31	Dry mode
900	0	5.45	165.2	26	Dry mode
900	0	7.06	127.48	18	Dry mode
900	0	9.01	99.94	10	Dry mode
900	0	9.94	90.56	0	Dry mode
900	0	10.23	88	-5	Dry mode

Et. glycol 20%; RWT= 26°C; LWT= 20°C; Reference capacity 900 kW

Table 1: Typical energy savings and EERs for hybrid chiller



# Module 39

April 2012



KLIMA-THERM

A growing influence in workplace climate control

**1. The recommended envelope's upper dry bulb temperature limit for data centres in the ASHRAE TC 9.9 2011 white paper is:**

- ☐ A 35C  
☐ B 27C  
☐ C 42C  
☐ D 18C  
☐ E 40C

**2. What is the maximum allowable dry bulb temperature for class A1 data centres?**

- ☐ A 27C  
☐ B 35C  
☐ C 32C  
☐ D 45C  
☐ E 22C

**3. Which of the following is NOT a principal design factor to be considered from the ASHRAE TC 9.9 2011 white paper:**

- ☐ A Reliability of the IT equipment  
☐ B Low power usage effectiveness  
☐ C Adequate ventilation  
☐ D Maximise the use of ambient conditions  
☐ E Adequate lighting levels

**4. Water cooled versions of the oil-free centrifugal compressor technology chiller can achieve ESEERs in excess of:**

- ☐ A 10  
☐ B 25  
☐ C 12  
☐ D 18  
☐ E 40

**5. Which of the following does NOT improve the performance of the cooling system?**

- ☐ A Economiser for free cooling  
☐ B Floating head pressure control  
☐ C Adiabatic cooling  
☐ D Reducing the size of the chiller heat exchangers  
☐ E Low current drawn on the compressor motor at part load operation

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## Advertisement feature

# NEW COOL-PHASE PCM SYSTEM FROM MONODRAUGHT SOLVES OVERHEATING PROBLEM FOR NOTRE DAME SCHOOL

The Notre Dame Catholic girls' school in Southwark, Central London has been based on the same site for over 150 years. The existing building, which dates back to the Victorian era, has a number of areas where overheating is a problem for various reasons, including external heat gains, changing usage and additional heat loading within the space due to computers and other equipment.

Split air conditioning (AC) systems were installed to provide cooling for a number of problem areas, but the only ventilation available was via the opening and closing of manually operated windows. Due to concerns with running costs, sustainability and the mounting of external split AC units to the outside of the building, the school was keen to consider an easily-retrofitted, environmentally-friendly solution for its future ventilation and cooling needs.

Monodraught's new COOL-PHASE® low energy cooling and ventilation system was recommended by the school's consultant Tom Cairns, due to its potential to maintain classroom temperatures, and improve air quality whilst minimising energy usage and running costs. A trial was run to compare Cool-Phase to the AC systems installed elsewhere in the school.

To evaluate the Cool-Phase system's innovative phase change material (PCM) technology, two systems were installed in April 2011 in an IT classroom that experienced high internal heat gains from 30 PCs and an overhead projector, and suffered solar gains created by partly shaded windows.

To ensure an accurate evaluation and provide a performance comparison with the Cool-Phase system, two 'control' areas were chosen. The first was also an IT classroom equipped with 30 PCs and an overhead projector. It suffered similar internal heat gains to the classroom in which Cool-Phase systems were installed and, due to solar gains from south-west facing windows, slightly higher external heat loading. A wall mounted split AC system was already providing cooling for the control IT classroom.

The second control area was a Geography classroom equipped with only a single PC and overhead projector, which experienced a much

lower internal and external heat loading. This room was chosen because it was located next to the Cool-Phase equipped IT classroom and would provide a baseline with which to compare performance.

To compare the environments before the Cool-Phase trial, data logging equipment was installed in each classroom to monitor temperature and CO<sub>2</sub> levels every minute during the spring term; and confirmed that the rooms did indeed have similar internal heat loadings.

The results show that Cool-Phase achieved an impressive reduction in average temperatures before and after the installation. The percentage of hours between 8am and 4pm when temperature or CO<sub>2</sub> levels were above a set point, confirm that the Cool-Phase system achieved better performance than both control rooms even with the air conditioning installed. The Geography classroom, despite its lower heat loading, experienced temperatures above 25°C for 59% of the time, while Cool-Phase reduced the time in its IT classroom to just 2%.

With the AC system turned on in the second control room some areas were overcooled and the AC was turned off as a result, predictably temperatures then rose until the AC needed to be turned on again! Also, since opening windows provided the only ventilation source, they contributed to higher temperatures because the AC's cooling effect was lost, explaining why so many hours above 25°C and 28°C were recorded even with AC installed.

A similar pattern emerged with CO<sub>2</sub> levels, where data showed that the control IT classroom fitted with AC was not as well-ventilated as the Cool-Phase IT classroom. To some extent this was expected because the control IT classroom had windows only on one side, whereas the Cool-Phase



classroom had windows on opposite sides of the room, allowing cross ventilation. An improvement in the background air quality between spring and summer terms can be explained by windows being opened more frequently.

However, despite the opening of windows the Cool-Phase system resulted in a marked reduction in the number of hours when high CO<sub>2</sub> levels were recorded. In fact, the 44% of hours recorded above 1500ppm in the control IT classroom was reduced to just 2% in the Cool-Phase IT classroom – a major improvement. CO<sub>2</sub> levels above 1500ppm correlate with studies indicating poor concentration levels and tiredness.

The deputy head-teacher Jocelyn Lewis who regularly teaches in the classroom says "The installation of the Cool-Phase system has had a profound effect on the students. They settle more quickly and there is a much more focused start to the lesson. Now the pupils can concentrate on their learning."

The head teacher Sr. Anne Marie Niblock commented "I think this is a really positive story for the school and the students." adding: "Cool-Phase has proved effective, sustainable and economically viable and ideally we would like the system fitted throughout the school."

Cool-Phase is a registered trademark owned by Monodraught Limited.

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## MHS Boilers at historic abbey

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● For more information email [sales-support@armstrong.co.uk](mailto:sales-support@armstrong.co.uk) or visit [www.armstrong-ceilings.co.uk](http://www.armstrong-ceilings.co.uk)



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

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

● For more information call 01293 871751 or visit [www.castlinesystems.com](http://www.castlinesystems.com)

## JS Humidifiers keeps hops tip-top at brewery with Condair CP3

JS Humidifiers has supplied two Condair CP3 electrode boiler steam humidifiers to maintain the humidity of the hops in Timothy Taylor Brewery's new hops store at Keighley. Wilsden-based contractor and installer, Airedale Cooling Services, approached JS Humidifiers as the companies had worked together previously and JS had already supplied two humidifiers for the brewery's original hop store two years ago. JS specified the Condair CP3 5kg/hr in-room humidifiers to satisfy the conditions for optimum hop storage of 65% relative humidity at 50C.

● For more information call 01903 850 200 or email [dmarshallgeorge@jshumidifiers.com](mailto:dmarshallgeorge@jshumidifiers.com)



## Evinox fits art history and library centre

The Kent History and Library Centre has been described as one of the most innovative in the UK, providing local people with state-of-the-art facilities and better access to Kent's culture and heritage. It houses around 14 kilometres of historic material relating to Kent, dating back to 699 AD, and is a fantastic resource for anyone interested in local history. The Evinox boilers were chosen due to their excellent seasonal efficiency performance, which enabled the client to obtain extra points for BREAM certification.

● For more information call 01372 722277 or visit [www.evinox.co.uk](http://www.evinox.co.uk)



## New kit meets MCS solar PV test needs

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

● For more information call 0191 5863511 or visit [www.seawardsolar.com](http://www.seawardsolar.com)



## Crane Fluid Systems launches cost-effective Press-Fit valve range



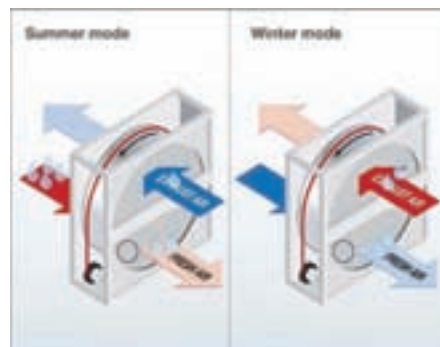
A core range of Press-Fit valves, featuring integrated Geberit Mapress adaptors, has been launched by Crane Fluid Systems. Comprising a ball, balancing, strainer and check valve, this new range connects effortlessly, offering building services engineers a variety of time and cost-saving benefits, as well as the excellent quality and reliability comparable with traditional threaded or soldered joints. The range features the same exacting specification as Crane Fluid Systems' valves, but with the additional benefits of integrated Geberit Mapress adaptors.

● For more information call [www.cranefluid.com](http://www.cranefluid.com)

## Crawley win for Stanley CSS

Stanley Convergent Security Solutions (Stanley CSS) has completed the security and fire system installations for Crawley Borough Council's Town Hall and local football stadium. A comprehensive CCTV system has been installed across both the six-storey town hall and at Broadfield Stadium, one of the finest non-league stadiums in the country with a capacity of 4,996 and home to Crawley Town Football Club. The CCTV was installed as a crime prevention measure and to ensure the safety of council staff and visitors to the sites.

● For more information call 01793 692401 or visit [www.stanleycss.co.uk](http://www.stanleycss.co.uk)



## Climaveneta's i-Whisper offers efficient alternative to AHU and chiller combinations

The latest addition to Climaveneta UK's i-Whisper range is the i-Whisper Enthalpy, a reverse cycle air-to-air packaged rooftop unit with inverter driven scroll compressor and enthalpic heat recovery wheel for enthalpic heat recovery and free cooling. It also features a 'plug and play' approach for simplified installation and maintenance. In bringing precise control of temperature and indoor air quality together in a single unit, i-Whisper Enthalpy is an ideal alternative to a combination of air handling units and chillers.

● For more information call 0871 6630664 or visit [www.climaveneta.co.uk](http://www.climaveneta.co.uk)



## Rayburn's £500 cash back for installers

Installers are receiving £500 cash back when they install one of Rayburn's Heatranger 600 series of oil-fired central heating range cookers, or its 480CD gas-fired condensing model under the benchmark scheme. The Rayburn 600 series is the only range of oil-fired appliances in the UK to be backed by the Heating and Hot Water Industry Council's Benchmark scheme. Installers are not the only ones to benefit. Homeowners who have a Rayburn 600 or 480CD installed under the scheme will enjoy an extended five-year guarantee.

● For more information call 01952 642062

## Low-cost combined CO<sub>2</sub> temp and humidity sensor from Titan Products

Titan Products has launched a new range of low cost, combined CO<sub>2</sub> temperature and humidity sensors, designed to be used in classrooms, theatres and meeting rooms to ensure that working conditions are kept comfortable and productive. With list prices starting from only £120, the TPVRCO<sub>2</sub>T range of room sensors provides CO<sub>2</sub> and temperature measurement with the option of an additional 0-10V output for relative humidity. There is also a resistive temperature option available. Optional LEDs can also be added to provide status indication of the measured CO<sub>2</sub> concentration levels.

● For more information call 0161 406 6480 or visit [www.titanproducts.com](http://www.titanproducts.com)



## Windowmaster widens distribution options by appointing new partners

WindowMaster, Europe's largest provider of natural comfort and smoke ventilation solutions, is increasing its distribution capabilities by appointing more than 20 new distribution, installation and service partners. WindowMaster is now able to supply its products directly through selected certified partners in the UK, Ireland, Belgium, Germany, Australia and the US. The network will enable WindowMaster to supply its natural comfort solutions directly into fresh global markets. Certified partners will provide WindowMaster's end users with a direct point of contact for parts and service.

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

## Tesco superstore shoppers stay safe and cool with SE Controls

An integrated smoke and natural ventilation solution from SE Controls is helping ensure that Tesco's recently completed Walkden superstore in Manchester maintains a safe and comfortable environment for shoppers and staff. Constructed as part of the £80 million Ellesmere Centre retail development and designed by AEW Architects, the new store replaces an existing Tesco on the same site, but has been expanded to provide more than 168,000 sq.ft of floor area, making it one of Europe's largest Tesco Extra stores. Working to the smoke control strategy defined by consulting engineers Van Zyl & de Villiers, the store's expansive glazed

atrium was separated into three individual smoke and natural ventilation zones to not only provide the specified smoke extraction capacity, but also enable more accurate temperature control.

● For more information call 01543 443060 or visit [www.secontrols.com](http://www.secontrols.com)



## Oceanair highlights expertise at ACR show

Oceanair (UK) Ltd, the UK's leading Panasonic and Fujitsu specialist, will be displaying the latest high efficiency air conditioning from across its range and promoting the company's expertise in delivering sustainable, low-carbon cooling and heating solutions. The company (Stand E35) is a leader in the design, application and commissioning of electric VRF, Gas-powered Heat Pumps (GHP) and air-to-water systems. It has a growing track-record of designing and commissioning air conditioning systems to meet the highest environmental standards.

● For more information call 0845 6800 410.



## Simply Food – simply Weatherite

When Marks & Spencer decided to improve the environment at its Simply Food store in Derby, they turned to Weatherite Building Services (WBS) to install a new air conditioning system. WBS designed and installed the latest, energy efficient heat pump ducted system to provide better air flow distribution around the cold aisle area and also modified the existing ductwork to provide better airflow distribution throughout the rest of the store. WBS specified Mitsubishi equipment, which delivered an improved environment for customers.

● For more information call 0121 665 2266 or email [rboswell@weatheritegroup.com](mailto:rboswell@weatheritegroup.com)

## DRU Art heaters at ballet school

The Dorothy Stevens Ballet and Theatre School in West Yorkshire is one of the UK's most famous dance academies, run for more than 50 years by the indefatigable Dorothy Stevens. It has trained thousands of aspiring dancers and theatre performers. The school building was recently in need of a new heating system. Miss Stevens selected the Art series gas wall heaters, which have a balanced flue system, allowing them to be run independently or as part of a thermostatically-controlled heating network.

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



## Consultancy delivers critical designs for ICU upgrade

Henderson Green is playing an important role in the reconfiguration of the Intensive Care Unit at Jersey General Hospital in St Helier. The consultancy was selected by States of Jersey Health and Social Services Department to undertake the complete Mechanical and Electrical designs for the Unit. In the existing ICU department, care is currently split between medical, surgical and single isolation facilities. The £2.5m scheme will bring the facilities together to create a five-bed combined Unit and two Isolation Rooms.

● For more information visit [www.hendersongreen.co.uk](http://www.hendersongreen.co.uk)



## Hamworthy introduces site survey

Hamworthy Heating is introducing a bespoke site survey - designed to help identify a client's needs and ensure the recommendation of the most suited boilers, water heaters or renewable energy products.

By conducting a site survey, Hamworthy is taking a proactive approach to understand the demands faced by its clients today - a point HVCA

president, Bob Shelley, emphasised at the organisation's annual general meeting as key to contractors remaining "in business and in profit" during the tough economic period.

● For more information call 0845 450 2865 or visit [www.hamworthy-heating.com](http://www.hamworthy-heating.com)





## HygroMatik launches new website

HygroMatik has launched a new and improved website detailing 40 years' international experience in humidification. The website offers a comprehensive insight into each product within the precise speciality area for the HVAC and SPA sectors. Each section provides detailed explanations for the product ranges and precise application areas. For example, the HVAC section describes the relevant specifications for offices and public facilities, production and research and storage. The SPA section defines the relevant applications for HygroMatik's steam generators, including the luxurious steam bath and Turkish hammam.

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

## Imofa UK launches range of ATEX-certified duct heaters

Imofa UK, specialist supplier of bespoke air handling, heating, cooling and ventilation plant, has expanded its range of highly successful electric duct heaters with a new range of ATEX-certified heaters from VEAB. Designed for heating air in duct systems, central ventilation plant or industrial processes where the danger of explosion occurs, the heaters are approved to EC/EFTA requirements for zone one and zone two hazardous areas. Flexible design and production and a range of sizes, from 1kW to 400kW, enables the heaters to be adapted for a wide variety of applications and industrial

## Bolshoi Theatre gets a complete refit

The Bolshoi company was formed back in 1776 and the current, now world famous theatre in Moscow opened its doors in 1856. Today the building that is regarded by many as one of Moscow's icons and a 'must visit' tourist attraction and has once again been transformed thanks to a massive restoration project that took place from 1 July 2005 to 28 October 2011 to complete. Such a significant project involved upgrading many aspects, including the HVAC solution and this is where Grundfos Pumps was on hand to offer its expertise.

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



## Dimplex SmartRad scores in Scandinavian-style showhome



For an aspirational Swedish-style show home on the outskirts of Durham, housebuilder Dunelm Homes has found that Dimplex SmartRad fan convectors strike just the right note with their

combination of advanced performance, low temperature sustainable heating and striking designer looks. Dunelm Homes prides itself on delivering the customer's dream home, right up to personalised Grand Designs-style homes. Inspired by Scandinavian design, Dunelm developed the Climät Hus concept; a contemporary open-plan home featuring integrated renewable technology, efficient heating systems and Dimplex SmartRad heaters.

● For more information call 0845 601 5111 or visit [www.dimplex.co.uk](http://www.dimplex.co.uk)

## Rinnai – continuous hot water to infinity and beyond

Rinnai's Infinity 16i continuous flow water heater is designed to meet the hot water needs of domestic and light commercial applications, offering reduced levels of energy usage and harmful emissions. The 16i provides a constant flow of safe hot water via accurate temperature control with a delivery capacity of 15.2 litres per minute. Water temperatures can be pre-set through easy-to-use built-in digital controls, eliminating the risk of scalding and eradicating the need for thermostatic mixing valves.

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



sectors, with flanged and insertion versions available for installation into duct systems and air handling units.

● For more information call 01206 505909 or visit [www.imofa.co.uk](http://www.imofa.co.uk)

## All the options - Shell and Tube from MHS

The Shell and Tube range from MHS Boilers is a selection of reverse flame and three-pass, shell-type boilers, with outputs from 60kW to an impressive 10.5MW. The range includes the latest forced draught low-temperature hot-water boilers. A notable model is the Ecocond series of narrow-bodied, three-pass, shell and tube type condensing boilers. The 11 models in the Ecocond series have outputs from 110kW to 641kW and are suitable for natural gas, LPG and heating oil, including biofuel.

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



## Water supply pipe sizing and drainage design software

What is the wastewater flow for multi-use building having 12 apartments, offices with 6 WCs/WBs, and public toilets with 10 WCs/WBs? Answer 6.52 l/s. If you are unable to give the answer in under one minute then you should be using SanCheck; one of five applications within the PH Office Calculation Suite, competitively priced at £95 + VAT, supplied as a binder enclosing a CD and user guide.

● For more information visit [www.phoffice.co.uk/design-software.php](http://www.phoffice.co.uk/design-software.php)

## Stylish new BPT Perla door entry monitor

The latest addition to BPT Security Systems' XiP and X1 door entry systems, the Perla wall-mounted monitor and handset with intercom combines the latest designer looks with low power consumption. Available in both video (with 3.5 ins LCD screen) and hands-free wall-mounted audio versions, Perla features ergonomic controls for ease of use and a stylish contemporary design with blue backlit buttons. It is available in a choice of Ice White or Fusion Black to complement most interior decor.



● For more information call 01442 230800 or visit [www.bpt.co.uk](http://www.bpt.co.uk)



## Biomass district heating opts for Hilina Aqua pipe system

CPV's pre-insulated Hilina Aqua pipe system has been specified for a new home heating scheme, fuelled by sustainable biomass. Lead system designers for the project, The Bruce Boucher Consultancy, demanded high performance, ease of installation and strong field support when choosing energy conserving pipes for the Binton Farm project in Surrey. The Hilina Aqua pipework distributes central heating and hot water services from a wood chip-fired energy centre to seven new properties.

● For more information call 01794 322884 or visit [www.cpv.co.uk](http://www.cpv.co.uk)



## Static Systems fit out emergency care centre in Aberdeen

Static Systems Group (SSG) is currently providing integrated systems, including nurse call, staff attack and bedhead trunking, at the £110m Emergency Care Centre at Foresterhill, Aberdeen, one of the most ambitious construction projects undertaken in the north east of Scotland. In a contract valued at almost £1m, SSG is installing equipment to eight of the floors encompassing A&E and acute medical assessment, along with specialist areas such as cardiology, renal, respiratory, oncology and many more. The 10-storey, 365-bed, new build scheme will serve around 70,000 patients a year.

● For more information visit [www.staticsystems.co.uk](http://www.staticsystems.co.uk)



## Danfoss relaunches website

Heating controls manufacturer Danfoss has given its website a fresh look with fast-track navigation to pages tailored to the needs of either the heating trade and building professionals or domestic heating consumers. Visitors can now select their area of interest in either the 'My Business' or 'My Home' sections. In just a couple of clicks they will find the information that's relevant to them, whether they are a homeowner seeking energy saving advice or an installer looking for Danfoss product guides and training programmes.

● For more information call 0845 1217400 or visit [www.danfoss-randall.co.uk](http://www.danfoss-randall.co.uk)



## Gas-fired heating for large open-space buildings

Stokvis Energy Systems has introduced a new range of gas-fired air heaters that provide combined heating and ventilation solutions across a broad range of industrial and commercial buildings, including factories, warehouses, sports centres and theatres. Combined heating and ventilation units ensure

precise control, excellent indoor air quality and optimum energy efficiency. The new Econo-Air units are available as either direct fired or indirect fired to give complete flexibility for optimum design capability.

● For more information visit 0208 7333050 or visit [www.stokvisboilers.com](http://www.stokvisboilers.com)



# PRODUCTS & SERVICES

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## REHAU's biggest ever Scottish installation nears completion

The largest ever installation of REHAU underfloor heating in Scotland is nearing completion in the new £22m Chryston High School, being built as part of North Lanarkshire Council's £200m Schools and Centres 21 programme. More than 45,000 metres of REHAU PE-Xa 16mm pipework has been installed across a floor area of more than 8,000 sq m – larger than a full-size football pitch. In the classroom and corridor areas of the new school, the pipework has been fixed in reverse spiral circuits using REHAU's TACKER system.

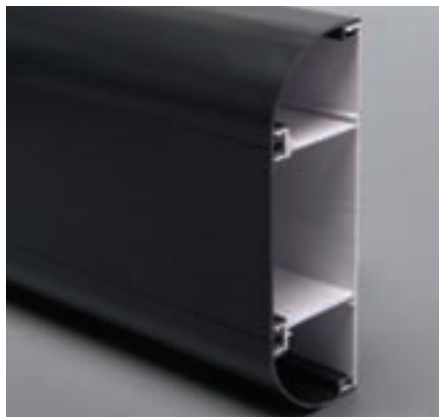


● For more information visit [www.rehau.co.uk](http://www.rehau.co.uk)

## Chiller saves energy at Pegasus House

Weatherite Building Services (WBS) has provided a replacement chiller system for Pegasus House, Swindon. The energy-efficient solution is intended to improve the building's cooling performance and long-term running costs. Pegasus House is a multi-let property. The upgrade was part of the landlord's investment program for replacing R22 plant, while improving air conditioning capabilities and running costs for tenants. WBS selected two energy-efficient chillers to replace the footprint of the existing R22 models, which were at the end of their useful life.

● For more information call 01922 741641 or email [mthomas@weatheritegroup.co.uk](mailto:mthomas@weatheritegroup.co.uk)



## Blackout cabling solution for Building Schools for the Future scheme

Marco, the UK's largest manufacturer of Steel Wire Cable Tray, has supplied its Elite trunking in charcoal grey as part of a new blackout drama room at Farnley Park High School, Leeds. The £23m Building Schools for the Future programme will see a host of new facilities for the secondary school. Marco is supplying cabling solutions to the electrical contractor across the large-scale site and developed a bespoke colour specification to blend seamlessly with the new drama centre.

● For more information visit [www.marcocableman.co.uk](http://www.marcocableman.co.uk)



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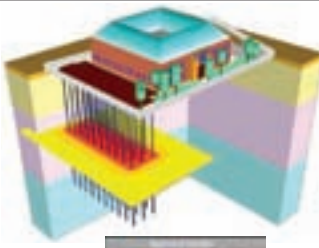

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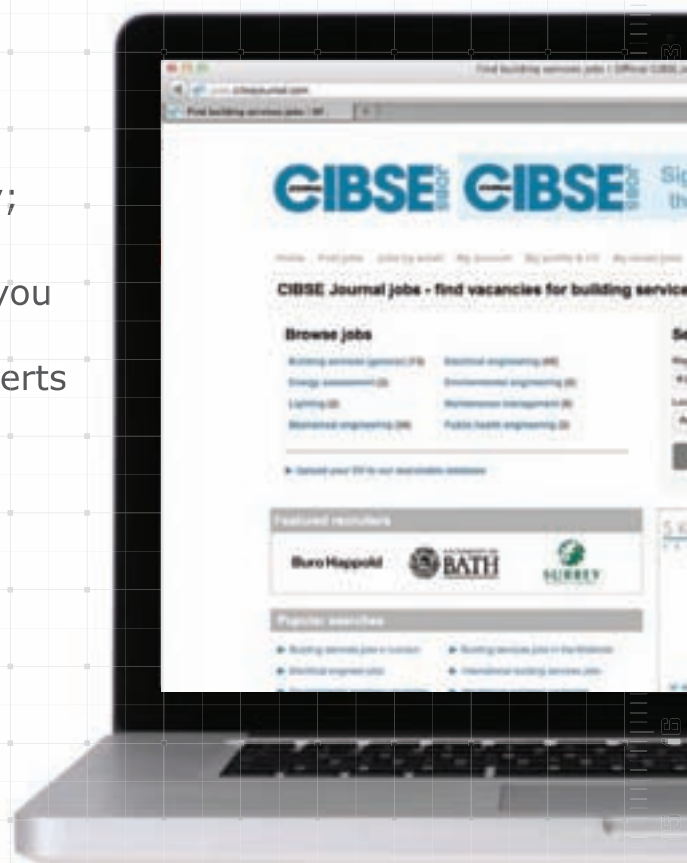
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Talent Motion is working in partnership with Asia Pacific's leading sustainable building services consultancy. Established for over 50 years, they operate from offices in Australasia, SE Asia and employ over 500 staff. Seeking to strengthen the management teams in their Melbourne and Honolulu offices, we have been retained to identify talented individuals located outside of these local markets. With an excellent track record of relocating and retaining engineers from all over the world, this is an outstanding opportunity to make a long term career move internationally. As well as a market leading salary and benefits package, they offer an extensive relocation package including: Shipping + Flights + Visa Sponsorship.

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

**www.talentmotion.com**

### Senior Electrical Engineer

£34,549 to £38,961 a year.

Ref: 504410

37 hours a week at County Hall, Preston, Lancashire PR1 8XJ. An experienced electrical design engineer is required to fill the post of Senior Electrical Design Engineer within Lancashire County Council's Commissioning and Construction Unit. The post forms part of the Mechanical and Electrical Design Section and is one of a team 10 design engineers.

The role requires a degree qualified engineer with a minimum of seven years post qualification experience. Candidates should ideally be Chartered or at least actively working towards Chartered Engineer status. An additional qualification in a specialist area of electrical building services is desirable.

Good knowledge and experience in design of electrical building services is essential as are skills in preparation of contract documents, project management and the ability to work quickly and accurately. The role requires the non-managerial supervision on a team of three design engineers and a trainee engineer.

**Essential:** You must have a degree or equivalent in Building Services Engineering with an electrical bias; and Chartered Engineer (or actively working towards Chartered status), membership of CIBSE. You must have: substantial experience in Electrical Building Services Engineering; preparation of designs and contract documents; and experience of project Management of Electrical Building Services installations.

**Informal discussion:** Matthew Tidmarsh on 01772 533243.

The post you are applying for is covered by the Rehabilitation of Offenders (Exceptions) Act 1975. If successful you will be required to apply to the Criminal Records Bureau for a 'disclosure'. You will be required to provide a car for use in connection with the duties of this post and must be insured for business use. However, we may consider you if you cannot drive because of a disability.

**Interview date:** 24 May 2012.

For more information and to apply online visit: **www.lancashire.gov.uk/vacancies**  
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**Closing date:** 30 April 2012.



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If you are due to graduate this summer, or if you have recently graduated in the last 2/3 years and are looking for your next employment opportunity, we are hosting an Open Evening on Wednesday, 27th June 2012 at our London office. You will be able to spend an evening with us to find out more about our Graduate and employment opportunities and you will be able to meet our current Trainees, Graduates and Engineers who have progressed their careers with us over the past few years. Our Senior Management Team will give you an insight into working life at Chapman Bathurst.

If you are interested in attending our Open Evening then please forward your name, CV and contact details, to [openevening@chapmanbathurst.com](mailto:openevening@chapmanbathurst.com) by the 20th April 2012.

No agencies please.



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### Senior/Assoc Electrical Design Engs | London | to £60K | ref: 2680

An international blue-chip company is looking for senior and associate electrical design engineers. Suitable candidates will ideally be Chartered and have worked on large rail or airport projects previously.

### Int/Senior M&E Design Engs | Southampton | to £40K+ | ref: 1956

We are looking for intermediate and senior M&E engineers for a client based in Southampton. Ideal candidates will be degree qualified, have relevant post graduate experience and be Chartered, or working towards.

### Electrical Technical Director | Berkshire | £60-70K++ | ref: 2053

Our client, an international multi-disciplinary consultancy, is looking for a lead electrical engineer. Ideal candidates will be Chartered and have a proven track record in the delivery of major projects in the UK and overseas. Current projects include airports and commercial offices.

### Senior Electrical Design Engineer | Surrey | to £35LTD | ref: 2083

We are looking for a senior electrical design engineer for a busy multi-disciplinary consultancy. Candidates will be degree qualified and have experience of industrial or pharmaceutical projects. Long term opportunity!

### Revit MEP Coordinators | London/Home Counties | to £32LTD | ref: 1934

Our clients are looking for experienced Revit MEP coordinators who are currently using the software on a daily basis. Candidates who have recently completed the Revit training course will also be considered.

### Security Cleared Candidates | Berkshire | £HIGH! | ref: 1198

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## Senior Electrical Design Engineer

London, £43k - £48k + benefits

Our client is an iconic architectural practice that has been involved in the design of some of the most high profile and prestigious projects in the UK and Worldwide. Your detailed understanding of electrical engineering will contribute towards pioneering sustainable engineering solutions on some of the largest and most complex projects in the world. You should be I.T. literate, possess good interpersonal skills, be on track towards becoming chartered, and be able to assist with the management of junior graduate engineers.

BAR790/JA

## Associate Director (Mechanical)

Aberdeen, To £60k + benefits

We currently have a fantastic opportunity for an Associate Mechanical design engineer to join an award winning design consultancy. The client has over 150 staff, operating from 6 UK offices and undertakes projects in a broad range of sectors. Due to an increase in workload, they are currently looking to bolster the management team in their Aberdeen office. Ideally the successful candidate will be a degree qualified, chartered engineer. You should have the ability to demonstrate extensive commercial, management, and technical expertise.

BAR788/CM

## Electrical Technical Director

Dubai, UAE, 60000 dirhams pcm

This client is one of the largest International consultancies, employing well over 8500 staff in its 30+ offices. They undertake a variety of schemes worldwide, typically, the Middle Eastern region carries out projects within the healthcare, government, commercial, and education sectors. They are looking for a technical authority that is a natural leader of people. The candidate should have a background in building services design, be employed in a similar position within a consultancy, and possess a very well developed commercial acumen.

BAR562/PA

## Senior Electrical Engineer

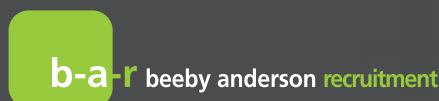
Southampton, £40k - £45k + benefits

Our client have been established for over 20 years and have been involved in a number of award winning schemes, current workload involves a range of exciting and challenging projects including MoD, education, and multi million pound high spec residential. The ideal candidate will be degree qualified and ideally chartered or working towards CEng status. Applications can only be accepted from British nationals due to the sensitive nature of the secure defence sites.

BAR804/JA

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

Discover your future at [www.b-a-r.com](http://www.b-a-r.com)



Thinking of your future



# Events & Training

## NATIONAL EVENTS AND CONFERENCES

### CIBSE ASHRAE Technical Symposium: building systems and services for the 21st century

18-19 April, London

The second CIBSE Technical Symposium, in conjunction with ASHRAE, will bring to the fore the latest research and practice.

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

### Data Centres

26 April, London

Guidance for owners, operators and all those that have an interest in data centre design.

[www.cibsetraining.co.uk/conferences](http://www.cibsetraining.co.uk/conferences)

### BIM

15 May, London

BIM is going to play a greater role in building services design, installation and operation; this conference provides a greater understanding.

[www.cibsetraining.co.uk/conferences](http://www.cibsetraining.co.uk/conferences)

### The Facilities Show

15-17 May, Birmingham

This year the show will include a CPD theatre, courtesy of the British Institute of Facilities Management.

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

### Institute of Domestic Heating & Environmental Engineers (IDHEE) Conference

23 May, Loughborough

This year's theme is 'Design - the way to a greener future', and reflects the current need for best design principles.

[www.idhee.org.uk](http://www.idhee.org.uk)

### All-Energy

23-24 May, Aberdeen

The UK's largest renewable energy exhibition and conference.

[www.all-energy.co.uk](http://www.all-energy.co.uk)

### ThinkFM

18 June, London

A series of industry leaders and thinkers on topics relevant to facilities management.

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

### POWER-GEN Europe 2012

12-14 June, Cologne

The theme, 'Integrating the power sector' will shape the conference programme this year.

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

### Second symposium on lift and escalator technologies

27 September, Northampton

This symposium will provide a detailed, academic study of engineering and related management issues, for persons employed in lift-making and allied industries.

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

## SOCIETY OF LIGHT AND LIGHTING

### SLI Masterclasses - One building a minute

26 April, Leicester

This series brings speakers from Philips, Thorn, Tridonic, Trilux and Wila to talk about refurbishment.

[www.sli.org/events](http://www.sli.org/events)

## CIBSE GROUPS AND REGIONS

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

### Solar Thermal Systems

2 April, Cardiff

A South Wales region evening event looking at solar thermal systems.

### East Midlands region annual general meeting

10 April, Nottingham

The AGM will be coupled with the final technical meeting in this year's programme, entitled: 'An introduction to self-employment for building services engineers.'

### Photovoltaics and other green things

10 April, Exeter

This is a South West region event. For more information contact Richard Knight.

[millham.orchard@fiscali.co.uk](mailto:millham.orchard@fiscali.co.uk)

### Society of Facade Engineering: AGM and lecture

18 April, London

This evening event includes a joint meeting with the IStructE Glass Study Group, AGM and a technical meeting on 'Advanced facades-design and construction'.

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

### AGM and seminar

18 April, Birmingham

This is a West Midlands region event.

### AGM and Hab Housing presentation

19 April, Bristol

Mike Roberts will give a presentation on Hab Housing's approach to sustainable design and construction.

### Home Counties North East region AGM

24 April, Chelmsford

CIBSE president-elect David Fisk will give a speech.

[andrew.saville@armville.com](mailto:andrew.saville@armville.com)

### AGM and LED lighting advances

25 April, Bury St Edmunds

East Anglia region event.

### East Anglia region spring ball

27 April, Newmarket

Taking place in the magnificent surroundings of The Bedford Lodge Hotel.

[jonathan.page@mlm.uk.com](mailto:jonathan.page@mlm.uk.com)

### Membership issues

30 April, Cardiff

An evening meeting for the South Wales region

## CPD TRAINING

Visit [www.cibsetraining.co.uk](http://www.cibsetraining.co.uk), call 020 8772 3660 or email [eventbookings@cibse.org](mailto:eventbookings@cibse.org)

### Lighting and energy efficiency

3 April, London

## Building Future Education

9-10 May, Business Design Centre, London



Formerly known as BSEC, Building Future Education is the UK's only dedicated exhibition and conference for the design, construction and adaptation of education spaces from the planning stage through to the fit out and use of new or refurbished buildings.

The event will bring together more than 2,500 visitors across the two days, offering a detailed insight into government

policies, new funding and procurement routes, free schools and academy projects, refurbishment projects and the future of the education market through the free-to-attend seminars and the main conference.

BFE UK is exclusively supported by Partnerships for Schools, soon to be the Education Funding Agency.

For more information, please visit [www.bfeuk.com/CIBSE](http://www.bfeuk.com/CIBSE)

### Smart metering

10 April, London

### Fire resisting and smoke control doorsets

11 April, London

### Effective Maintenance Management

12 April, London

### Energy Survey

17 April, London

### Standby Diesel Generator

18 April, London

### Energy Strategy Reports

19 April, London

### Getting ready for the Green Deal 2012

24 April, Manchester

### Monitoring and Targeting

24 April, London

### The Carbon Reduction Commitment

25 April, London

### Low and zero carbon energy technologies: undertaking feasibility studies and understanding design considerations

26 April, London

### Practical project management

1 May, London

### LCEA EPC Training

1-2 May, London

### Fire detection and alarm systems for buildings - BS 5839 Part 1 2002

2 May, London

### Air conditioning inspection for buildings

4 May, London

Send your events to [cbailey@cibsejournal.com](mailto:cbailey@cibsejournal.com)



## CIBSE Update on Building Information Modelling (BIM)

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**One-day conference • Tuesday 15 May 2012**

ETC Venues, The Hatton, 51-53 Hatton Garden, London EC1N 8HN

BIM presents opportunities for success and risk for the unprepared. It requires innovative new thinking, new working relationships and a creative approach to implementation in a field that once thought that 3D CAD was the end game. BIM is rapidly changing all stages of building services design, construction and operation, from conceptual building optimisation, to driving integrated project delivery and leading the occupier to a new era of sustainable whole life operation.

BIM is going to play a greater role in building services design, installation and operation. It cannot just be ignored as a techie tool, but there are still many unanswered questions.

For a full agenda and to book a place visit  
**[www.cibsetraining.co.uk/conferences](http://www.cibsetraining.co.uk/conferences)** or call  
the events team on 020 8772 3660

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# CMR

## in complete control

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

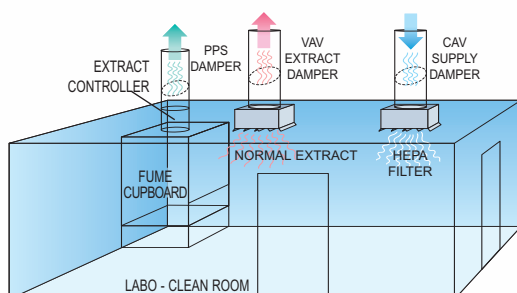


### DPM PRESSURE SENSOR

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

### AIR MANAGEMENT SYSTEM

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



### 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-propylene 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

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