

# CIBSE

JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

April 2015

## THE AISLES HAVE IT

Shopping mall developer  
M&G Real Estate wins Carbon  
Champion crown

WITH THIS  
ISSUE  
*Education  
Special*

### SIZE MATTERS

Consequences  
of oversizing cold  
water systems

### HANDLE WITH CARE

Bill Bordass on  
why government  
should value DEC's

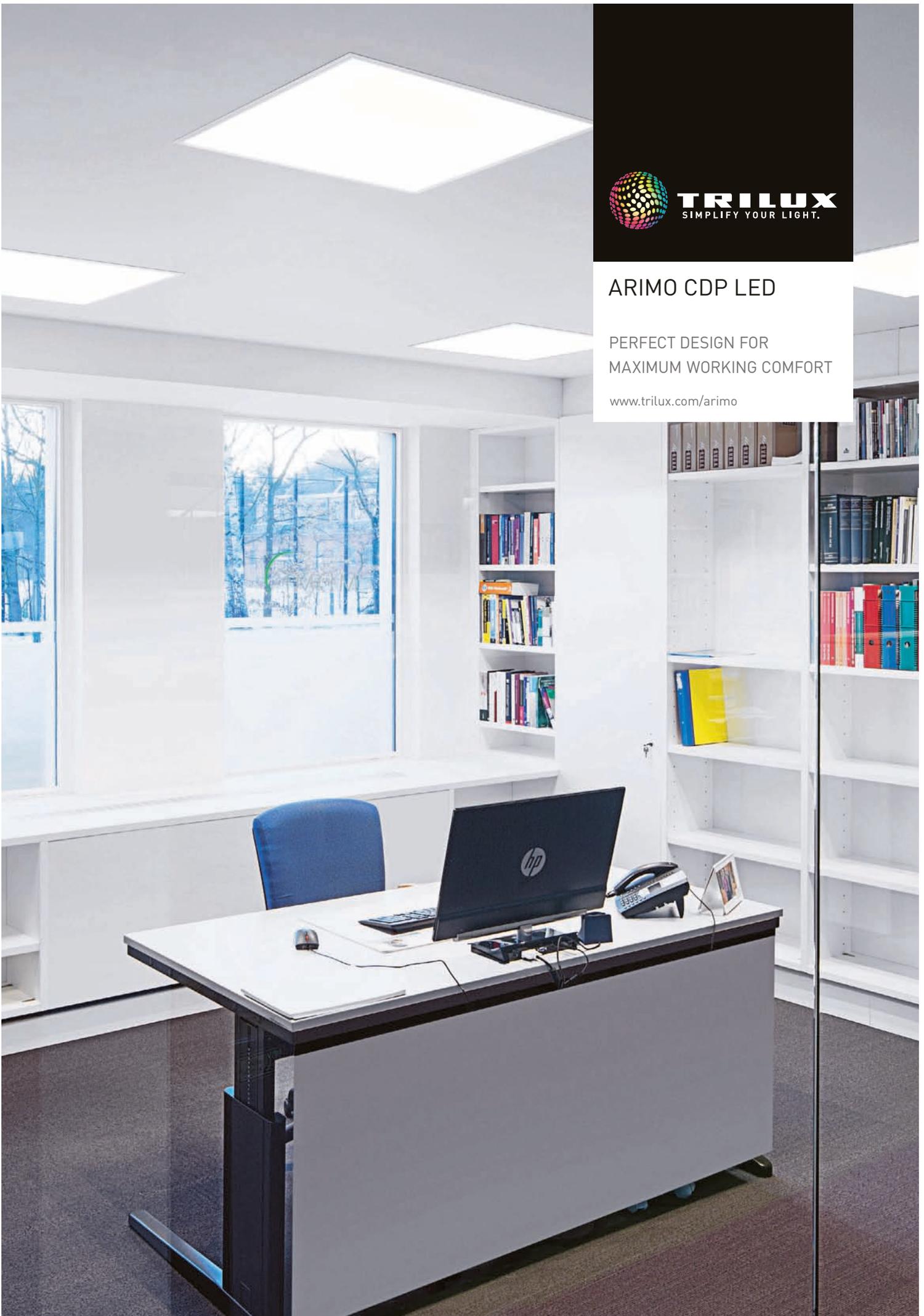


**TRILUX**  
SIMPLIFY YOUR LIGHT.

## ARIMO CDP LED

PERFECT DESIGN FOR  
MAXIMUM WORKING COMFORT

[www.trilux.com/arimo](http://www.trilux.com/arimo)



# Contents

## NEWS

- 6 News**  
New government should stick with wider energy mix; proposed changes to DEC regime criticised; smart meter roll-out in trouble
- 10 CIBSE News**  
Reader research results; awards and prizes; Geoffrey Cundall obituary

## OPINION

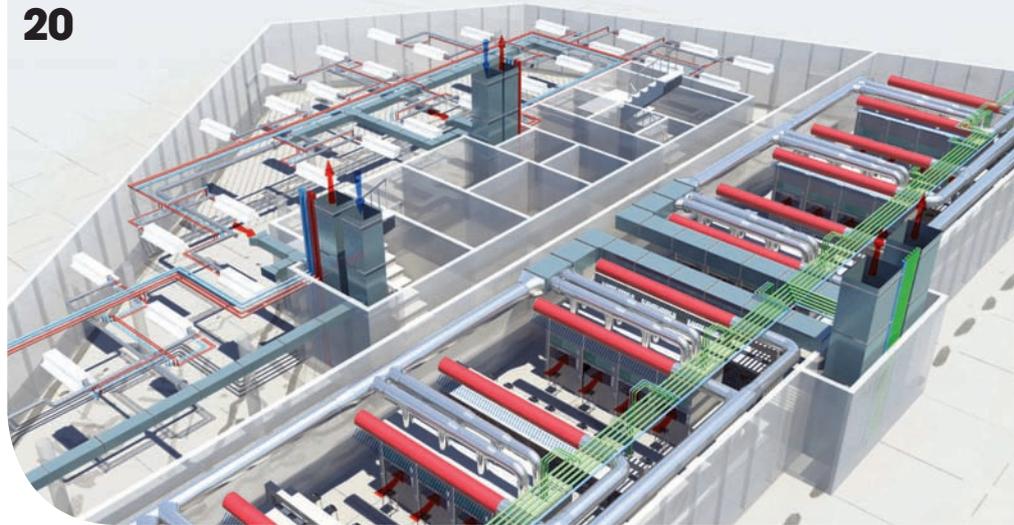
- 12 Letters**  
Readers discuss direct-fired water heating, gas and good management
- 14 Tackling the energy policy trilemma**  
Hywel Davies reviews current policies and considers the scope for improvement
- 16 Pushing the envelope**  
How Allowable Solutions can help mitigate the environmental impact of new buildings on their neighbours
- 18 Designs on health and safety**  
New CDM Regulations mean consultants will have more health and safety responsibility
- 20 Time to change our BIM practices**  
Contractors and designers must work on the same BIM model, says Paddy Conaghan



### Read the School and Education Special

with this issue, and online at [www.cibsejournal.com](http://www.cibsejournal.com)

20



## Features

- 22 Are simple buildings better buildings?**  
What makes a successful building? A preview of presentations at CIBSE's technical symposium
- 24 Green thinkers cool hot air**  
Pre-General Election, cross-party agreement may have emerged on the need for energy efficiency
- 28 Making DECs fly**  
Bill Bordass and Robert Cohen argue that DECs are essential to reducing the performance gap
- 32 COVER FEATURE Clear-cut winner**  
How M&G Real Estate took energy efficiency at shopping centres to new heights
- 38 Turning the desert green**  
Sustainability challenges for MEP designers working in the Gulf states
- 41 Size matters**  
Are we oversizing domestic water systems?

## SPECIAL FEATURES

- **Water heaters/datacentres**
- 45 Full steam ahead**  
Tough new European regulations on water heaters will affect manufacturers and specifiers
- 49 Power complex**  
Decarbonising the energy supply at datacentres
- 53 Banking savings**  
Reconciling the demands of datacentre cooling with the clamour for energy efficiency

## LEARNING

- 57 CPD**  
Commercial hot water systems: reducing the risk of legionella and maximising efficiency

## CLASSIFIED

- 62 Products**  
A round-up of systems and services for the industry

## PEOPLE AND JOBS

- 67 Appointments**  
Jobs at [jobs.cibsejournal.com](http://jobs.cibsejournal.com)
- 70 Looking ahead**  
Technical Symposium 2015; free ESOS CPD briefing; CIBSE groups, regions and societies

Hitachi Air Conditioning

Engineered for tomorrow.

# Widest range with highest ESEER on the market

FSXNH



Set Free  
VRF Systems

FREE FUEL OR TRAVEL VOUCHERS  
when you purchase any Set Free VRF

Boasting the market's only 2-pipe heat pump or 3-pipe heat recovery from a single unit, our Set Free VRF range is already pretty impressive. Available with the widest range (14kW to 100kW nominal cooling), the highest seasonal efficiency (up to 8.79 ESEER(2)), and connectable to more indoor units than any other VRF, new Set Free FSXNH is naturally great news.

Japanese engineering excellence,  
naturally

SYSTEM  
FREE



To find out more call Hitachi on **01628 585 394**  
[hitachiaircon.com](http://hitachiaircon.com) | [hitachiheating.com](http://hitachiheating.com)

**HITACHI**  
Inspire the Next



www.cibsejournal.com

**Editorial**

**Editor:** Alex Smith  
 Tel: 01223 273520  
**Email:** asmith@cibsejournal.com  
**Senior Reporter:** Liza Young  
 Tel: 01223 273529  
**Email:** lyoung@cibsejournal.com  
**Designer:** James Baldwin  
**Technical editor:** Tim Dwyer

**Advertisement sales**

**Sales manager:** Jim Folley  
 Tel: 020 7324 2786, jim.folley@redactive.co.uk  
**Sales executive:** Darren Hale  
 Tel: 020 7880 6206,  
 darren.hale@redactive.co.uk  
**Sales executive:** Patrick Lynn  
 Tel: 020 7880 7614,  
 patrick.lynn@redactive.co.uk  
**Senior sales executive:** Paul Wade  
 Tel: 020 7880 6212  
 paul.wade@redactive.co.uk  
**Advertising production:** Jane Easterman  
 Tel: 020 7880 6248  
 jane.easterman@redactive.co.uk

**For CIBSE**

**Publishing co-ordinator:** Neil Walsh  
 Tel: 020 8772 3696, nwalsh@cibse.org  
**Journal production manager:** Nicola Hurley  
 Tel: 020 8772 3697, nhurley@cibse.org

**Editorial advisory panel**

- George Adams**, engineering director, Spie Matthew Hall
- Patrick Conaghan**, partner, Hoare Lea Consulting Engineers
- Rowan Crowley**, director, einsidetrack
- James Fisher**, e3 consultant, FlaktWoods
- David Hughes**, consultant
- Philip King**, director, Hilson Moran
- Nick Mead**, group technical director, Imtech Technical Services
- Jonathan Page**, building services consultant engineer, MLM
- Dave Pitman**, director, Arup
- Christopher Pountney, senior engineer, Aecom
- Alan Tulla**, independent lighting consultant
- Ged Tyrrell**, managing director, Tyrrell Systems
- Hannah Williams**, mechanical engineer, Atkins
- Ant Wilson**, director, Aecom
- Terry Wyatt**, consultant to Hoare Lea

*CIBSE Journal* is written and produced by CPL (Cambridge Publishers Ltd) Tel: +44 (0)1223477411. www.cpl.co.uk 275 Newmarket Road, Cambridge CB5 8JE

**Editorial copy deadline:** First day of the month preceding the publication month

**Printed by:** Warners Midlands PLC

The opinions expressed in editorial material do not necessarily represent the views of the Chartered Institution of Building Services Engineers (CIBSE). Unless specifically stated, goods or services mentioned in editorial or advertisements are not formally endorsed by CIBSE, which does not guarantee or endorse or accept any liability for any goods and/or services featured in this publication.

CIBSE, 222 Balham High Road, London SW12 9BS  
 Tel: +44 (0)20 8675 5211. www.cibse.org  
 © CIBSE Services Ltd. ISSN 1759-846X

**Subscription enquiries**

If you are not a CIBSE member but would like to receive CIBSE Journal, subscribe now! Costs are £80 (UK) and £100 (international). For subscription enquiries, and any change of address information, please contact Nicola Hurley at nhurley@cibse.org or telephone +44 (0) 20 8772 3697. Individual copies are also available at a cost of £7 per copy plus postage.

The 2013 US annual subscription price is £100. Airfreight and mailing in the US by Air Business. C/O Wordnet Shipping NY Inc, C/O Air Business Ltd / 155-11 146th Street, Jamaica, New York, NY11434. Periodical postage pending at Jamaica NY 11431. US Postmaster: Send address changes to CIBSE Journal, C/O Air Business Ltd / 155-11 146th Street, Jamaica, New York, NY11434.



ABC audited circulation:  
 18,920 January to  
 December 2014



# Party time

Politicians have always been happy to take a turn at the lectern at the annual Ecobuild conference in London. It is an opportunity to sell key policy initiatives to the largest gathering of built environment professionals in the UK. This year energy secretary Ed Davey had the opportunity to trumpet the Liberal Democrats’ green manifesto as well as announce coalition government initiatives, such as £70m more funding for the Green Deal and £3m for projects tackling fuel poverty – popularly known as ‘boilers on prescription’ (page 24).

The government has continued to support renewables and as well as backing for the Swansea Bay Tidal Lagoon project announced in the Budget, it recently agreed to fund another £315m of renewable energy projects.

What will happen after May is less certain. Current polls point to no outright winner and suggest a colourful kaleidoscope of potential coalitions. To guide you through the political smog descending over Westminster in the coming months, CIBSE is holding an election briefing in London on 29 April (page 9). To prepare the ground, CIBSE technical director Hywel Davies has outlined the current regulatory landscape in this month’s

Regulations column (page 14). He suggests that a new broom should be taken to some existing regulations to eliminate overlap and reduce the resource and skills required to enforce energy reduction policies.

One current policy instrument that has almost universal backing is the Display Energy Certificate (DEC) but with one major exception – the current government.

It seems intent on diluting the one piece

of legislation that enables building operators to keep tabs on performance. The proposals were attacked by Lord Deben, chair of the advisory committee on climate change (page 7), and CIBSE’s response to the consultation called for a strengthening of the DEC regime to help make energy and cost-savings in the public sector.

Away from politics, the Technical Symposium offers a welcome return to engineering reality. We preview some of the 60-plus papers, and Northumbria University’s Jess Tindall explains in depth why cold water systems are prone to being oversized (page 41). Tindall offers essential insight, and there is plenty more to be had at the conference at UCL, London on 16-17 April.

**Alex Smith, editor**  
 asmith@cibsejournal.com



## In brief

### LONDON TO ISSUE £1.6BN CONTRACTS

Eight firms have been appointed to deliver major public sector projects, worth £1.6bn, in London over the next four years.

Education schemes are expected to make up the bulk of the programme, with each job worth more than £10m. The eight companies selected are: Bam; Bouygues; Galliford Try; Kier; Mace; Morgan Sindall; Wates; and Willmott Dixon.

They are now awaiting the projects from local authorities, which will also include some healthcare works, civic offices and housing.

### MAX FORDHAM SHORTLISTED FOR ENERGY AWARDS

Max Fordham has been shortlisted for the 2015 Ashden Awards, which recognise excellence in the field of sustainable energy. The practice is joined on the shortlist by energy-use management experts Demand Logic and Enistic.

Max Fordham has been recognised for helping to influence the design of buildings so that they harness natural light and ventilation, and use energy efficient equipment, aimed at cutting energy use by 30%.

Demand Logic and Enistic have been selected for their work helping clients to analyse energy use in buildings, to reduce their carbon emissions and bills.

The Ashden Awards will be presented at the Royal Geographical Society in June. Winners receive up to £20,000 and are listed as 'Ashden alumni'.

### BOSCO VERTICALE CLARIFICATION

In the *Bosco Verticale* feature in *CIBSE Journal* of March 2015, the building services engineer, previously operating in Italy as Hilsen Moran Italia, became part of Deerns Group in 2012. It is known as Deerns Italia, and was responsible for the MEP design at *Bosco Verticale*, including the groundwater network. The commissioning engineer on the project was Planning.

## New government urged to stick with gas, nuclear and wind

### ● MPs support adoption of wider energy mix

The government formed after the General Election in May must 'stand its ground' over controversial energy technologies such as nuclear, onshore wind and fracking for shale gas, according to the parliamentary committee on energy and climate change.

It must support a wider energy mix that also includes carbon capture and storage, but which retains an important role for traditional gas-fired systems. The new administration should also replace the Green Deal – which, the committee said, had largely failed – with a policy that 'genuinely engages the consumer to bring about a step change in energy efficiency'.

'With the right policies in place, we can have a low carbon, high-competition, super-efficient and much more secure energy system by 2030,' said committee chair Tim Yeo MP. 'But to get there, the next government must stand its ground in the centre.'

Yeo said the new administration would have to 'face down the misguided campaigners who oppose any form of fracking and all onshore wind. Instead, it must allow business to find the



MPs: Onshore wind part of energy solution

MARCELEMMANS / SHUTTERSTOCK

lowest-cost, low carbon solutions, and support the development of carbon capture and storage. It must also grow the country's nuclear capacity, which the committee believes is essential to replace fossil fuels.

'[The new government] must continue to lead on climate change, support emissions trading, maintain investor confidence with long-term targets and stable policy, and ensure that electricity-market reforms encourage innovation,' added Yeo.

In its last report before next month's General Election, the all-party parliamentary committee said it had scored notable successes in its five-year

term, holding the government to account and improving policy and legislation on electricity-market reform, competition in the energy market, and shale gas.

*Fuelling the debate: Committee successes and future challenges* urges the new administration to support more research and innovation, but not to assume that emerging technologies would be commercially viable in the short-term. It adds that the UK needs to keep a diverse energy mix, to ensure value for money for end-users.

The committee also welcomed the agreement between the three main parties to work together to tackle climate change 'regardless of the outcome of the election'.

## 25,000 homes sign up for RHI

There have been more than 25,000 accreditations for the domestic Renewable Heat Incentive (RHI) – including homeowners, home builders and social landlords – since its launch in April 2014.

Parliamentary Under Secretary of State for Climate Change, Amber Rudd, said the scheme was world-leading and the 'enthusiastic response' proved

that 'installing renewable heating can be a real, everyday choice for people's homes'.

Rudd added: 'The RHI aims to help kick-start the renewable heat market, to make it attractive to investment from businesses, as well as individuals, so they can enjoy the benefits of renewable heating in terms of having warmer premises or homes, and lower bills and emissions.'

The scheme, which pays people for the heat that they generate for their homes, is open to homeowners, social and private landlords, and self-builders, as well as to households that are on and off the gas grid.

Rudd called for more consumers to take advantage of the opportunity to gain payments through the Renewable Heat Incentive scheme.

## SKANSKA STARTS ON NEW PAPWORTH HOSPITAL

Skanska has won a £140m contract to deliver the New Papworth Hospital project in Cambridgeshire.

As part of a public-private partnership with the Papworth Hospital NHS Foundation Trust, the company will assist in creating a new hospital – the first in the UK to aim for an EPC 'B' energy rating. Among other green measures, Skanska will install a large-scale ground source heat pump system to reduce carbon emissions.

The company will continue to provide services at the hospital for 30 years after delivery.



# Pickles warned off 'rushed' DEC changes

## ● Deben: No evidence to weaken DEC legislation

Proposed changes to the Display Energy Certificate (DEC) regime have been roundly criticised by political and industry figures.

A four-week consultation on 'improving and simplifying' DEC legislation, which closed on 15 March, stirred up a storm of protest and prompted a series of hard-hitting responses, led by the government's own advisory committee on climate change.

It was noted that the government was leaving itself little time to consider the responses ahead of May's General Election, which caused the committee's chairman, Lord Deben, to caution against decisions taken without more detailed and specific evidence.

In a letter to the Communities and Local Government Minister, Eric Pickles, Lord Deben said the committee had seen no evidence that would support weakening the legislation, and chastised the government for failing to consider options that would



Lord Deben: sent letter to Pickles

actually strengthen the DEC regime. He said watering down the requirement for DECs ran the 'risk of incurring long-term liabilities for minimal short-term gain'.

'Our analysis suggests that DECs are an important tool for identifying energy efficiency opportunities and limiting the impact of rising energy prices on public finances,' Lord Deben wrote, adding: 'DECs are unique in that they show operational energy demand, benchmarked against building type.'

CIBSE also provided a robust response to the consultation,

asserting that the proposals would 'not represent an improvement'. On the contrary, CIBSE members called for the DEC regime to be strengthened, 'to help ensure that it delivers greater benefits to participants'.

The Institution said that the system 'would also benefit from a clear focus on identifying energy savings... in a wider range of buildings, to help support and drive public sector leadership on energy efficiency'.

It said that it found the consultation surprising given the government's desire to cut public sector costs and increase accountability for expenditure.

'Far from saving money for the public purse, these proposed "improvements" can be expected to increase pressure on [the government's] finances. 'They are also likely to have significant adverse knock-on effects on our energy security and our ability to meet our legally binding climate change commitments,' the CIBSE response concluded.

● Bill Bordass on why DECs are essential, page 28.

## More funding for heat networks announced

The government has awarded a further £3m in funding to 55 local authorities in England and Wales, to boost community and district heat recovery, heat pump and tri-generation projects.

'Using waste heat to warm our buildings is a cost-effective way to cut carbon and slash energy bills,' said the Secretary of State for Energy and Climate Change, Ed Davey, when announcing the funding. 'This money will help transform the way communities heat their buildings, schools and homes – as well as show how people and councils can work together to boost jobs and investment in their area.'

The local authorities – which were bidding for the fourth round of funding under the scheme – will be offered grants, ranging from £16,000 to £263,000, to set up projects as part of an overall £800m national investment in 180 heat networks, via the government's Heat Networks Delivery Unit.

According to the Department of Energy & Climate Change, 15% of UK heat demand could be 'cost-effectively met by heat networks by 2030; and more than 40% by 2050'.

## In brief

### ASHRAE TAKES ON ENERGY EFFICIENCY IN BUILDINGS

A newly revised standard from ASHRAE is designed to improve energy efficiency in refurbished buildings.

ANSI/ASHRAE/IES Standard 100-2015 Energy Efficiency in Existing Buildings describes the processes and procedures for an energy efficient retrofit, including appendices for lifecycle cost-analysis, as well as potential energy conservation measures.

The standard addresses single and multiple-activity buildings with variable occupancy periods and identifies the approach for 53 building types in 17 climate zones/sub-zones.

It also establishes the need for an energy management plan and an operation and maintenance programme.

### BRE LAUNCHES HOME RATING SCHEME

The BRE has launched a rating system to help buyers and renters gauge the quality and energy efficiency of new houses.

The Home Quality Mark gives stars – from one to five – to properties to illustrate a home's overall running costs and its impact on health and wellbeing.

The BRE said this system was needed because the average annual energy bill is more than £1,000 and more homes are becoming airtight, leading to an increase in respiratory conditions and other health problems for the UK's ageing population.

A home's environmental footprint and its resilience to flooding and overheating will also be measured.

# Lords report slams energy policy

## ● Energy efficiency vitally important, says committee

The government should be doing more to safeguard the UK's electricity supply, according to a report from the House of Lords Science and Technology Committee.

The report, *The Resilience of the Electricity System*, said while the UK had avoided power cuts, it was not acceptable for an advanced economy to 'sail so close to the wind'.

It said topping-up the power supply with electricity generated using fossil fuels had been costly for both taxpayers and the environment.

The Lords said that improving



energy efficiency was of vital importance, and that buildings should have adequate insulation, especially if they are to adopt comparatively new technology such as heat pumps.

Although measures put in place by the National Grid have secured sufficient supply for now, the report identified a number of ways to increase the capacity margin and improve resilience of supply in the long term. Research, development and early deployment of new technologies in the UK was considered vital.

The report urged the government to accelerate the roll-out of smart meters to allow consumers to have more control over how – and when – they use electricity.

Such measures will be essential as the rise of electric vehicles and heat pumps increases demand, and the UK comes to rely on 'intermittent renewables' to generate more of its power.

ANDREW MACKAY / SHUTTERSTOCK

# Smart meters could be 'costly failure'

## ● Technical issues and delays threaten 2020 targets

The government's programme to install smart meters in every UK home and small business by 2020 has hit further delays and is now in danger of becoming a costly failure, according to politicians and industry observers.

The £11bn scheme, which aims to put 53 million smart meters in 30 million buildings, has suffered from disputes over appropriate technology and skills shortages. It is now unlikely to meet its 2020 target, according to

the Energy and Climate Change Committee (ECCC).

'Smart meters could generate more than £17bn in energy savings,' yet a series of technical and other issues have resulted in delays to the planned roll-out,' said committee chair Tim Yeo MP, who added that problems highlighted in 2013 had still not been addressed.

Yeo explained that the industry had been advising the government to impose industry-wide solutions, rather than the 'less efficient alternative of letting each energy supplier develop its own solution'.

As a result, the whole roll-out could prove to be a costly failure



IR STONE / SHUTTERSTOCK

unless there was a 'significant and immediate change' to the government's approach, he said.

Mike Foster, chief executive of the Energy and Utilities Alliance (EUA), said the latest delays were 'disappointing, but not unexpected'.

## Rinnai

Intelligent Hot water solutions

“Energy conservation is the foundation of energy independence”

Condensing

Intelligent controls

Extended warranty

Low NOx

Renewables ready

Design support

Contact Rinnai today for more information:  
 General enquiries 01928 531 870 Rinnai London 0208 622 3500  
[www.rinnaiuk.com](http://www.rinnaiuk.com)

# CIBSE gears up for election

## ● Expert briefing to take place in London on 29 April

To help businesses identify the risks and opportunities they may face after the General Election, CIBSE is holding an expert briefing at the end of this month.

The breakfast event, in central London, on 29 April, will examine the policy landscape and the potential impacts of the different political parties and coalitions that may result from the May vote.

CIBSE said the briefing will be highly relevant to building services companies, as the outcome of the election could have significant implications for their business, whether they be a consultancy,



VALENTINNE/SHUTTERSTOCK

contractor, manufacturer, client or facilities manager.

In the briefing, CIBSE technical director Hywel Davies will consider:

- Which parties and coalitions will seek to change which policies
- Which existing regulations or legislation are at risk, and why
- Which regulation and legislation are likely to survive

What will arrive from Europe irrespective of the election. The briefing will consider the likely outcomes of the election bearing in mind that new governments often change existing policies.

A change in government may have consequences for a number of policies and rules including Building Regulations; energy performance of buildings and renewables regulations; the energy efficiency directive; Energy-related products; the CRC Energy Efficiency Scheme; F-gas and Ozone Depleting Substances regulations; Minimum Energy Performance Standards; and planning rules.

For more information on the event visit [www.cibse.org](http://www.cibse.org)

## Budget backing for Swansea tidal lagoon

Chancellor of the Exchequer George Osborne said negotiations are beginning on a £1bn tidal lagoon scheme in Swansea, in his Budget speech in the House of Commons last month.

The plan would see a giant man-made lagoon generating power to run 120,000 homes for 120 years. Talks will focus on the amount of subsidy the scheme will get from a guaranteed price for its power.

After confirmation that commercial negotiations had begun, Energy Secretary Ed Davey said the five new planned lagoons could provide 8% of the UK's electricity for a £30bn investment, replacing foreign fossil fuels with clean, reliable, home-grown electricity.

His department said the negotiations would establish whether a guaranteed price for power generated by the lagoon would be both affordable and value for money.

## Our time has come, say FM leaders

Clients are becoming increasingly comfortable about committing money to long-term building maintenance plans, according to leading facilities management figures.

Improved planned maintenance strategies, driven by sophisticated software and online tools, are dramatically changing attitudes to service and maintenance budgets, a joint meeting of CIBSE and Building & Engineering Services Association (B&ES) specialists heard.

'Our time has come,' said CIBSE FM Group chairman, Geoff Prudence. 'In the past, so many design compromises were made and buildings were built that we simply couldn't maintain - that is changing fast.'

He hailed the collaboration of the two organisations on the new CIBSE Guide M, and its links with the B&ES service and maintenance standard SFG20, for creating a comprehensive approach to lifecycle building operation that dissuades clients from making knee-jerk, disruptive cuts to maintenance budgets.

The use of the dynamic online SFG20 system is giving clients more confidence in the maintenance programmes proposed for their buildings and a clearer idea of long-term cost implications and risks.

Clearer maintenance data is also giving clients the confidence to invest in a building in the first place, SFG20 product manager Tony Luck told the meeting, which was hosted by the B&ES London Region.

## £40m boost for IoT innovation

An investment of £40m for new research projects looking at how data can be used to improve city environments, health and social care, has been announced by the Chancellor of the Exchequer.

The Internet of Things (IoT) - where everyday objects connect to digital networks to share data - will be a major area of growth, according to an Arup report which estimated that the global value of the sector will exceed £255bn per annum by 2020 and that the UK could command a 10% share.

The funding will help accelerate new and existing UK innovation, according to Future Cities Catapult chief executive Peter Madden. He said: 'This is a wonderful budget for urban innovation. IoT will be a key technology in making urban infrastructures more intelligent and efficient, and investment in its use in cities will help stimulate UK businesses working on IoT technologies and solutions.'

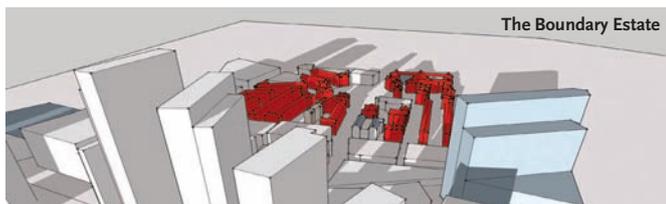
## Shadow cast over historic estate

New towers on the edge of the City of London are set to put one of the country's oldest social housing projects in the shade.

The Boundary Estate was built in 1890 and replaced Old Nichol Street Rookery, one of London's most notorious slums.

If seven proposed towers are built on its southern fringe, it will be in shadow for much of winter. The planned blocks at Bishopsgate Goods Yard range from nine to 48 storeys (right).

The analysis was carried out by Urban Generation architect Julie



The Boundary Estate

Futcher and urban climatologist, and lecturer at University College Dublin, Gerald Mills.

Much of the design for the Boundary Estate was designed to maximise light and ventilation, said Futcher. 'Ironically, the new development proposes a similar

'passive design' methodology strategy. As it stands, areas such as the Boundary Estate will pay an energy price for a carbon-compliant new development.'

Read Futcher and Mills' article on how Allowable Solutions could help on page 16.

## In brief

### AGM DATE

The CIBSE AGM will be held on 7 May 2015, at The Royal Academy of Engineering, Prince Philip House, 3 Carlton House Terrace, London, SW1Y 5DG. It will be followed by incoming president Nick Mead's address. Members will receive a calling notice this month. More details at [www.cibse.org/agm](http://www.cibse.org/agm)

### MASTERCLASS IN IRELAND

The CIBSE Republic of Ireland Region and Dublin Institute of Technology, are hosting a building services masterclass in Dublin on 16 April.

The event will include speakers from both academic and industry backgrounds and will cover issues that relate to building services engineering in Ireland, including building information modelling (BIM), use of 'lean' for offsite fabrication, sustainable buildings and new energy legislation.

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

### ATLANTIC CROSSING

Two CIBSE members from the North East Region will be crossing the Atlantic to raise money for charity.

Mike Waugh and Tom Wood, will be sailing from Cape Cod to Falmouth in June to help support the Children's Heart Unit Fund.

To make a donation visit [www.justgiving.com/chuf-n-builders-atlantic-crossing](http://www.justgiving.com/chuf-n-builders-atlantic-crossing)

## Readers rate Journal

### Survey reveals readers are keen to see more costs data

The reader research survey results are in, and we're delighted to report that 89% of readers rated the *Journal* as either good or excellent.

More than 350 people responded to our 2015 survey, to tell us what they think of the magazine, and what they would like to see in future.

When asked to assess/evaluate different sections and subjects, building case studies rated highest – with 57% of respondents calling it very useful. Second highest was CPD (55%) and HVAC technical articles came in third (48%).

When rating the areas less

frequently covered in the *Journal*, 58% said they wanted to see more costs data, and 45% asked for more international case studies. We will be working hard to feature more on these areas over the coming year.

The technical coverage was rated good or excellent by 85% of respondents, and 70% said the website was good or excellent.

The majority of respondents indicated that a technical section containing CPD materials, white papers, reports and research, would encourage them to visit the website more, with 65% of people answering this question.

Webinars also scored highly, with 63% rating them as good or excellent. We hope to hold at least three more in 2015.

We were surprised to discover that 57% of people were unaware that the *Journal* is now available via an app for Apple and android devices. The free app has now reached 3,000 downloads, so if you haven't already got it, visit the Apple, Amazon or Google Play app stores so you can read the *Journal* on the go.



## Young lighter competition opens

The Society of Light and Lighting's annual Young Lighter of the Year competition is open for entries.

Now in its 21st year, the competition provides high profile opportunities to help promote younger members of the lighting profession.

Anyone working in lighting, design, architecture, manufacturing, research or healthcare, or studying a lighting-related educational course can enter the competition.

Entrants must be under 30 on 8 May 2015.

SLL secretary Brendan Keely, said: 'This competition provides a unique platform for young lighters to present on a lighting subject of their choice, to hone their presentation skills, and to win the considerable professional kudos of being chosen as the SLL Young Lighter of the Year.'

For more information and to enter, visit [www.cibse.org/sll](http://www.cibse.org/sll) by 8 May.

## New members, fellows and associates

### FELLOWS

**Ching, Ming Tat**

West Point, Hong Kong

**Crafter, Andrew Richard**

South Croydon, UK

**Scharfau, Conrad**

Vancouver, Canada

**Yeung Hok Hong**

NT, Hong Kong

### MEMBER

**Blossom, Hannah Elizabeth**

Elwood, Australia

**Chan, Chi Ming**

Fortitude Valley, Australia

**Cheung, Sheung Kwan**

Tsuen Wan, Hong Kong

**Collins, James**

Swillington, UK

**Crawford, Laura**

Sydney, Australia

**Duret, Fanny**

London, UK

**Field, Kimberley**

London, UK

**Havire, Morgan**

Randburg, South Africa

**Ho, Lok Ting Terry**

Shatin, Hong Kong

**Iddon, Christopher Roy**

Coventry, UK

**Ip, Chak Ki Jacky**

Sai Ying Pun, Hong Kong

**Kwan, Chun Hing**

Kowloon, Hong Kong

**Lam, Yuen Cheong**

Shatin, Hong Kong

**Lam, Ying Keung**

Kowloon, Hong Kong

**Lau, Ka On**

Shatin, Hong Kong

**Lee, Ka Fu**

Mong Kok, Hong Kong

**Li, Ka Kin**

Shek Tong Tsui, Hong Kong

**Merriman, William John**

Sutton Coldfield, UK

**Merf, Bogdan**

Teddington, UK

**Richards, David Philip**

London, UK

**Safder, Muhammad Omer**

Ajman, United Arab Emirates

**Wait, Jamie Ross**

Dubai, United Arab Emirates

### ASSOCIATE

**Wait, Peter**

Greenock, UK

### LICENTIATE

**Carnew, Paul**

Bristol, UK

**Carter, Lee Charles**

Gravesend, UK

**Davies, Jason Charles**

Bridgend, UK

**Fenwick, Clinton**

Plymouth, UK

**Kane, Stephen**

Bristol, UK

**Kinsella, Sarah Anne**

Poole, UK

**Lawrence, Tim**

Oxford, UK

**Logan, Alexandra**

Gillingham, UK

**Thornton, Steven James**

Northampton, UK

# Calling all young engineers: now is your time to shine

## ● Young engineers get opportunity to show their worth at annual event

The CIBSE Young Engineers Awards are open for entries, and you could win a trip to the ASHRAE Winter Conference in Orlando, Florida.

The awards, which encompass the CIBSE ASHRAE Graduate of the Year and the CIBSE Employer of the Year Awards, will take place on 8 October at the Institution of Mechanical Engineers, London.

This year marks the 20th anniversary of the graduate award, which – since its launch in 1995 – has become one of the most sought-after accolades for young building services engineers.

The competition is open to anyone who has graduated in a building services-related discipline in the past two years.

The 2015 winner will enjoy a fully paid trip to the ASHRAE Winter Conference, where they will represent CIBSE as an international ambassador.

Emilia Targońska (pictured above), winner of the 2014 Graduate of the Year Award, said:



'I cannot think of a better start to my career than winning the Graduate of the Year competition, which opened many doors for me.

'Attending the ASHRAE winter meeting in Chicago gave me the opportunity to meet inspiring people from around the world.

'For a young engineer like me, it was an amazing experience, as I had the opportunity to share views on various design

issues with extremely experienced engineers and specialists.'

The Employer of the Year Award recognises companies that have put the development of young engineers at the heart of their businesses, giving them the recognition they deserve.

The award has three categories: small, medium and large employers. There is also an overall award.

For more information, to download an entry form, and view last year's Employer of the Year shortlisted entries, visit [www.cibse.org/YEA](http://www.cibse.org/YEA)

## Early advocate of sustainability, Geoffrey Cundall, dies aged 90



Leading engineer and one of the founders of multidisciplinary engineering consultancy, Cundall, Geoffrey P Cundall died in February, aged 90.

Cundall had a distinguished career in building services and was a partner of R W Gregory & Partners before leaving to

lecture in the building services department of the University of Sheffield in 1971.

He was very active in the field of lighting and delivered papers to the IES, where he served a term as national president in 1972, before its incorporation into CIBSE.

He also served on the editorial committee of the *Building Services Journal*.

Cundall was a Quaker; one of his main motivations in establishing a new practice was for it to reflect his own values of honesty, integrity, commitment, supportiveness and responsibility. These values are still at the heart of Cundall.

Along with Michael Burch, Rick Carr, David Gandy and Bernard Johnston, he founded

Cundall in 1976. As a partner, he contributed to laying the foundations that enabled the local firm to grow into a national and, eventually, an international organisation.

He was an early advocate of sustainability. During the first oil crisis in the 1970s, he was a founding member of the North East Energy Conservation Group, led by Sir Horace Heyman.

Cundall also worked on the study for the second low energy hospital in the UK in 1984 and developed an energy strategy still used today.

He retired in 1989 but stayed close to the Cundall business. He is survived by Rachel, his wife of 64 years, his daughters Ruth, Heather and Joanna, and 10 grandchildren.

## Applications open for President's Prize 2015

Applications are open for the President's Prize 2015: The CIBSE Undergraduate Award.

The award, sponsored by Hays Building Services, is open to all UK and international final-year building services engineering (or related) BSc, BEng and MEng CIBSE student members.

Entrants are required to submit a 2,000-word synopsis of their final-year project, showing evidence of excellent understanding and knowledge in building services engineering, science and design, as well as originality and high quality visual information.

The winner receives £500 and a trophy, while the two runners-up will each receive £100. The awards will be presented at the President's Awards Dinner in October in London.

The closing date for entries is 27 July 2015. For more information and to download your application form, visit [www.cibse.org/awards](http://www.cibse.org/awards)

## TM54 wins Aecom award

CIBSE TM54 has won the Thought Leadership Award at this year's Aecom Awards.

The Aecom Excellence Awards recognise extraordinary contributions of Aecom employees and highlight outstanding projects from around the world.

*TM54: Evaluating operational energy performance of buildings at the design stage* was produced to help to turn low energy designs into low energy buildings that achieve the design energy targets.

It is one of several CIBSE actions to promote more effective assessment of energy performance, and provides guidance on how to address energy at the design stage – not just to comply with Building Regulations and EPC ratings, but also to improve the understanding of operational energy performance.

TM54 is available at [www.cibse.org/knowledge](http://www.cibse.org/knowledge)

# @ Feedback

## Readers discuss direct-fired water heating, why gas may not be the best option at home, and good management practice

### Coming to a head

With reference to the CPD article on direct-fired water heating (*CIBSE Journal*, March 2015), I have concerns that the illustrative schematic in Figure 1 – which appears to be following the schematics in *KS14: Energy efficient heating* – can create unwanted problems if not carefully implemented.

Work undertaken for *AM15: Biomass heating* included an investigation into the design of low loss headers, which resulted in the ‘Talking Headers’ article (*CIBSE Journal*, February 2014) and Section 8.3 of *AM15*. This investigation – and my experience of investigating poorly performing heating systems – has shown that pressurising a low loss header should be avoided unless the velocity on the header is so low that primary-secondary interactions are avoided. I have identified several instances where the installation of excess boiler capacity is masking poor hydronic design, which becomes apparent only when attempting to optimise boiler plant on the primary side of a low loss header.

Modern low water content gas boilers have a typical internal resistance of between 10kPa and 30kPa, so the primary pump has to develop

this pressure. While gas boiler manufacturers have divided views over whether it matters if the pump is on the primary or secondary loop of their boilers, once a low loss header is included, the pump should preferably be on the return to the boilers. If a circuit with low water content boilers has a primary pump on the flow, and the velocity on the header is too high, many problems can result, including primary-secondary circuit interactions and partial reverse flow up the header, making circuit balancing problematic.

The configurations in *KS15* have been in existence for a very long time, and would have been developed when boilers had a low internal hydronic resistance with the load circuits having a higher resistance – so pumps were, correctly, placed on the flow from the boiler. I believe the era of low water content, high-resistance boilers operating into low loss headers necessitates a review of CIBSE advice on hydronic configurations, including the many publications containing such schematics. The new CIBSE Guide B1 is currently being updated to reflect the above findings.

*David Palmer*

Gas is a finite source, so why is it that low-grade requirements – such as heating new homes – rely on this high-grade fuel

*Technical editor Tim Dwyer*

*FCIBSE replies:*

The simplified sketch of the traditional boiler with a true ‘low loss’ header in the CPD is typical of many legacy systems but, as David has correctly highlighted, this might be unsuitable for newer, lower water content boilers – and certainly not appropriate where there is significant pressure drop in the header. Such traditional header systems can also challenge the effective use of condensing boilers, as discussed in the presentation by Simon Mitchell at [www.cibseashrae.org](http://www.cibseashrae.org)

### Living without gas

Technological innovation has allowed us to generate synthetic gas from waste products to deliver into the grid. However, gas is still a finite resource, so why is it that low-grade requirements, such as heating new homes, still rely on this high-grade fuel?

If we put on our utopian glasses and wind the clock forward, we will find an electricity network fuelled by renewable, low carbon and highly efficient energy. So why do gas cookers and gas boilers still have a place in new homes?

Modern induction hobs are cleaner, quicker and have almost no local waste heat; electric ovens provide multiple programmes to suit any chef, can be self-cleaning and efficient; underfloor heating is comfortable, flexible and easy

## The perfect combination..... P-Sensor and the CMR Velogrid



**VELOGRID**  
Velocity Averaging Sensor



**P-Sensor**

CMR are the inventors and manufacturers of both the P-Sensor and the Velogrid. The Velogrids are made to measure to fit any ductsize up to 3m x 3m and the P-Sensor has a keyboard to easily enter : duct height - width - density - magnification factor and the scaling in m/s - m3/s - m3/h - l/s. It can even work out the Air Change rate. And the BMS gets three linear volume signal outputs of 0..10V 4..20mA and an addressable Modbus rtu bus.

**CMR CONTROLS Ltd**

22 Repton Court Repton Close  
Basildon Essex SS13 1LN GB  
[www.cmr-controls.com](http://www.cmr-controls.com)

Tel +44 (0) 1268 287222  
Fax +44 (0) 1268 287099  
[sales@cmr-controls.com](mailto:sales@cmr-controls.com)





ANDREAS G. WARELUS / SHUTTERSTOCK

to install; and ground and air source heat pumps are now readily available for the domestic market.

Putting two utilities in the road is not efficient and generates more maintenance, which causes mass inconvenience. Two meters, two distribution systems, two sets of safety devices – gas isn't winning too many votes here. This leaves cost and perception as the things we need to change if we are to build homes that will optimise the gradual decarbonisation of our electricity grid.

*Geoffrey Palmer, Grontmij*

**Micro-management**

There is much to agree with in Jackie Portman's article ('Giving building services design the attention it deserves', *CIBSE Journal*, February 2015).

However, I disagree with her assertion that a new profession of design manager is required. OK, on larger projects where the work has to be divided up – but what

is needed is somebody who has been a services designer, but who is senior enough to get the respect and trust of those doing the design, and who is not worried about simply monitoring what has happened and where additional effort is required. In short, good direction is preferable to overly concentrated management.

In the case of a smaller project, involving fewer staff, the designer is really the only person who *can* be competent to manage what they do.

Within all this lies the truth that HVAC (and some other building services) design time is unpredictable at the beginning of a project, and depends on the project, the client, and the architect and structural engineer. There is a statistical-mean design time based on building type, area, servicing and project cost, but it is only a mean – and these factors are variable for quite some time into the run of a project.

Statistics may show that particular firms

of architects, and particular types of building, cause extended design times, but the inexactitude remains.

This vexes graduates of certain MBA courses, who have not designed services (or anything at all), and means many of them will never understand sub-plots – such as HVAC design being less predictable than that of almost all the other professions. Thus, this type of manager is not suited to interfering with the design process. At risk of infringing copyright, Det Supt Pullman, in the TV series *New Tricks*, exemplifies how good direction and minimal management of old – but vastly experienced and technically competent – staff gets results.

One could also criticise a too intellectual approach that treats design concepts and elements as discrete, self-contained – and, therefore, programmable – entities, whereas they often have unnoticeable strings attached that may unexpectedly link with other design professions.

*John Moss, consultant, building performance and systems, Arup*

*CIBSE Journal* welcomes readers' letters, opinions, news stories, events listings, and proposals for articles.  
**Please send all material for possible publication to: editor@cibsejournal.com,** or write to Alex Smith, editor, *CIBSE Journal*, CPL, 275 Newmarket Road, Cambridge, CB5 8JE, UK. We reserve the right to edit all letters.



I want a good product that helps me to save on labour, time and costs.

I'll help you increase your profit: I am 60% lighter and 33% faster to install than the others!

Zehnder Zmart Flex. Lightweight and easy to install: more economically efficient.

- **Easy to transport and handle:** Up to 60% lighter than standard radiators and 33% time savings on site
- **Easy to install:** Flexible connections, adjustable wall brackets and lightweight nature makes installation easy
- **Exceptional flexibility:** Flexible connections ensure that all pipework configurations can be covered

**For more information visit:**  
[www.zmart.zehnder.co.uk](http://www.zmart.zehnder.co.uk)  
**T:** 01276 605 800  
**E:** enquiries@zehnder.co.uk

always around you



# TACKLING THE ENERGY POLICY TRILEMMA



A whole host of policies affect energy use in the built environment. As a new administration looms, **Hywel Davies** reviews the current situation and considers the scope for improvement

Energy policy is built around three objectives: security of supply, reducing costs to consumers, and cutting emissions. This is the so-called energy 'trilemma' because the three objectives are not necessarily compatible. Cutting emissions and bolstering security means lower carbon renewable generation, or nuclear power – neither of which do much to reduce energy costs. Cutting costs tends to drive the use of the lowest marginal cost energy, which may not be low carbon, and may be imported.

These objectives are not just a UK – or even European – concern; they occur around the world. The US majors on cost and security, but there is a growing realisation in Australia that environmental issues need to be taken more seriously as its agricultural industry faces serious challenges to cope with climate change. The recent destruction in Vanuatu – wrought by one of the most powerful hurricanes in history – has sparked a renewed debate about man-made changes in our environment. China and India, often used as excuses for inaction, are also agreeing that more must be done.

With the UN conference on climate change later this year, there is a renewed impetus for governments to think about the environment.

In the UK, a plethora of regulations and schemes affect energy use in buildings. The panel (above) shows just how much legislation there is in the area of buildings and energy. It also shows some of the overlaps between schemes, and the inconsistencies of approach.

For example, the CRC scheme requires a fairly detailed annual emissions return for many large organisations – public and private – using the CRC reporting methodology. However, ESOS requires private companies that are also in CRC to apply a different methodology, doubling up

**REGULATIONS RELATING TO ENERGY USE OR ENERGY-USING SYSTEMS IN BUILDINGS**

1. CRC Energy Efficiency Scheme (CRC)
2. ESOS Audits & Energy Savings Opportunity Scheme
3. Mandatory Greenhouse Gas reporting
4. Energy Performance Certificates (EPCs), Display Energy Certificates (DECs) and air conditioning inspections
5. Minimum energy performance standards (MEPS)
6. Enhanced Capital Allowances (ECAs)
7. Green Deal
8. Building Regulations, including Zero Carbon Homes and Code
9. Climate Change Agreements and Climate Change Levy
10. F-Gas Regulation & related requirements
11. Smart meters
12. EU minimum product-efficiency standards and energy-performance labelling

**This is not efficient regulation; it penalises the compliant, undermines all the schemes, and may not save any energy**

on compliance costs. What's more, a number of these organisations also come under the Greenhouse Gas (GHG) reporting methodology.

This is not efficient regulation; it penalises the compliant, undermining all the schemes – and it may not save any energy use or carbon emissions.

Then there are energy certificates. From 2018, if you want to let a UK commercial building you will need to show that it is E-rated or better – or bring it up to that standard – under the new Minimum Energy Performance Standards for commercial property.

In theory, you will be able to fund any improvements through the Green Deal, but – as we know – that is floundering. It may also be possible to do it through appropriate use of enhanced capital allowances (ECAs), but this requires upfront funding and there is a risk that the ECAs will not be allowed by HM Revenue and Customs.

Quickly, the interdependencies become clear, along with the need for a more coordinated set of policies and measurement tools to meet them. However, what we have now is the exact opposite.

We understand that, at present, compliance with Energy Performance

Certificates (EPCs) on buildings that are sold or rented out may be no better than 39%. This means a number of buildings will escape minimum energy performance standards (MEPS) altogether, as MEPS only apply if you have an EPC.

This cannot be rational, nor will it contribute to the policy intent behind MEPS – to get older existing buildings refurbished. The lack of attention to one aspect of the policy mix undermines another.

Perhaps a more rational world would bring ESOS, CRC and GHG reporting much closer. It could involve common metrics, allowing key performance characteristics to be measured once, and then for data to be reused again and again. It would reduce the range of measurements required, narrow the skills needed for delivery, and cut costs for businesses complying with all the current rules. It would also reduce the justification for those that fail to follow the rules.

It might even mean looking to use some of the revenue from CRC to incentivise improvements by rewarding those with good energy efficiency programmes. This would fit well with the latest report from the House of Lords Select Committee (see page 7), which clearly states that energy efficiency must be far higher up the political agenda if we are to achieve some of these multiple-policy targets.

With the right heads put together in a quiet corner, the policy landscape for energy in buildings could be markedly improved. Come mid-May, we will have a better idea of how we can argue most effectively for this global approach to a more energy efficient built environment – and what role CIBSE members can play in achieving it.

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



open **4** innovation  
niagara forum 2015  
hilton london metropole april 19 - 21

## Are you ready for truly open systems?



The era of the Internet of Things (IoT) has arrived – a time when openness and connectivity are vital to realizing operational efficiencies in commercial buildings.

**The Niagara Forum 2015** will be the place to learn what truly open systems can achieve and how to make the most of the opportunities offered by the IoT.

The Niagara Framework has the power to connect diverse devices and systems in ways that have never been imagined before.

Whether you are designing for an office,

hospital or data centre this truly open platform empowers users to achieve more than they thought possible.

**Join us in April 2015** to see the very latest smart, inventive and disruptive building automation technologies that are built on the Niagara Framework. The Forum is about the power of connections and community.

Now is the time to get ready for a new kind of open system that can harness the power of the Internet to create an efficient, productive and usable built environment. Register now at [www.niagaraforum.eu](http://www.niagaraforum.eu).

# PUSHING THE ENVELOPE



The environmental impact of new buildings on neighbours should be taken into account when calculating energy use. **Julie Futcher** and **Gerald Mills** says Allowable Solutions offers an answer

The London skyline is changing rapidly, as tall and very tall buildings are inserted into a low-rise urban setting. Although many of these buildings have impressive energy credentials their impact on their surroundings is not accounted for.

The best-known example is 20 Fenchurch Street, which casts a shadow over buildings to its north and, for a brief period, directed sunlight onto an adjacent street to its south, melting cars.

The Heron Tower has embedded PVs in its south-facing façade, and has organised its indoor space to avail itself of this renewable energy source. However, it does not have a right to this resource, and will lose it as soon as 100 Bishopsgate is completed, casting Heron Tower in its shadow.

Buildings in cities are not energy islands; they share the space – and passive and renewable resources – with other buildings and outdoor areas. Energy-management strategies require a spatial approach that accounts for the wider impact of buildings on their surroundings. Here, we consider Allowable Solutions under the framework of zero-carbon buildings as a means of addressing accountability.

Current strategies towards zero carbon buildings are founded on two principles: the inherent efficiency of the building fabric and energy-demanding

systems (the regulated loads); and the supply of energy from renewables. Both are onsite mitigation measures to meet carbon compliance, but may not be enough to achieve zero carbon under the 2016 Building Regulations. This is especially the case in cities where passive-resource opportunities are degraded and onsite renewables are limited. To address this shortfall, a third principle will be introduced permitting buildings to mitigate the remaining onsite emissions through offsite actions (Allowable Solutions) that have yet to be defined<sup>1</sup>.

Currently, buildings are considered as stand-alone entities for which energy management ends at the building envelope. However, in cities, the Allowable Solutions policy could introduce a higher level of accountability into assessments, by linking buildings to their immediate environment. This would address energy management at an urban scale, by including net energy effects beyond the building envelope as a zero-carbon objective.

A good example is the proposed development of the Bishopsgate Goods Yard (BGY), on the edge of the City of London. The 4.7-hectare, brownfield site is deemed suitable for tall buildings, for which the planning guidelines require proposals ‘to consider the impact of both taller and lower buildings on

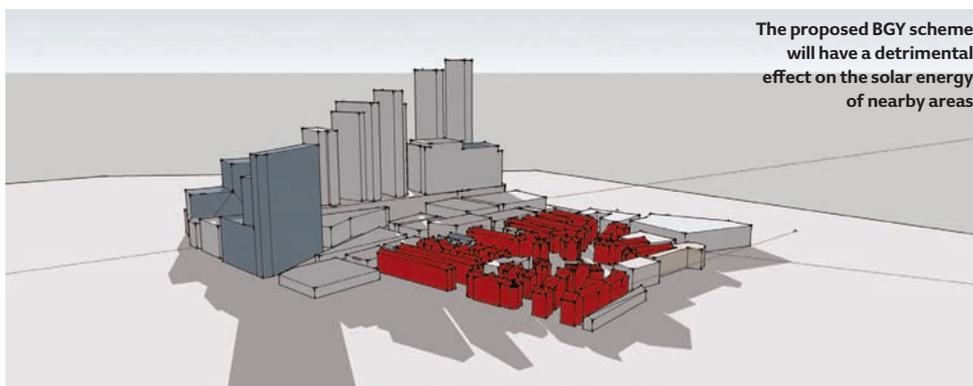
As the Bishopsgate development stands, areas such as the Boundary Estate will pay an energy price for a carbon-compliant building

conservation areas, listed buildings and strategic and local views’<sup>2</sup>

The current BGY proposal is for seven towers – ranging from nine to 48 storeys – on an existing podium around 15 metres high. The development is expected to come in at 35% under Part L (2010), with a 17% carbon reduction due to its passive design methodology and the use of low and zero technologies. What is little considered is the loss of solar energy – both as a passive and active resource – for the adjacent neighbourhoods to the north.

Among these is the 125-year-old Boundary Estate. Its design reflects the concern at the time for ventilation and light to improve public health – in fact, much of it remains as built, with single glazing and poor insulation. If BGY is completed, the estate will be shaded for much of the winter heating period (November to February). Ironically, the BGY development proposes a similar ‘passive design’ methodology as part of its energy-management strategy. As it stands, areas such as the Boundary Estate will pay an energy price for a carbon-compliant building.

This example poses questions about how to manage energy need and carbon compliance in cities. Where does accountability for the building envelope end? Who should be accountable for the energy costs (or benefits) that are distributed in the neighbourhood? Could allowable solutions offer a framework for energy management at the urban level? To answer these questions we must develop tools to assess the energy impacts of tall buildings on their neighbourhood.



The proposed BGY scheme will have a detrimental effect on the solar energy of nearby areas

## References:

- 1 *Next steps to zero carbon homes – Allowable Solutions*, July 2014 <http://bit.ly/1CtdZ5M>
- 2 *Bishopsgate Goods Yard: Interim Planning Guidance*, 2010 <http://bit.ly/1920UnZ>

**JULIE FUTCHER** is an architect at Urban Generation, **GERALD MILLS** is an urban climatologist and lecturer at University College Dublin

## Viega press systems

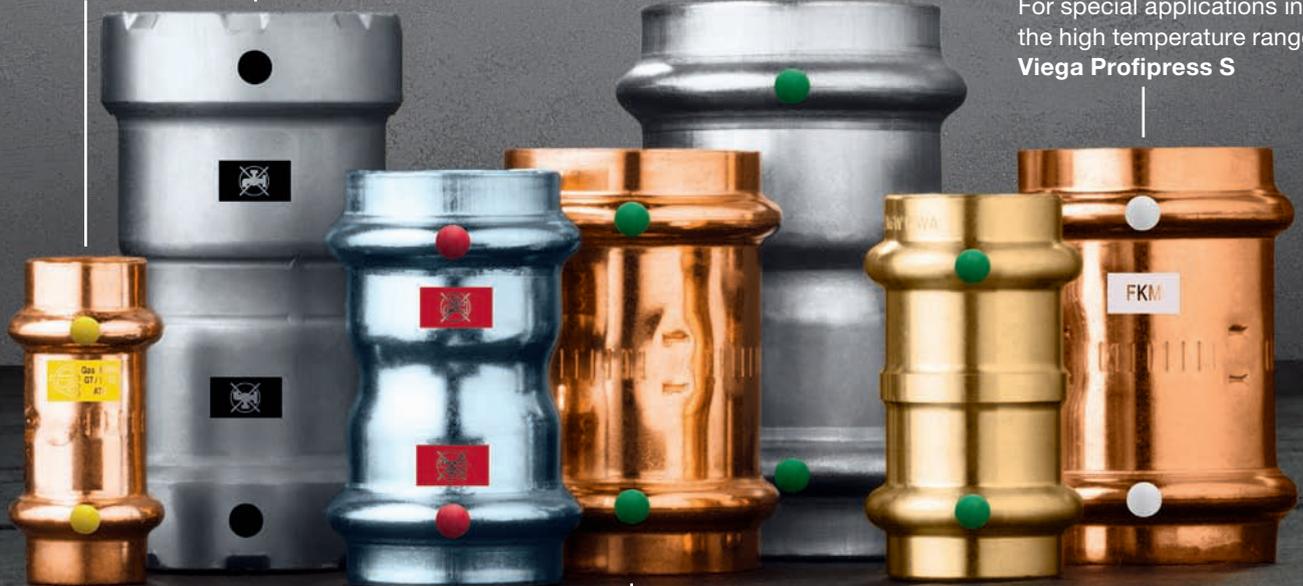
One connection technology for all installations.

For secure and clean gas installation:  
**Viega Profipress G**

The cold pressing technique for thick-walled steel:  
**Viega Megapress**

Stainless steel for optimal hygiene in drinking water installation:  
**Viega Sanpress Inox**

For special applications in the high temperature range:  
**Viega Profipress S**



Cost-effective: Externally galvanized steel for heating installation:  
**Viega Prestabo**

Perfect for drinking and heating water installation:  
**Viega Profipress**

Reliable: Gunmetal for use in building services:  
**Viega Sanpress**

[viega.co.uk](http://viega.co.uk)

### Unbeatable in practice

A single press tool is all you need for quick, clean connections. The function of the SC-Contur ensures that unpressed connectors are 100% leaky and immediately identified during a pressure test. This ensures the highest possible installation security and the extensive range of product solutions on offer has every practical application covered. More information: Viega Ltd 200 Brook Drive · Green Park · Reading · RG2 6UB · Tel: 0800 612 2206 · [sales@viega.co.uk](mailto:sales@viega.co.uk)  
**Viega. A better idea!**



Pressgun 5

**viega**

# DESIGNS ON HEALTH AND SAFETY



New CDM Regulations are replacing the role of coordinator with that of principal designer, so consultants will have more responsibility for health and safety. **Peter Caplehorn** reports

On 6 April, Construction (Design and Management) (CDM) Regulations 2015 come into effect, with several important changes that, hopefully, will herald a more effective approach to making construction, maintenance and demolition safer.

These latest regulations follow several iterations. Instigated by European Directive 92/57/EEC in 1992, the CDM rules have never had the smoothest of passages. This time, the Health and Safety Executive (HSE) has spent a considerable amount of effort fine-tuning the regulations, and has liaised with industry in an attempt to consider any potential unintended consequences. Unforeseen elements have, in the past, blighted the regulations, especially in the pre-construction phase.

CDM has always been about making construction, maintenance and demolition safer. All designers have a significant role to play – if they are allowed to. For too long, many have felt that CDM is not within their remit, or that they can't exert influence. This is definitely not the case; however, after non-designers stepped into the role, bureaucracy bloomed, and there has been little benefit to health and safety.

With the latest set of regulations, we have a new opportunity. There is a clear desire by the HSE for less bureaucracy and more focus on practical and proportionate health and safety. There are many areas of improvement.

Previously, several elements of the regulations did not reflect the directive, including the exclusion of domestic clients, which are now covered by CDM 2015. The domestic client is important on small projects where, perhaps, there are only two contractors; they need to work together to ensure a safe approach.

Under the new regulations, the role of the CDM coordinator (CDM-C) has been dropped. The CDM-C was



a liaison officer between the client and the consultants and contractors, but the HSE felt the role offered few tangible benefits for health and safety. In addition, clients thought it gave them poor value for money. CDM 2015 introduces the role of principal designer (PD), who will be appointed from the design team and have responsibility for minimising risk in the design.

There are also simplified notification trigger points: projects of more than 30 working days, employing more than 20 workers or exceeding 500 person-days, must now be notified.

The regulations put more onus on clients to ensure correct measures, resources and procedures are applied. The duties for contractors and site management remain largely the same.

### The principal designer

The PD is not a direct replacement for the CDM-C; it is a role for the designer or consultant. The PD needs to have authority over the design phase, understand construction, and be able to lead the team. Often, engineers will be in this position – and there is every likelihood this would be a very good fit. For the purpose of these regulations, a designer will have influence over choices of materials and specifications.

The role includes collating health and safety information, and ensuring the design team reduces – or eliminates – risk in the building throughout its life-cycle. Creating a health and safety file for the end of the project is also a duty, as well as ensuring the client understands its responsibilities. There is a requirement to ensure the contractor understands the design and has sufficient information.

The PD role can finish when the project starts on site, or continue through the construction period to ensure design issues are picked up and the H&S file is handed over.

There is flexibility in the PD role, recognising that contracts and remits vary from project to project. For example, the PD may hand over the H&S file when the project goes on site, when their commission ends. If the PD's responsibilities continue during the construction phase, they will need to assimilate all the necessary information and hand the file to the client at the completion of the project.

The PD may also perform the duties of the 'designer'. These are broadly, as under the previous regulations, to ensure hazards are minimised – or at least flagged up – in designs. It's not a complex procedure, but is most successful when there is good communication across the team, and simple clear records are kept.

It is clear that all designers and consultants can play a central role in these new regulations. While considerable progress has been made, we still have too many accidents in and around buildings. We also have too many long-term health issues emanating from poor work practices.

Designers can bring significant influence to bear in these areas and it is a professional's duty to ensure this continues to improve. These new regulations will help in that respect.

**PETER CAPLEHORN** is policy director and deputy chief executive of the Construction Products Association

For too long, many designers felt that health and safety was not within their remit or they couldn't exert influence

# DELABIE



COMFORT  
DESIGN  
EASY INSTALLATION  
EASY TO MAINTAIN



## SPORTING 2 SHOWER PANEL

- ▶ Up to 80% water savings
- ▶ Durable
- ▶ Minimal servicing
- ▶ Easy to maintain

### NEW

- ▶ Top or back inlet option on the same panel
- ▶ Integrated stopcock and filter
- ▶ Ligature-resistant diffuser

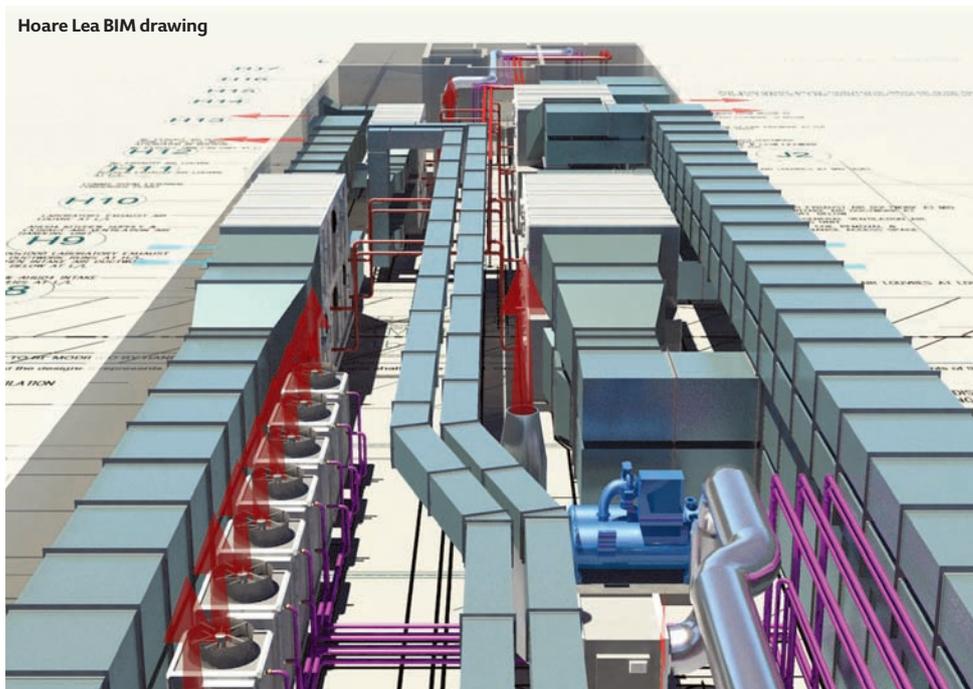
**10**  
YEAR  
WARRANTY

More information at [delabie.com](https://delabie.com)

# TIME TO CHANGE OUR BIM PRACTICES



Contractors and designers must work on the same BIM model to eliminate inefficient ‘double-handling’, says Hoare Lea’s **Paddy Conaghan**, who argues that it is the only way the construction industry can move forward



Hoare Lea BIM drawing

We are constantly told that UK construction practices must involve far more collaboration, with building information modelling (BIM) becoming a core process. Certainly, achieving the ambitious targets of Construction 2025 – 33% cost savings over a built asset’s life; 50% project delivery time savings; and halving the trade gap between product imports and exports – will be no mean feat.

While the report is not overly specific about BIM’s role in this renaissance, one can infer at least some of the factors at play. For example, a BIM of a well-liked building can be reused in briefing the next version – thus saving time and money – while the data in a BIM provides a full dashboard of everything needed for efficient building operations.

True, viewed through the lens of current industry structures

and practice, one can equally see many barriers to harvesting these kinds of efficiencies. However, the inescapable truth is that ‘business as usual’ is not an option, and that the leading-edge BIM users, even though some way off the final vision, would never contemplate reverting to the old ways.

We get into a muddle in our industry defining what we mean by BIM. The major trade contractors usually refer to a 3D modelling tool – linked to libraries of geometrically exact products – that also supports a range of smart production and back-office functions. Having developed truly efficient systems that so well serve the contractors’ own needs, it’s understandable that their systems’ deficiencies in handling, using and reproducing product data are not much advertised.

Unfortunately, these production

models are not the form of BIM being called for – the so-called Level 2 (L2) that is central to the BIM vision and all that flows from it. Our BIM design communities have – by and large – switched to these L2 platforms and are beginning to ‘live the dream’ by producing models in which every component is defined by both 3D geometry and a data set.

However, our standard industry practice is that the contractor selects products and installation methodologies, and determines final setting out within the range of possibilities afforded by the designer’s drawings and specifications. The contractor typically undertakes a complete and detailed redraw of the design information, and – once approved – this working-drawing information is then used, and the designer’s information is shelved. This double-handling is a process inefficiency that BIM is intended to eliminate, because the same model is supposed to be used by both parties with a soft transition between them.

The problem is that the current generation of L2 platforms used by designers doesn’t give the contractor all of the features of its well-proven production tool, so – in time-honoured fashion – the design model is abandoned and the contractor creates a new production one. *Plus ça change...*

Unfortunately, the production tool, for all of its functionality and precision, is dumb. It can hold neither design information nor developing data. Yet we routinely accept its precedence and park the design model when the production one appears. Thus, the fixed model presented at handover is devoid of data – despite this information transfer being the central tenet of the BIM ambition.

### ‘No-brainer’

It would be daft, now, to overhaul the arrangement completely. For a start, L2 BIM is not adequately supported

‘The fixed model presented at handover is devoid of data, despite this information transfer being the central tenet of the BIM ambition’

by product libraries and all of the post-processing features of the production tool. It's also harder to modify the L2 model to suit specific products and installation methods that vary from one contractor to another.

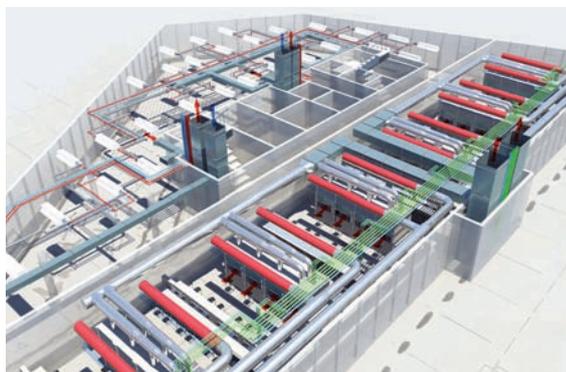
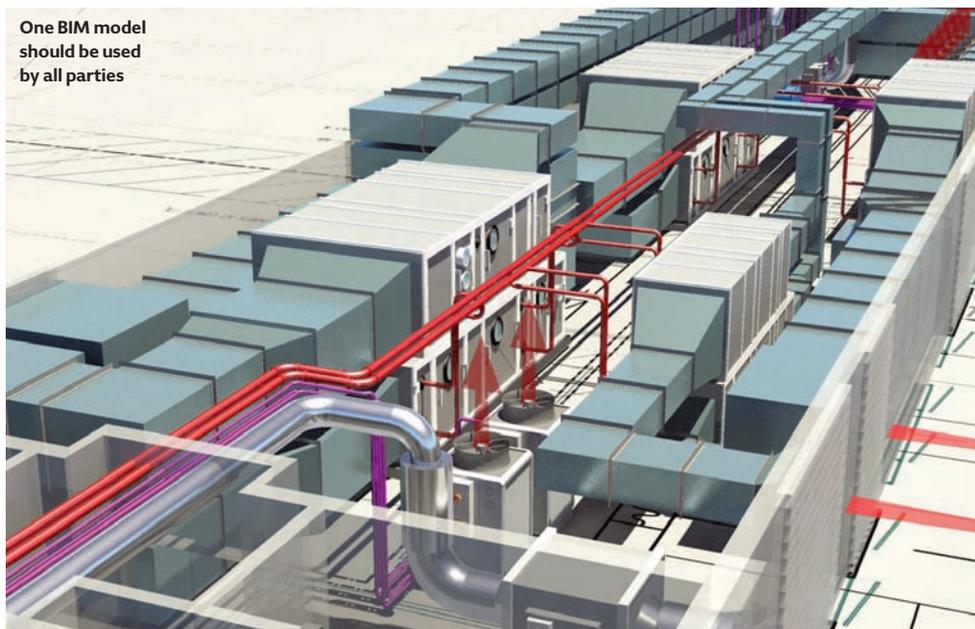
The software vendors will eventually resolve the problem by morphing the essential features of the production tool into the L2 version. However, it may then take five years for the supply chain to enable switchover fully, even with prime contracting. Something of an interface problem will remain, where design is disaggregated from contracting – which is still often preferred on one-off projects and by many overseas clients.

I believe the solution is staring us in the face: namely that the contractor should be able to use the well-proven production model until switchover is feasible, but that the L2 BIM should be continued parallel to it – as its data carrier – and become the data-rich, as-fixed model at handover that is called for.

Of course, this will involve further 'double-handling' and become an additional cost. But it's the norm with architecture and structures – so why should mechanical, electrical and plumbing (MEP) be any different?

It's time to turn to the question of costs. The use of the production tool is reckoned to add about 1.5% to the price of MEP works, but to yield about 10% savings in production efficiencies. The extra-over cost of designing in L2 BIM may be of similar order, but it's a moot point whether it saves anyone anything if the model is abandoned halfway

One BIM model should be used by all parties



through. The additional cost of continuing the L2 BIM to handover would be about 2% of the MEP works. Yet, if it is the fundamental enabler of the Construction 2025 targets, it's surely a 'no brainer'?

Continuing the L2 model to handover has the less obvious advantages of enabling the industry

to start its transition to the BIM vision immediately, rather than depend on vendors' actions. While we don't yet have all the features needed for data handling, the cross-industry uptake of CIBSE's Product Data Templates – and the promise of the upcoming NBS Toolkit – suggest that this is now the moment to make a start.

If we get this right, then industry can expect to reap the rewards implicit in the trade balance targets, also enshrined in the 2025 Construction report.

\* I'm obliged to the members of the CIBSE BIM Group for their advice in developing this thesis, and for cost information.

● PADDY CONAGHAN FCIBSE is a consultant at Hoare Lea



**SAV**  
SYSTEMS

**Waste Not,  
Want Not!**

Optimum indoor climate,  
minimum energy usage

[www.sav-systems.com](http://www.sav-systems.com)



# ARE SIMPLE BUILDINGS BETTER BUILDINGS?

Academics and practitioners will discuss what makes a successful building at CIBSE's Technical Symposium this month. **Tim Dwyer** selects eight presentations that reflect the breadth of knowledge on display at the event

**OTHER HIGHLIGHTS**

A new guide to school design will be launched at the Symposium. *CIBSE TM57 Integrated School Design* includes post-occupancy evaluation studies, including at Loxley School (see page 12 of the education special). The co-author discusses how TM57 will benefit designers in an interview on page 10 of the same supplement.

On page 41, Jess Tindall discusses his poster on hot water and cold water design flow rates, and the dangers of oversizing.

The fifth CIBSE Technical Symposium on 16 and 17 April looks set to deliver further highly informative and entertaining presentations on the major issues affecting the building services industry.

The two-day event at University College London (UCL), sponsored by Taylor & Francis, Rinnai and Delabie, will give practitioners, manufacturers, researchers, academics and students an excellent opportunity to meet and share ideas and knowledge.

This year's theme is 'Simple Buildings – Better Buildings?' and, after a sneak peek at the papers, I am impressed by how the presenters have addressed the question. Here is a snapshot of some of the 60-plus presentations.

optimisation models have been developed in an effort to provide more realistic expectations around energy use. Doug Baldock, of Hoare Lea, will consider the feasibility of downscaling these to more localised projects.

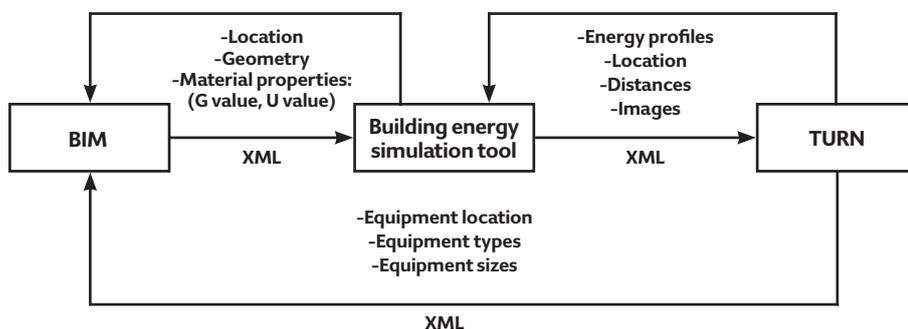
Baldock worked with Imperial College on the Technology Urban Resource Network (Turn), and will demonstrate how it compares with the actual energy strategies developed by building services engineers for a campus development at White City, London. He will explain how well the model correlated with the energy strategy and distribution of services.

Turn provides details of capital and operating costs, as well as CO<sub>2</sub> emissions, early in the design process. The model's additional value will be considered in the context of the building design process and its integration with the RIBA plan of work 2013, plus the application of BIM, as shown diagrammatically in Figure 1.

## Scaling models

Large-scale, urban, energy-system

Figure 1 – Integrating the decision-making and information tools into the simulation process [Source: Doug Baldock et al, Hoare Lea]



## Biomethane CHP in retail stores

Julien Bos, of Imperial College, London, reports that the retail food industry consumes 3% of the UK's total energy spend. By comparing different technical configurations and operational strategies Bos has investigated the potential for replicating zero-carbon stores that employ biomethane combined heat and power (CHP) solutions. He evaluates the



Delegates (centre and right) at the 2014 Symposium, in Dublin, and (left) the venue for this year's event, UCL

impact of internal and external parameters to deliver the most cost-effective CHP.

### Potential for heat pumps

Phil Draper, of Broadgate Estates, explores how heat pumps with heat recovery can improve energy performance, reduce the carbon footprint of buildings, and give a swift payback. His investigations are centred on London office buildings that offer an integrated approach to heating and cooling, confirming an expected reduction of 38% in the building's primary energy consumption, and a cut in CO<sub>2</sub> emissions of 34.6% (Figure 2). Draper shows it is possible to deliver even greater efficiencies with a gradual decarbonisation of UK electricity production, plus ancillary solutions such as thermal storage, solar PV plates and chiller-plant optimisation systems.

#### Energy and emission savings of new heat pumps

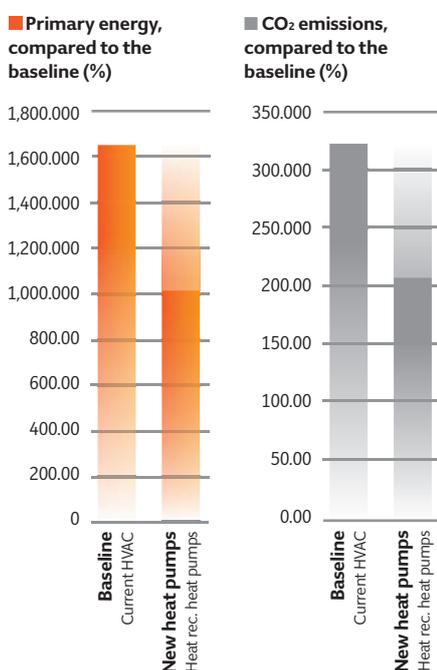


Figure 2 – Energy and emissions savings of new heat pumps in example buildings [Source: Phil Draper, Broadgate Estates]

### Aceing atriums

Buildings with multistorey atriums can be optimised to benefit from stack ventilation. Andrew Acred, of the University of Cambridge, uses mathematical analysis to identify scenarios where the atrium assists flows and so optimises the natural ventilation performance. Just as importantly, his method determines what will be detrimental to natural airflow. Acred will show that by applying an 'enhancement ratio' – where the control of ventilating flows is evenly shared between vents – undesirable flow patterns are avoided and adequate ventilation is delivered to all occupants. The enhancement ratio will vary significantly from building to building, depending on their physical construction and heat gains within the atrium.

### London post-occupancy evaluation

The proof of a building's performance is in the occupational phase, and Michael Lim, of Aecom, will report on a two-year post-occupancy evaluation of apartments at Galliard Homes' Seager Distillery redevelopment in London. He considers the energy and environmental performance of three apartments, including the performance of the building fabric, MVHR (mechanical ventilation and heat recovery) units, and the communal heating system.

By comparing the actual performance with the design intent of the apartments and communal heating system, Lim identifies the performance gaps, and provides examples of when good design intent has been subverted by operational challenges.

### Urban weather files

Dane Virk, of UCL and CIBSE, has been considering the need for a 'Design Summer Year' (DSY) – representative outdoor conditions used for design calculations – for Manchester and Birmingham. Following a similar methodology to that in CIBSE's *TM49 Design Summer Years for London*, Met Office

weather stations were situated in more urban locations (compared with the current DSY) for each city. Dane has analysed this data to determine whether the cities have urban heat islands and whether these are significant enough to justify new weather files.

### Generative design

Generative design is likely to be new to many, but Andrew Corney, of Sefaira, will suggest it could transform building services. The method uses algorithms and computing to produce designs beyond normal conception. A simple architectural example would be the automated sizing of a solar-shading device for optimal cooling loads. Corney argues that generative design has the potential to affect the type of work engineering consultants do, and the skills needed by engineers. He will review the implications and consider how building services will be impacted.

### Educating users

Aaron Gillich, of London South Bank University, will present a sobering paper that reinforces the need for industry to communicate the impact of building systems better. He reports on a study of student accommodation, where students who volunteered meter readings used 20% less energy than non-participants. This was aided by the use of infographics to stimulate interest in the effect of energy consumption.

However, Gillich's studies of what happened after the trials were completed have highlighted a need to examine our preconceptions of how building users apply information and knowledge of building energy use as, in many cases, any lessons learned appeared to be quickly forgotten. **CJ**

● Visit [www.cibse.org/symposium](http://www.cibse.org/symposium) for booking information and details of the presenters.

● **TIM DWYER** FCIBSE is technical editor and chair of the Technical Symposium

With an election around the corner, politicians were well represented at the 2015 Ecobuild conference. **Liza Young** reports from the hustings and detects cross-party agreement over the urgent requirement for energy efficiency



# GREEN THINKERS COOL HOT AIR



## FEELING BLUE, GREEN AND GREY

By Sara Kassam, CIBSE

Faced with a packed Ecobuild programme, I plumped for a seminar on 'Urban liveability and wellbeing: balancing blue, green and grey infrastructure'. According to an EPSRC-funded project, led by the University of Nottingham, a blue-green city aims to recreate a naturally oriented water-cycle while bringing water management and green infrastructure together. What I tend to find missing is the interaction with building services. The UK-GBC recently released a report, *Demystifying Green Infrastructure*. The focus is on wider infrastructure, and perhaps it's up to building services engineers to be more vocal about how the coherence of systems within buildings can affect external environments, and vice versa.

**T**he political sustainability agenda made headlines at Ecobuild 2015, with party representatives jostling for position in the lead-up to next month's General Election.

Energy secretary Ed Davey said a future Liberal Democrat government would spend £2bn a year on a 'green homes revolution' to improve energy efficiency in the UK.

During his keynote speech, Davey said the party's green proposals – including a 'Green Magna Carta' – would be 'breathtaking' in their ambition.

A Green Homes Bill would contain a long-term target to bring all homes up to EPC rating C by 2035, with financial incentives for homeowners, such as Council Tax reductions for raising energy efficiency by two bands, and a feed-out tariff for solid-wall insulation.

Davey said that, from 2018/19, the Lib Dems would invest about £2bn a year on domestic energy efficiency, which needed to be reclassified as part of a national infrastructure plan. This approach could result in four million homes being upgraded by 2015, and 10 million by 2025, he said.

### Boilers on prescription

The outgoing government has made a further £70m available for the Green Deal home-improvement fund.

The scheme, which opened to new applications last month, offers up to £5,600 to households in England and Wales to help with the cost of improvements such as solid-wall, cavity-wall and floor insulation, double glazing and boilers.

Davey also announced the coalition's £33m of



funding for pilot schemes designed to tackle fuel poverty, including £1m, released now, for ‘warmth on prescription’ projects.

Doctors will be able to prescribe boilers, insulation and double glazing for patients whose ailments are exacerbated by cold, damp homes.

Paul Burns, Green Futures manager at Gentoo housing association, runs one such pilot in Sunderland. He told a Refurb and Retrofit seminar – which was discussing alternatives to the Green Deal – that Gentoo partnered with the Sunderland Clinical Commissioning Group to ‘prescribe health, not treat sickness’.

The average spend on energy efficient improvements to homes in the trial has been £5,000, while each emergency admission to hospital costs £2,500, he said.

Since the pilot was launched, household gas consumption has reduced by 36.6%, while the average living room temperature had increased by 42%. Burns said the scheme was expected to generate a reduction in visits to GPs, walk-in and A&E centres, and cut in prescription costs.

### Not a big deal

The Conservative Party’s declaration of being the greenest government ever was

overshadowed by one of its MPs, who condemned further investment in renewables.

Speaking at the conference, Peter Lilley said politicians had ‘enormously exaggerated’ the effects of global warming, and that the potential costs of implementing the Climate Change Act could be twice the amount of the maximum financial benefit for the UK.

The Hitchin and Harpenden MP, who studied natural sciences at Cambridge University, said global warming was ‘of the same order of magnitude as other natural factors, which have offset it’.

Under the Climate Change Act, the UK is committed to reducing emissions by 80% by 2050, while the European Union (EU) has set



a target of at least a 40% reduction by 2030, which includes sourcing 27% of all energy from renewables.

However, Lilley said it was cheaper to use fossil fuels. ‘We can crack this problem without impoverishing people in the process.’

The rest of the panel, which included Davey, Labour’s shadow spokeswoman for energy and climate change, Baroness Worthington, Green Party leader, Natalie Bennett, and environmental professor, Paul Ekins, opposed Lilley’s views.

Ekins said the scientific and economic case for low carbon electricity was ‘compelling’ and that ‘there’s a real possibility that unmitigated climate change could be catastrophic’.

He said the cost of renewables had fallen considerably, and future investment would bring it down even further.

Shortly before Ecobuild, the Department of Energy and Climate Change (DECC) announced £315m of funding for 27 renewable projects designed to generate more than two gigawatts of electricity.

Labour’s Worthington believed the costs of implementing the Climate Change Act was an investment. ‘For me, the pounds we are adding to people’s bills are investment in jobs, the future and my child’s planet.’

Meanwhile, former deputy prime minister John Prescott called for cross-party

## Save up to 30% on commercial gas bills



Ideal for upgrading your existing system or for new build projects, the Vitocrossal 200 CM2 features a high efficiency of up to 98% and has a maximum operating pressure of 6 bar.

- Higher efficiencies in commercial applications due to high water content
- Output range 87 to 620 kW. Cascade up to 2480 kW
- Self cleaning stainless steel Inox-Crossal heating surface
- Pre mix burner - low NoX <39 mg/kWh
- Variable flow - greater flexibility for refurbishment projects
- No minimum flow rate - pump power consumption reduced by 60%
- Modulating range down to 33%
- Suitable for natural gas or LPG at higher outputs

Available now, for more information please see our website or email us at, [info-uk@viessmann.com](mailto:info-uk@viessmann.com)  
[www.viessmann.co.uk](http://www.viessmann.co.uk)



**Effizienz Plus**

**VIESSMANN**

climate of innovation

Viessmann Limited • Teiford • Telephone 01952 675000



EcoBuild visitors check out a living wall. Below: Lord Deben addresses EcoBuild



unity in dealing with climate change, saying: 'We're all in it together'. He said improving the UK's housing stock was key to tackling the problem, but focusing on new build missed 95% of the problem.

If Labour wins the election next month, Prescott will represent the UK government at the Paris climate summit, in December.

### A question of Europe

In a debate that questioned whether the UK would ditch its sustainability policies if it voted to leave the EU, panellists' opinions were unanimous. Lord Deben, chair of the committee on climate change, said staying in Europe was 'crucial to the future of Britain', not just because it has influence over policies, but also because, environmentally, 'it would be disastrous'.

Joanne Wade, director of the Association for the Conservation of Energy, said a No vote for EU membership would have repercussions for UK firms. 'Businesses trading in the EU will have to comply with European regulations, but will have no influence on how those regulations are designed.'

She added: 'Energy efficiency increases the GDP, health and wellbeing, and employment. Whether we are in or out, that's a fact that is going to stay the same.' CJ



### Lighting for health

How buildings are lit has a significant effect on occupier wellbeing and quality of life, according to panellists on a lighting session, chaired by Paul Littlefair, principal lighting consultant at BRE.

Littlefair said daylight provides high levels of blue-enriched light that helps maintain a person's circadian rhythms - the physical, mental and behavioural changes that follow a 24-hour cycle. Exposure to light at night suppresses melatonin, raising the risk of cancer, he said.

Florence Lam, global lighting design leader at Arup, said it was important to embrace biological needs in lighting design. With LED, for example, it is possible to create

'biological darkness' by removing the blue light that tells your brain it's daytime.

Brian Charman, manager at Philips Lighting University, said changing colour temperature could accelerate the recovery time of hospital patients. He referred to studies that show how circadian lighting in neo-natal units resulted in weight gain in pre-term babies, while dementia patients slept longer and deeper.

He added that, at Maastricht UMC, cardiac patients with circadian lighting slept for 30 minutes longer - and fell asleep more quickly - than their control-group counterparts. The system led to an 8.5% reduction in patient-stay times.

# AMEND AND IMPROVE

Amendment Number 3 to BS 7671:2008 Requirements for Electrical Installations aims to improve safety says Jim O'Neil, Director of Technical at the Electrical Contractors' Association (ECA).

## Keeping pace with changes

Technology evolves rapidly, which means regulations governing electrical installations and maintenance need amending to ensure they keep pace with the change. In the case of Amendment Number 3 to BS 7671:2008, these changes aim to improve safety and reduce the damage and distress caused by electrical malfunctions and their results.

These amended requirements should lead to safer working and living environments which is a high priority for everyone involved in building services.

## Minimising consequences of fires

For instance, a key amendment to the regulations is the requirement for wiring systems in escape routes to be supported in a way that makes them less liable to collapse in the event of fire. This means that plastic clips, cleats, ties or PVC trunking can't be used in corridors used as escape routes regardless of building type. Instead, cables must be restrained by fire resistant supports and restraints which will keep wiring secure in the event the escape routes need to be used.

## RCDs and Risk Assessments

In addition, RCDs are required for sockets with a current of less than 20A unless a Risk Assessment has been filled in saying they aren't required. This also applies for sockets that have been identified for connection of a particular item of equipment. This isn't required for domestic premises but is necessary in commercial buildings that are used by a high volume of people – such as shops – in order to minimise the risk of accidents and injuries.

## Improving safety

It is this desire to reduce risk in both commercial and domestic buildings which is at the heart of the Amendments to BS 7671:2008. Although electricity is the lifeblood of modern society it's also something that can have devastating consequences for anyone involved in an



accident. Hopefully the new regulations will mean that the likelihood of this happening will be kept to a minimum.

## Timescale

The new edition of BS7671 was published on 1 January and comes into force on 1 July this year. These changes are not retrospective but all new installations from that date should incorporate them.

## JOIN ECA FOR FREE AS A CLIENT ASSOCIATE FOR:

- Free technical helpline
- Free health & safety advice
- Free subscription to *ECA Today* magazine
- Access to ECA's BIM and Energy Solutions e-forums
- ECA website login for exclusive member-only content
- Discounted BSI and IET publications
- Preferential rates on training

Visit [www.eca.co.uk/client](http://www.eca.co.uk/client) or contact ECA Membership on 020 7313 8400 quoting CIBSE 1.

## ELECTRICAL ENGINEERING AND BUILDING SERVICES CONTRACTORS YOU CAN TRUST

For the gold standard on your building project hire an ECA Member who will be:

- Covered by the ECA guarantee of work scheme and ECA bond
- UKAS assessed for technical competence
- Safety prequalified and/or SSIP assessed
- Adherent to the ECA Code of Fair Trading
- Kept up to date on the latest regulations and standards
- Fully supported by ECA expert advisors

Visit [www.eca.co.uk](http://www.eca.co.uk) to find an ECA contractor in your area.



Representing the best in electrical engineering and building services

The government is proposing to loosen the requirement for Display Energy Certificates. Arguing that they are essential for closing the performance gap, **Bill Bordass** and **Robert Cohen** put forward a plan for widespread adoption

# MAKING DECs FLY



---

“ The government wishes to position DECs as EU bureaucracy, not as a window on real-energy performance and the anchor for policy and industry measures

**C**ase study evidence of performance gaps has been around for many years. In *Flying Blind*, published by the Association for the Conservation of Energy in 2001<sup>1</sup>, Bill Bordass discussed reasons for the difference between predicted and actual performance of buildings.

In his preface, the author regretted how responsibility for non-domestic buildings and energy was being dispersed from the former Department of the Environment to three departments and the Carbon Trust. Policy rhetoric at the time professed ‘joined-up government’ – but this seemed more like a jumbling up. The creation of the Department of Energy & Climate Change (DECC), in 2008, jabbed another set of fingers into the pie, not to mention the Treasury’s interventions.

*Flying Blind* recommended making in-use energy performance visible and actionable, so that good performance would become a duty for building professionals, and a badge of good management for occupants.

This needed a clear, common language to communicate energy performance at all stages of a building’s life-cycle, and to help motivate those involved to do their bit.

Just as *Flying Blind* was being completed, the European Commission published a draft of what was to become the Energy Performance of Buildings Directive (EPBD), including energy certificates. In response, a postscript to the text highlighted key points from the draft and expressed the hope that the EPBD would be the spur to making energy performance visible.

The EPBD was ratified in December 2002. To support its transposition in six countries both of us were working on Europrosper, an EU research project set up by ESD (now Verco) to explore methods of labelling office buildings for their in-use energy performance. This made substantial use of British developments, in particular, the CIBSE *TM22 Energy assessment and reporting methodology*<sup>2</sup>, the *Energy Consumption Guide 19* for offices, from the government’s Energy Efficiency Best

offices; and training packages that had been tested and well received in the UK and the countries of the six partner organisations.

In its July 2004 consultation<sup>3</sup> on Part L and the EPBD, the Office of the Deputy Prime Minister (ODPM, later renamed the Department for Communities and Local Government – DCLG) supported the idea of Operational Ratings for public display, and referenced Europrosper extensively.

Unfortunately, unintended consequences of the ‘jumbling up’ then began to emerge. ODPM said it could not invest in development until the minister agreed – which took until June 2006. The Carbon Trust couldn’t invest either, because its remit was to go beyond government policy, while Ofgem, serving the privatised utilities’ interest, rather than the national energy security, did not see why utility companies should be required to provide annual energy statements to feed into DECs. We were also unable to persuade the Carbon Trust to update the Energy Consumption Guides it had inherited from the EEBPp. Consequently, the UK – despite being equipped with many of the tools – lost an opportunity to develop a world-class system.

In *Onto the Radar*<sup>4</sup>, the Usable Buildings Trust (UBT) demonstrated how, in the absence of robust benchmarks, DECs could be phased in. This would be assisted by a ‘soft start’, with participants encouraged to get their data organised in the years before display requirements came into force. UBT also undertook two commercial-sector initiatives, to dovetail with DECs: the Voluntary Energy and Carbon Declaration (sponsored by the Carbon Trust and the built-environment think-tank Edge), and the Landlord’s Energy Statement for rented buildings<sup>5</sup>.

A second EC research project, EPLabel – again led by ESD – then developed a system plus demonstration software, which the DCLG and its consultants were able to use to inform the DEC approach.

In late 2006, the DCLG also asked CIBSE to comment on benchmarks for DECs. Finding the existing ones inconsistent and out of date, a task force, led by John Field, recommended a simple implementation of the tailored benchmark approach demonstrated in EPLabel, with a framework that enabled further detail to be added as it evolved.

When the recommendation was accepted, the task force worked with key stakeholders to develop simple placeholder benchmarks and allowances, which were published as CIBSE TM46. The intention was that

these should evolve once DECs came into operation, in October 2008.

## The present

While DECs have helped to expose widespread performance gaps, their implementation has not been as effective and influential as hoped, for three main reasons:

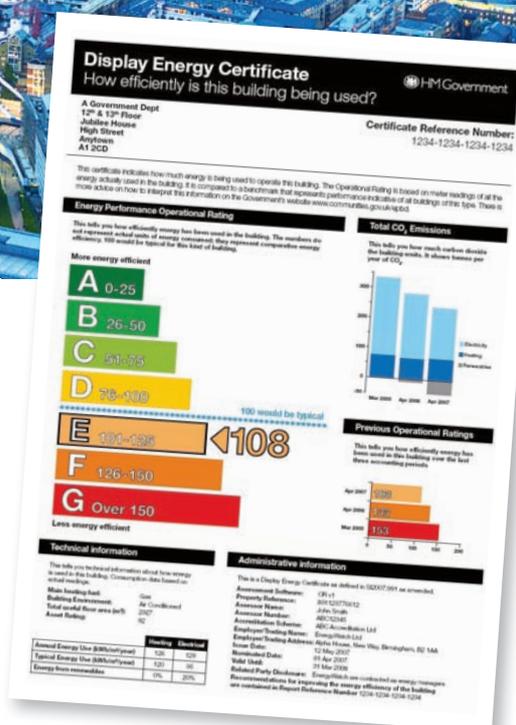
- The government wishes to position them as EU bureaucracy, not as a window on real energy performance and the anchor for a whole variety of policy and industry measures. A 2014 report by Deloitte<sup>6</sup> regretted that, instead, we have a set of inconsistent and time-consuming rituals
- For more than a decade there has been no investment in the energy benchmarks that lie at the heart of an operational rating scheme, despite DEC data on the Landmark central register providing a wealth of empirical evidence. Two reviews of the DEC database have been carried out – by CIBSE and University College London, but – no action has been taken to refresh the benchmarks
- DECs have not been extended to private-sector buildings, despite strong support from influential organisations, including the Confederation of British Industry. This is partly because of concern about the benchmarks, because the commercial sector prefers to recognise the split responsibilities between landlords and tenants.

For all the policy interest in improving the energy and carbon performance of buildings, we still lack clarity on the key objective: how is this building actually performing?

In February 2015, DCLG issued a consultation – ‘DECs: current regime and how it could be streamlined and improved’. Surely, at last, in-use performance would go to the heart of buildings and energy policy, including better integration, improved benchmarks, and extension to commercial buildings. Instead, DCLG’s ‘improvements’ range from abolition to various forms of dilution, enlarging the hole in the middle of buildings energy policy. All the responses to the consultation that we have seen – not least CIBSE’s<sup>7</sup> confirm the foolishness of this approach. By proposing to emasculate DECs, DCLG is mandating inefficiency in legislation and in buildings – the very things the government is supposed to be tackling.

## A vision for the future

- DECs must be used to make performance visible and actionable, as originally intended
- Industry and policy measures can then



Practice programme (EEBPp), and a ‘tailored benchmarking’ system that Bordass had helped the EEBPp to develop in 2001, to supersede Guide 19.

When Europrosper ended, in early 2004, considerable progress had been made on what were to become Display Energy Certificates (DECs) based on actual energy use. This included: an exploration of the principles and applications; a suggested certificate design; demonstration software for

- converge onto DECs – for example, with Building Regulations requiring predicted and in-use DECs; and clients, designers, occupiers and facilities managers committing to achieving particular levels<sup>8</sup>
- The key to DECs is disclosure, not display, so the database of results must be freely accessible. At present, the cost is prohibitive
- The benchmarking system needs to be improved, including work to support DECs in commercial buildings and feedback from the existing database for the public sector
- DECs need to be made cheaper to produce and to update – for example, using automated uploads of metered data by the utility companies, as happens with EnergyStar Portfolio Manager in the USA<sup>9</sup>
- DEC data should feed directly into reporting performance at the portfolio level
- Policies for buildings and energy must be joined up and technically coherent. **CJ**

**References:**

1 B Bordass, *Flying Blind – everything you wanted to know about energy use in commercial buildings but were afraid to ask*, Association for the Conservation of Energy (October 2001). Downloadable from the publications section of [www.usablebuildings.co.uk](http://www.usablebuildings.co.uk)

2 John Field, principal author of TM22, was also on the Europrosper and ELabel teams, and wrote the associated software.

3 ODPM, *Proposals for Amending Part L of the Building Regulations and Implementing the Energy Performance of Buildings Directive* (July 2004).

4 Usable Buildings Trust, *Onto The Radar: how energy performance certification and benchmarking might work for non-domestic buildings in operation, using actual energy consumption* (June 2005). Downloadable from the publications section of [www.usablebuildings.co.uk](http://www.usablebuildings.co.uk)

5 Developed by UBT with the British Property Federation, with Carbon Trust funding, see [www.les-ter.org](http://www.les-ter.org)

6 Deloitte, *Carbon Penalties & Incentives: A review of policy effectiveness for carbon reduction and energy efficiency in the commercial buildings sector* (March 2014).

7 CIBSE response to DEC consultation <http://it.ly/1Ds0sNq>

8 The NABERS Commitment Agreement in Australia demonstrates how this can be done <http://bit.ly/1FpWWSP>

9 Energy Star Portfolio Manager <http://1.usa.gov/1Bjk9gh>

● **BILL BORDASS** FCIBSE is principal of William Bordass Associates, and adviser to the Usable Buildings Trust; **ROBERT COHEN** is technical director of Verco

By proposing to emasculate DECs, DCLG is mandating inefficiency in legislation and in buildings – the very things the government is supposed to be tackling

# THE POWER OF GAS SAFETY REGULATION KNOWLEDGE IN YOUR HANDS

## FREE CIBSE ACCREDITED CPD TRAINING FROM S&S NORTHERN

**REGULATIONS COVERED ARE:**

- BS6173:2009
- IGEN/UP19
- BB100 (Building Bulletin)
- IGEN/UP11

S&S Northern can deliver Continuous Professional Development training to mechanical and electrical consultants, contractors and local authorities throughout the UK at your company's premises, from our new offices in Chorley, Lancashire or a location to suit you. Lunch can be provided for all delegates.

If you would like to book our CIBSE accredited CPD training or would like further information please contact us:

**S&S HEAD OFFICE: +44 (0) 1257 470 983**  
 E: [INFO@SNSNORTHERN.COM](mailto:INFO@SNSNORTHERN.COM) • W: [WWW.SNSNORTHERN.COM](http://WWW.SNSNORTHERN.COM)  
 SOUTH EAST OFFICE (UK): 01702 291 725 • [SOUTH@SNSNORTHERN.COM](mailto:SOUTH@SNSNORTHERN.COM)





# USB Charging Wiring Accessories

Available profiles...



Nexus Metal



White Moulded



Nexus Flatplate Screwless

- Charge your iPad, iPod, tablets, mobiles, cameras & more
- USB sockets - 2.1A total output, 5V
- Nexus Metal and White Moulded will fit 25mm box



FREE UP  
YOUR SOCKETS

For more info on USB sockets

T: (01952) 238 100

E: [sales@bgelectrical.uk](mailto:sales@bgelectrical.uk)

[www.bgelectrical.uk](http://www.bgelectrical.uk)

# CLEAR-CUT WINNER

M&G Real Estate was the deserved recipient of the 2015 CIBSE Carbon Champion of the Year Award. **Andy Pearson** explains how the retail landlord's energy management strategy took energy efficiency at shopping centres to new heights



Entries to the 2016 Building Performance Awards open on Monday 1 June and close on Thursday 10 September 2015. To receive the latest news and updates about the awards please sign up to our newsletter [www.cibse.org/bpa](http://www.cibse.org/bpa)



### ARNDALE CENTRE'S ENERGY STRATEGY

- 1 Demonstrate that basic maintenance, good practice and housekeeping is being undertaken
- 2 Monitoring and targeting
- 3 Tenant engagement
- 4 Installation of automated metering and sub meters
- 5 Assess short payback energy saving measures
- 6 Assess longer payback energy saving measures
- 7 Consider the case for renewables

**O**n a bustling Saturday afternoon in Manchester's Arndale Shopping Centre a crowd chanting 'release the balloons' surrounds a man dressed in a sequin-encrusted red jacket and matching bow tie. The glittery host is challenging shoppers to guess the carbon footprint of various means and modes of transport. He selects a volunteer from the crowd and asks them to pick a balloon representing the item that they think has the biggest carbon footprint from a big green bin full of balloons.

As the chosen one rises into the air, others representing the carbon footprints of the remaining activities are also released from the bin. The balloons are tethered. The longer the line, the larger the carbon footprint the balloon represents. Once all are aloft, the host seizes the opportunity to discuss the relative carbon emissions of the various items with the crowd.

The Big Carbon Balloon Game took place in June 2014. It was conceived to help raise awareness and public engagement in carbon saving activities. The game is one of a number of community carbon initiatives with which M&G Real Estate, manager of the Manchester Arndale Centre, is involved as part of a broader drive to reduce the energy consumption of its shopping centre portfolio.

It is a project that is having a big impact: over the last three years the real estate fund manager has achieved a 23% overall reduction in landlord energy



consumption across a total of eight UK shopping centres saving 21,152MWh, equivalent to almost £1m.

The company's achievement was recognised by the judges at this year's CIBSE Building Performance Awards, where the property investment company won both the coveted Carbon Champion 2015 award, and the Energy Management category. The judges said M&G Real Estate had 'methodically set about making lasting energy improvements to its shopping centre portfolio'.

From the real estate fund manager's perspective, its drive to reduce the carbon emissions from its shopping centres makes sound business sense. Nina Reid, director for responsible property investment at M&G Real Estate, says the initiative is driven by the joint aims of: managing the risk of obsolescence; ensuring compliance with environmental regulations; and reducing operational costs,



M&G Real Estate has achieved a 23% reduction in energy consumption across eight UK shopping centres

which would otherwise be passed on to retailers through the service charge.

'In developing our strategy, and in making the business case for doing it, we understand the growing impact of legislation, such as the Energy Savings Opportunity Scheme (ESOS),' she says. Other regulations influencing M&G Real Estate's strategy include Minimum Energy Performance Regulations (MEPS), and Air Conditioning Inspection Reports (ACI).

Manchester Arndale Centre accounts for more than half of all the energy consumed by the company's eight UK shopping centres, which have consistently formed part of its property portfolio. This enormous 130,000m<sup>2</sup> centre contains more than 240 retail outlets housed on two levels, along with a 19-storey office tower. Reid describes it as 'a complex shopping centre, built over a period of time, when energy efficiency was not designed in'.

Unsurprisingly, M&G Real Estate's drive to reduce its carbon emissions was initially directed towards tackling energy consumption at the Arndale Centre. Successful initiatives were then subsequently rolled-out across M&G Real Estate's wider shopping centre portfolio.

First the firm set about implementing measures that had either no or low-cost before considering those actions that would have required capital investment. 'Priorities are governed by capital outlay and linked to return on investment,' explains Reid.

In line with its no-cost/low-cost approach M&G Real Estate first set out to address

shortcomings in the management and maintenance of the centre's energy-consuming plant and equipment.

This included tackling tasks such as reviewing the time settings for the on/off control of plant, ensuring back-of-house lighting is switched off when not in use and ensuring the no-cost measures from the centre's Air Conditioning Inspection report were properly implemented. 'There are a lot of energy savings that can be made through low-cost measures, such as turning off equipment when it is not in use,' says Reid.

In tandem with the implementation of no and low-cost management measures, M&G Real Estate also set about understanding how energy was being consumed at the centre by installing more than 130 sub-meters to monitor the operation of all major plant.

In addition, the real estate fund manager has invested in an enhanced monitoring service provided by EP&T Global.

This includes on-going analysis and reporting by a team of engineers who liaise with the centre's operating staff. The service enables the operations manager and his team to identify the areas where the biggest energy wins can be achieved. The EP&T Global system has been in place for only 17 months, and is already showing savings well above the predicted reductions of 13% on electricity and 5% on gas. It is expected to save more than £1m during the first five years of use on the retail complex. 'To date, Manchester Arndale is the only shopping centre where the business case has been



► strong enough to invest in an enhanced monitoring solution,' says Reid.

After the no-cost/low-cost initiatives, energy saving actions with a short payback were targeted. These included measures such as switching the lamps in the centre's low-level downlighters from inefficient 70W ceramic discharge metal halide lamps to much more efficient 26W LED fittings. Other measures included: a thermal imaging survey of valves; fittings and exposed pipework of the high pressure hot water system, which resulted in improvements to the insulation that saved 417,402kWh, and had a payback of five months; and the introduction of night cooling to the malls by tweaking the operation of the BMS.

Once the short-payback initiatives had been tackled, higher payback measures were considered under an annual asset plan. This includes energy saving measures, such as upgrading plant and equipment, which could be considered when – and if – parts of the shopping centre are to be refurbished or redeveloped. 'We've tried to focus predominantly on low and no-cost measures. Where we do make an investment we look for a very clear payback that we can justify to our tenants,' Reid explains. The types of measures implemented at the Manchester Arndale are summarised, in order of priority, in the panel.

**Tackling tenant energy use**

In addition to reducing the landlord's energy consumption, M&G Real Estate has also produced environmental guides to help retailer tenants in its shopping centres to make improvements to their energy consumption by detailing the financial benefits of reducing their environmental impacts. The guides cover fit-out, refurbishment, energy efficiency of equipment and appliances, and explain the importance of monitoring consumption. Reid admits this can be 'a sensitive issue' for those retailers that have a standard fit-out across all of their stores. 'Our approach is on the soft side. It's about helping our tenants – particularly the smaller retailers – understand energy consumption by explaining the benefits in terms of cost savings from putting in energy efficient lighting, for example,' she says.

Alongside the guides, M&G Real Estate has also put in place an occupier engagement plan for the shopping centre. This has three main objectives: to update occupiers on energy, water and waste performance regularly; to improve occupier awareness of energy, water

and waste initiatives; and finally to engage with occupiers to help them improve their performance in all of these areas.

Another carbon-saving tenant initiative that M&G Real Estate is working on with the British Property Federation is the introduction of green clauses into leases across its entire retail portfolio.

In 2013 the company signed five green Memorandums of Understanding with Marks & Spencer, which encouraged the sharing of consumption data and a joint approach to investing in the fit-out of assets to the benefit of both parties. 'It's a light green approach; clauses typically talk about sharing energy data between the landlord and tenant or not fitting out a retail outlet in a way that would harm the shopping centre's environmental rating,' says Reid.

Looking to the future, Reid expects Minimum Energy Performance Regulations to start to have an impact on retail leases as the market adapts to forthcoming legislation. Under the Energy Act, from April 2018 proposed legislative changes will make it unlawful for commercial properties, including shopping centres, to be let if they have an EPC Rating of F or G (the lowest two



grades). 'In a retail environment a tenant's fit-out can have a big impact on the EPC rating. For example, if a tenant were to install an inefficient lighting system that makes the unit F or G rated, that unit can no longer be let unless the lighting scheme is changed,' explains Reid.

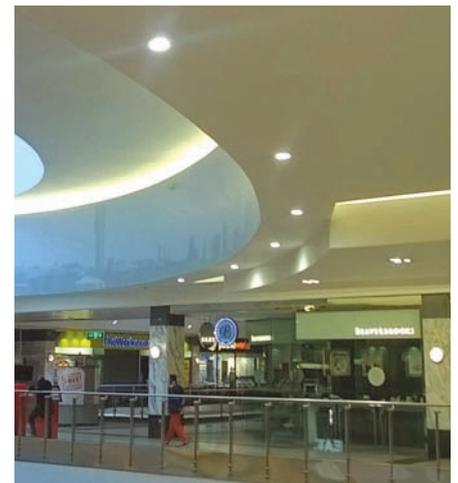
M&G Real Estate chairs the Better Building Partnerships (BBP) group involved with the creation of a landlord energy-rating tool to give detailed information on the split between landlord and occupiers, which is claimed to be more appropriate than the current version of DEC's for multi-tenanted properties such as shopping centres. The organisation participates in the BBP's annual benchmarking exercise to see how it is performing against its peers.

**Working towards a low carbon future**

More recently M&G Real Estate has worked with CO<sub>2</sub> Estates, an energy assessment and reporting software platform, to produce a Property Energy Performance Report for each of its shopping centres. The report provides an audit of each centre's energy consumption and compares it with operational



“ We've tried to focus on low and no-cost measures; where we do make an investment we look for a very clear payback that we can justify to our tenants



► benchmark data provided by the Real Estate Environmental Benchmark (a joint initiative between BBP and Jones Laing LaSalle) to identify further potential energy savings and methods of energy management that should be developed to deliver cost savings.

The Property Energy Performance Report includes recommendations for improvements categorised according to cost and detailing the effect on operational and asset rating.

It also explains whether these benefits will accrue to the landlord or tenant, or both, and it suggests budget costs and paybacks. The report even incorporates the requirements of the *TM44 Air Conditioning Inspection* guidelines so it should also contribute to satisfying the requirements of ESOS.

‘Shopping centres are all very different so we don’t have a one-size-fits-all approach; instead we develop tailored plans for each centre,’ explains Reid. ‘For example, moving to a naturally ventilated mall is an energy saving opportunity, but it is not an appropriate solution for every centre that we manage.’

Even with the CIBSE Carbon Champion accolade under its belt M&G Real Estate is not resting on its laurels. Looking to the future,



Property Energy Performance Reports are expected to play a key role in assisting M&G Real Estate to achieve its current target of a 20% reduction in carbon emissions by 2020 against a 2012 baseline. ‘Our key lessons learned is that you have to keep a constant eye on what you’re doing to prevent energy savings slipping backwards,’ says Reid.

With this level of commitment it will take a brave person to bet against the real estate fund manager being in the running for next year’s CIBSE Carbon Champion. **CJ**

## R40 MODUPAK

### The multi boiler package for custom-made performance

Combining the highest degree of material quality with intelligent technology.

- Allowing for substantially optimised transfer of heat
- Setting new standards of efficiency
- Corrosion-resistant stainless steel guarantees much less wear and tear
- Can be quickly installed
- Almost unlimited configurations of boiler size and number
- Units can be located against a wall, free-standing or back-to-back
- Modupak can be made up from a selection of any of the R40 boiler models
- Up to eight boilers can be combined with one another in a cascade operation

**STOKVIS**  
ENERGY SYSTEMS

Back to back



Wall mounted



Free standing



**STOKVIS**  
ENERGY SYSTEMS

**THE CONSULTANTS AND CONTRACTORS CHOICE.**

For further information or to receive a technical guide tel: 0208 783 3050 or email: [info@stokvisboilers.com](mailto:info@stokvisboilers.com)

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

# Be Free.

# BE WIRELESS!

PortHole III is the new in desk, wireless charging module from CMD Ltd - connecting directly to the mains power supply to provide wireless charging in any commercial and public spaces.

## Features

Compatible with all wireless enabled and wireless ready devices

Sound and light system that lets you know when charging begins

Automatically turns off when charging is complete

Stylish design available in a choice of three colours

Easy fit system designed to fit any surface installed with an 80mm grommet hole

## with **wave**<sup>TM</sup> technology..

What makes PortHole III unique is that CMD have developed a wireless charger that has an integral power supply so there is no requirement for a separate USB device to power the module.

t 01709 829511  
e marketing@cmd-ltd.com  
w www.cmd-ltd.com  
f /cmdltd  
@cmdltd  
in company/cmd-ltd



# TURNING THE DESERT GREEN

MEP designers face myriad sustainability challenges when working in the Gulf, but – as **ChewPieng Ryan** and **Catherine Elliott-Scott** explain – what seems like a negative can be transformed into a positive

**T**he Gulf Cooperation Countries (GCC) have embarked upon ambitious expansion and economic diversification plans in recent years. These have involved huge amounts of government spending across the industrial, energy and infrastructure sectors, as well as the construction of houses, sanitation and education facilities to upgrade standards of living while achieving sustainable economic growth. All of this is being done in highly challenging climatic conditions.

The biggest challenge facing mechanical, electrical and public health (MEP) designers in this region is the extreme environment, which drives the conceptual designs for building services systems and, thereafter, the processes that ensure the quality of the concepts is maintained.

The entire GCC region is desert, according to the climate classification of Köppen-Geiger. The majority falls into the hot desert category and only a small area – in the north-west of Saudi Arabia – into the cold desert classification. A hot desert climate is characterised by extreme heat – which regularly rises above 45°C – high humidity, and intense UV radiation. Sand erosion, plus high levels of dust, haze and fog, also contribute to the severe environment.

Other notable challenges for building services engineers in the Gulf include:

- Poor facilities maintenance, post completion
- The risk of earthquakes
- The need to protect tall buildings and their contents from lightning strikes
- Seasonal, dense, early-morning fog, which causes heavy condensation when air conditioning is used
- Floods caused by very occasional heavy rainfall with which the drainage systems are not designed to cope.

Sandstorms also affect the design of ventilation systems, so special consideration must be given to sand-trap louvres.

However, these challenges also present great opportunities. For example, high humidity and fog offer the chance for dew harvesting and water storage in a region where water is scarce. Flooding can also be used to restore the natural valleys and waterways, known as *wadi*. A good example of this is Wadi Hanifah, in Riyadh, where the natural environment has been restored and enhanced to provide a public space for residents and their families.

## Stringent regulations

The thermal performance of the building envelope is one of the main drivers in determining the cooling load and resultant energy use of a construction. It is important, therefore, to consider its design at the outset, as this will be a fundamental driver in determining building services concepts. Insulation, for example, plays an important role in reducing the heat exchange between interior and exterior environments, as well as the formation of condensation.

Although full-load conditions tend to occur more often in hot climates than in temperate zones, the majority of cooling coils operate at part-load for a large period of the year. If systems are designed to meet the most extreme circumstances, they and their associated controls will be greatly oversized for 'normal' conditions. Oversized air conditioning systems fail to cope with controlling humidity, which results in a cool, but humid environment – and, predictably, these systems waste energy.

In addition to concepts for HVAC and building-envelope performance, MEP designers in the Gulf can assist architects in



## VIEW MORE ONLINE

This article is adapted from a webinar given by the authors for the CIBSE ASHRAE Group. The presentation – *Designing MEP Systems and Code compliance in the Middle East GCC Region* – is available at [www.cibseashrae.org](http://www.cibseashrae.org), which features details of other group events.

implementing passive design elements. The exposed architecture of temperate climates is not appropriate for this region; spaces between buildings need to be protected from direct sun to facilitate comfortable circulation of people on foot. This often leads to an undercroft area that is well shaded.

The façades of buildings should be configured to reduce solar-heat gain and cooling-energy consumption. This is particularly crucial when it comes to windows, which should be small, and shaded by deep reveals and external structures. This must be balanced with the desire to provide occupants with daylight penetration and uninterrupted views.

Because of the importance of air conditioning in the Gulf, ASHRAE codes are used in designs, primarily for the ventilation



Burj Al Arab hotel in Dubai

LIOMANGITOVIA / SHUTTERSTOCK



CHERKAS / SHUTTERSTOCK

and air conditioning systems. The ASHRAE handbook is used as the main reference, providing the basis of design and climatic data. ASHRAE Standards 52, 55, and 62 provide further robustness in ensuring quality of testing in ventilation systems, energy benchmarking and material specifications, while ASHRAE standard 90 is widely used in ventilation modelling.

In May 2014, CIBSE published CIBSE TM04 for buildings in extreme environments. This document discusses key issues, such as building envelope, daylight and solar gains, building orientation, intelligent façade designs, wind movement, urban heat-island effects and U values. It also covers general design philosophy for extreme environments, as well as the geographical, climatic, and commercial, legal and social conditions and requirements.

Local resources and experience are essential to understand – and take advantage of – regional expertise; engineers and technicians here are trained in western technologies. It is advisable to allow the manufacturer’s specialist engineers or representatives to supervise, set to work and commission, as necessary, while the use of packaged equipment – involving minimal need for specialist installations – is encouraged.

International Plumbing Codes (IPCs) are used in the region, alongside local municipality and utility distribution codes.

All countries have their own electric and water distribution company codes, but – when it comes to detailed design – reference is made to IPCs and International Mechanical Codes.

With all the development and tall buildings in the Gulf, the industry is fully aware of health and safety in construction and, in particular – given the lack of water resources – life safety in relation to fire-fighting. All countries in the Middle East have their own fire and life-safety codes; however, countries such as the UAE mostly refer to the National Fire Protection Association 101 Life Safety Code for fire-fighting design, as well as the architectural life and safety systems.

The level of redundancy in electrical infrastructure is a fundamental driver in concept-stage design. Clients often require a higher redundancy than in a European counterpart building for a variety of reasons, including availability, stability and quality of supply. Mechanical cooling is a prerequisite for the safe and comfortable operation of many buildings, and is often generator-backed, with the knock-on impact on space requirements and acoustic considerations associated with this type of plant.

The exposed architecture of temperate climates is not appropriate for the Gulf; spaces between buildings need to be protected from direct sun to facilitate comfortable circulation of people on foot

In the GCC area, wiring regulations are generally based on IEC 60364 (BS 7671 is used in the UK). However there are local quirks; for example, in Kuwait it is not permitted to consider more than PF > 0.8 in demand calculations, regardless of the PFC equipment installed – and additional de-rating



Abu Dhabi's skyline

PATRYK KOSMIDEN / SHUTTERSTOCK

factors are required for transformer sizings, which can have a significant impact on the installed infrastructure. Outdoor building services equipment must be dust-proof, to prevent premature failure of switchgear, control gear and machines. ANSI/IEC 60529-2004 Degrees of Protection Provided by Enclosures (IP Code) (National Electrical Manufacturers Association, 2004) outlines the sealing effectiveness of enclosure of electrical equipment. Using this classification system, external control panels and switchboards should be rated IP53 and IP64.

Local shading should be used to provide protection for electrical components, and anti-condensation precautions should be taken to ensure continuous operation of electrical distribution and control systems. Fine wind-blown sand/dust invades circuit protective devices, and equipment has been known to fail in an energised state, increasing the risk of electric shock and fire. Specification, regular testing and maintenance are key to lowering these risks.

The growth in construction in the Gulf region has been phenomenal, and sustainability needs to start at the masterplan stage. Local and international building benchmarking systems are widely used to measure overall performance of buildings: Dubai has the Green Building Code; Abu Dhabi the Estidama Pearl Rating System; and Qatar has the GSAS, formerly QSAS. Other regions follow the USGBC LEED system, but they are also entitled to use the local codes. Several countries in the Middle East and north Africa – such as Saudi Arabia, Jordan and Sudan – are keen to make GSAS the unified green building code for the region.

International communities provide a large amount of expertise in the Gulf and – depending on the client, architect’s influence and, sometimes, brand guidelines – they may prescribe LEED Certification in addition to accreditation by a local benchmarking system. For example, the headquarters of the Dubai Electricity & Water Authority has achieved LEED Platinum, as well as complying with the Green Building Code. In Abu Dhabi, Siemens’ HQ building has achieved LEED Gold and Estidama Pearl 3 rating.

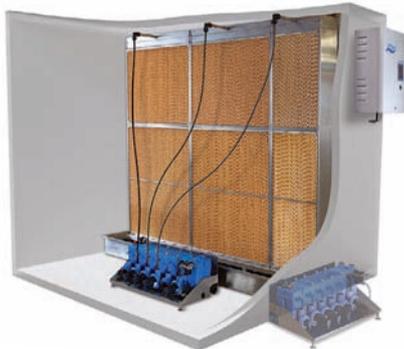
UAE is listed in the top 10 nations of LEED-certified buildings and is testament to how the Gulf region is very conscious of the sustainability agenda, as well as the need to design and build quality developments. CJ

• CHEWPIENG RYAN MCIBSE is group director, and CATHERINE ELLIOTT-SCOTT MSLI is associate, at Buro Happold



## CONDAIR ME

### The new generation of in-duct evaporative humidifier



This newly developed in-duct humidification system can deliver up to 1,000kg/hr of moisture and 630kW of evaporative cooling to an air stream while operating on less than 0.3kW of electricity.

Its innovative and patented features position it firmly as the world's leading humidifier of its type.

These features include a self-contained hydraulic unit that can be positioned inside or outside the AHU or duct to reduce AHU downtime.

Discover more about the new Condair ME  
[www.condair.co.uk/me](http://www.condair.co.uk/me)  
 T: +44 (0)1903 850 200

Humidification and  
 Evaporative Cooling

  
 The new name for JS Humidifiers

## Vibration Isolation



Goodwood House, 86 Holmethorpe Avenue,  
 Redhill, Surrey, RH1 2NL

Neoprene Turret Mounts	Inertia Bases
Neoprene Hangers	Noise & Vibration
Spring Mounts	Surveys
Spring Hangers	Ex Stock Delivery
Flexible Connectors	Selection Service
Floating Floors	Special Design Service

## Eurovib Acoustics Products Ltd

Telephone (01737) 779577  
 Fax (01737) 779537  
[sales@eurovib.co.uk](mailto:sales@eurovib.co.uk)  
[www.eurovib.co.uk](http://www.eurovib.co.uk)



Say goodbye to flanging, threading,  
 pipe grooving and welding with:



## Axilock-S

Join plain end pipe with Teekay Axilock-S  
 Seals and locks the pipes together  
**Two Pipes... Two Screws... Two Minutes**

tel: +44 (0)1494 679500

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

# ARE WE SIGNIFICANTLY OVERSIZING DOMESTIC WATER SYSTEMS?

A focus on saving water is pushing down domestic water volume flow rates, but UK sizing methods have yet to reflect this change, say **Jess Tindall** and **Jamie Pendle**

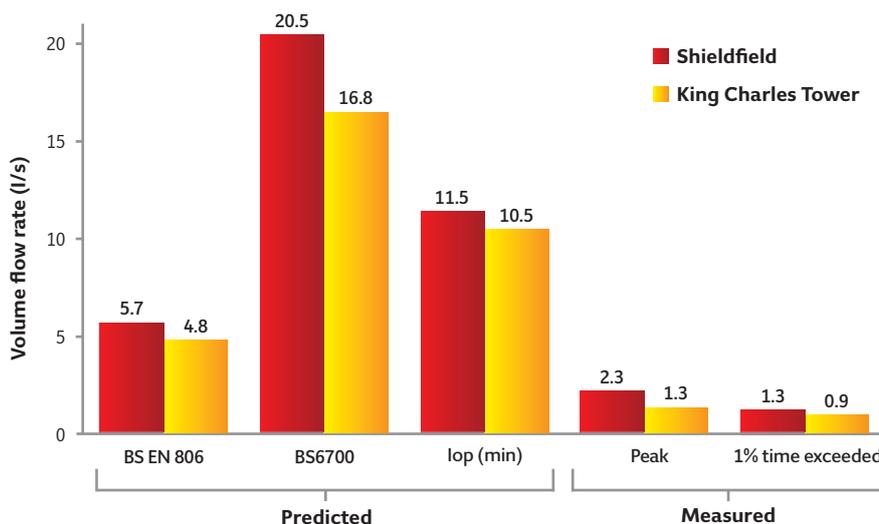


Figure 1: Design predicted vs measured volume flow rates

Over recent decades, a growing awareness of the need to reduce water and energy consumption has led to significant changes in the amount of water used. For example, manufacturers of washing machines are now obliged to show the water-consumption data for their products so that buyers can choose efficient models if they wish. Consequently, peak domestic water volume flow rates are likely to have reduced; however, UK sizing methods have yet to be updated to reflect this, resulting in the potential for oversizing.

To investigate this issue, incoming domestic cold water service (DCWS) volume flow rates were recorded at two multi-storey residential blocks. The measured peak flow rates were then compared with the flow rates predicted by the three most widely used UK sizing guidance documents; BS EN 806<sup>1</sup>, BS 6700<sup>2</sup> and the Institute of Plumbing (IoP) guidance<sup>3</sup>. Secondary data, supplied by a leading UK manufacturer of DCWS



King Charles Tower

pumping equipment, was used to validate the primary data, and enables firm conclusions to be drawn from the study.

## The problem

Oversizing of DCWS is detrimental to projects, not only because of the obvious capital-cost implications but also because it can lead to reduced water quality and problems with the operation of booster sets.

A recent paper<sup>4</sup> stated that oversizing pipework reduces water velocities, resulting in water remaining in the distribution pipework far longer than is ideal for health and hygiene reasons. This problem is most extreme in tall buildings, where the domestic cold and hot-water pipework runs within the same riser space, resulting in unwanted heating of the cold water.

Over-estimation of the DCWS flow rates can also lead to problems with the booster sets that are necessary for tall buildings. It is advisable to combine multiple smaller pumps into one booster set, to minimise the consequences of oversizing and ensure reliable operation by increasing the range of modulation. However, wouldn't it be a better idea to match the predicted and actual demand more closely, narrowing the design to operation gap?

## UK sizing guidance

The three sizing guides listed in the introduction employ the same approach: the flow rate, duration and frequency of use of each outlet type are considered to arrive at an allocated number of 'loading units' (LU). The LUs are then added up and a chart used to convert the LUs to a volume flow rate, which is intended to be exceeded for 1% of the time.

Housing association Your Homes Newcastle allowed access to two of its

Over-sizing of DCWS is detrimental to projects, not only because of the obvious capital-cost implications but also because it can lead to reduced water quality



properties: Shieldfield House, which has 26 storeys and 125 flats; and King Charles Tower, which has 15 storeys and 90 flats. Both properties were built around 1960 and recently benefited from modernisation, so the DWS outlets are typical of new builds.

All of the flats had a bath, shower, toilet, hand basin and kitchen sink. Both buildings used electrically heated DHWS storage vessels within each flat, so hot water LUs were calculated and added to the DCWS LUs, to arrive at predicted incoming DCWS volume flow rates. The low-frequency loading units were used where possible.

A clamp-on, ultrasonic flow meter was used to gather flow-rate data over a period of one week per building. From this, the peak volume flow rate – and that exceeded for 1% of the time – was identified and compared with the predictions.

**Results**

Figure 1 shows the predicted volume flow rates for each of the three UK calculation methods, as well as the measured peak and the 1% (of time) exceeded volume flow rate

for both buildings. DCWS flow-rate data for a number of multi-storey residential buildings was supplied by an independent UK manufacturer of fluid-pumping equipment. This was used to increase the sample size and to validate the primary data. (See Figure 2.)

There is some variance around the line of best fit, as expected, given the different sizes of flat and number and type of outlets. However, there is a clear correlation between the primary and secondary data.

**Findings**

It is evident that BS EN 806 predicts volume flow rates closer than the two other methods for all buildings in the study. Additionally, the line of best fit is almost parallel to that for the measured data (see Figure 3), so it results in less error for large projects. The IoP and BS 6700 methods both show that the margin of error increases in proportion to the size of the development.

There is a significant margin between the predicted and measured peak flow rates – a greater margin still if the 1% time exceeded is taken into account – so engineers should use BS EN 806 for similar projects. The IoP method led to more than double the oversizing compared to the use of BS EN 806, while the predictions of BS 6700 were many times the required value – so very significantly oversized.

These findings should be welcome news for architectural and building services engineers as we aim to ‘narrow the design to operation gap’.

A poster of this article will be presented at the CIBSE 2015 Technical Symposium on 16-17 April, at UCL London. More information at [www.cibse.org/symposium](http://www.cibse.org/symposium)

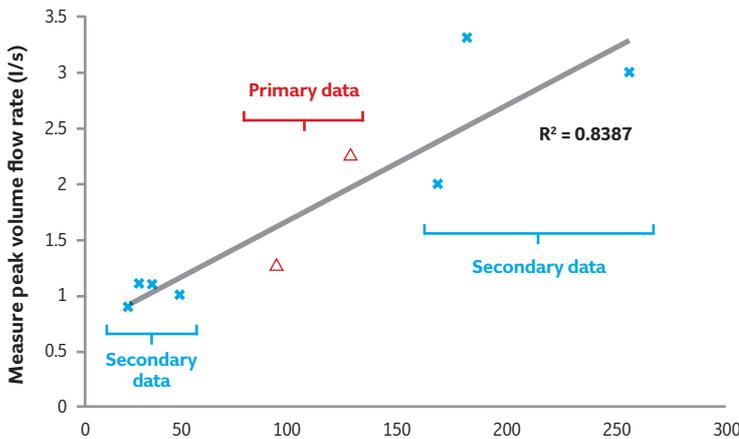


Figure 2: Primary and secondary data measured peak volume flow rates

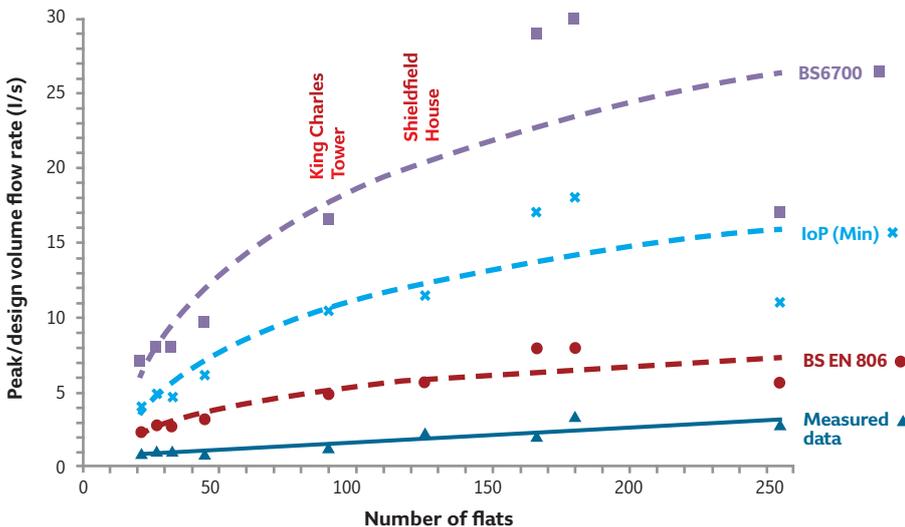


Figure 3: Design flow rates predicted for the nine buildings, alongside the measured peak volume flow rates

**References:**

- 1 British Standards Institution, BS EN 806-3:2006, *Specifications for installations inside buildings conveying water for human consumption*. London, BSI, 2006.
- 2 British Standards Institution, BS 6700:2006, *Design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages - Specification*. London, BSI, 2006.
- 3 The Institute of Plumbing. *Plumbing Engineering Services Design Guide*. Hornchurch, The Institute of Plumbing, 2002.
- 4 Agudelo-Vera C, Scheffer W, Pieterse-Quirijns I, Blokker M. New Method to Design Domestic Water Systems, *REHVA Journal*, December 2013, p12-16.

JESS TINDALL is a senior lecturer at the faculty of engineering and environment, Northumbria University  
 JAMIE PENDLE is a graduate mechanical engineer at Arup



“When the ref  
said early  
bath, I wasn’t  
going to argue.”

When you need hot water, and you need it fast. It has to be Andrews. Proven in the most demanding environments, from rugby clubs and military barracks, to hotels, hospitals and university campuses. Our industry-leading products are designed to work, and keep on working. First time. Every time.  
Sales: 0845 070 1055 Web: [andrewswaterheaters.co.uk](http://andrewswaterheaters.co.uk)

**Andrews. Built to perform.**



# Global heating systems locally focused

Commercial heating systems from ELCO have been specified worldwide for over 85 years, providing ultimate efficiency and reliability for their entire lifecycle.



## LEGEND

### BOILERS WALL & FLOOR STANDING



### RENEWABLES AIR & GROUND SOURCE HEAT PUMPS SOLAR THERMAL



### CHP



### HOT WATER PRODUCTION & STORAGE



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

HEATING - HOT WATER - RENEWABLES

This month: Regulations on water heaters, decarbonising datacentre energy supply, and how effective cooling cut a datacentre's annual carbon emissions by 400 tonnes



## FULL STEAM AHEAD

NIKITOK/SHUTTERSTOCK

Tough new European regulations on water heaters are nearly upon us. Designed to reduce energy use and NO<sub>x</sub> emissions, the new rules will impact both manufacturers and specifiers, says **Jonathan Tedstone** of Andrews Water Heaters

**S**pecifications for water heaters are set to change markedly over the next four years, as new EU legislation aiming at reducing the energy use of products comes into force.

In line with the EU Directive 2009/125/EC, from 26 September 2015, water heaters with a rated output of up to 400kW and hot water storage tanks with a storage volume of up to 2,000 litres will need to meet minimum energy performance criteria.

Smaller systems with outputs of up to 70kW and storage volumes of up to 500 litres will require an energy label.

In 2017, further energy efficiency requirements will be brought in, and in 2018 mandatory limits for NO<sub>2</sub> emissions will be set.

The directive, known as the ErP Directive, applies to energy-related products and is supported by the Energy Labelling

Directive, which require products' energy performance to be labelled under the Ecodesign scheme (see panel 'What ErP means for product specification').

Water heaters with a storage and instantaneous design: gas; LPG; oil and electric heaters; dual fuel heaters; solar thermal hot water products; and dedicated heat pump water heaters, are all included.

The energy efficiency bands for water heating products will initially range from A to G, but will eventually extend to A+++ and band G will be removed in 2017.

It is likely that conventional products will have an A-G (A-F from September 2017) classification, while A+, A++ and A+++ will be reserved for renewable technologies.

As well as stating the energy efficiency band, product labels for water heaters and hot water storage tanks will also include a size (load) profile, ranging from 3XS to 4XL.

For example: 3XS would be a water heater typically suitable for a small single basin at 35°C; S would be a shower and single basin at 35°C; M would be showers and a sink at 55°C; L would be a bath, shower and sink at 55°C; XXL would be



An overall energy label will be required if a system contains more than one component

6 The Ecodesign and Energy Labelling Directives should be embraced; they will ensure only the most efficient water heaters and storage tanks are being manufactured



WHAT ERP MEANS FOR PRODUCT SPECIFICATION

On 21 October 2009 the EU adopted the Directive 2009/125/EC: establishing a framework for the setting of ecodesign requirements for energy-related products (ErP). Commonly referred to as the ErP Directive, it applies to energy-related products (defined as products that use energy, or do not use energy yet have an indirect impact on energy consumption) sold in the domestic, commercial and industrial sectors in the European Economic Area.

There are dozens of product groups – called ‘Lots’ – under scrutiny, and so far the focus has been on those that consume the largest proportion of natural resources and energy, and therefore have the most potential to reduce greenhouse gas emissions.

The Energy Labelling Directive complements and works in conjunction with Ecodesign, with products being given an energy label based on a standard laboratory test regime. This type of labelling is already seen on domestic appliances such as fridges, freezers, TVs and washing machines.

simultaneous baths and showers; and 4XL would be large volume applications for use in hotels or healthcare facilities.

Additional performance and efficiency parameters will need to be conveyed via a ‘technical fiche’ and within product data, which must be included on company websites and in installation instructions included with the product.

If a number of components are installed as a system then an overall efficiency rating and customised package label will be required, but the individual products will still have specific labels.

This has been introduced in order to provide better information to end-users, recognising that, as well as the individual components of an installation being important, combinations of products can also greatly increase efficiency.

The manufacturer is responsible for providing product labels, but whoever supplies a package and processes the transaction – known as the ‘Dealer’ – is always responsible for generating the package label and undertaking the necessary calculations.

For the purpose of ErP, a water-heating package will contain one or more water heaters and one or more solar devices, which do not need to come from the same supplier or be delivered together.

According to the relevant definitions in the Regulations, a solar device always contains a solar collector.

So, what does all of this mean for the commercial water heating market?

It’s important to recognise that ErP is a significant piece of legislation, and the impact it will have should not be underestimated.

However, where the commercial water heating market is concerned, the effects probably won’t be seen immediately.

Direct gas, LPG and oil-fired water heaters won’t be overly affected by ErP this year, as the regulations don’t necessarily mandate condensing products.

In other words, it will still be possible to sell many of the non-condensing products available today.

However, the requirements start to get tighter from next year.

On 26 September 2016 there will be a specific review to analyse the possibility of setting different requirements for different types of water heaters, and on 26 September 2017 the Energy Labelling scale for water heating will be updated to A+ – F.

In addition – and perhaps most importantly – under ErP, emissions from the combustion of fuel are relevant for water heaters with a burner, and on 26 September 2018 mandatory NOx emissions will be introduced for gas, LPG and oil fired water heaters – electric heaters do not directly produce emissions of this kind, so aren’t regulated for them.

For gas/LPG-fired products the maximum NOx emissions will be 56mg/kWh and for oil-fired products 120mg/kWh.

As NO<sub>2</sub> emission levels become more stringent, we will see significant changes to the water heating market.

In terms of product alterations, gas and LPG products don’t pose any major R&D issues, but it will be relatively difficult for oil fired products to meet the new requirements without some redesign work or additional emission abatement technology.

Further requirements about the energy efficiency of water heaters also start to apply from 26 September 2018, and a review of the Regulations is anticipated.

The Ecodesign and Energy Labelling Directives should be embraced; they will ensure that only the most efficient water heaters and storage tanks are being manufactured, and will help specifiers and end-users to make more informed decisions. CJ

For more information please visit [www.andrewswaterheaters.co.uk](http://www.andrewswaterheaters.co.uk)

JONATHAN TEDSTONE is category manager for Andrews Water Heaters

OVER **45** HOT WATER PRODUCTS | **30** YEARS OF EXPERIENCE | **1** NAME TO REMEMBER



### Hamworthy Heating.

Perhaps we're best known for our **commercial boilers**, but our hot water products are worth discovering too.

You'll find our **hot water solutions** practical, efficient and tailored to your needs. Choose from a wide selection of outputs, storage capacities, flue arrangements, fuel supplies, condensing models and renewable energy options.

**NEW for 2015 - CIBSE accredited CPD on Domestic Hot Water Best Practice**



#### TAILORED HOT WATER SOLUTIONS

Direct and indirect fired

Condensing and atmospheric

Outputs 370l/h - 2400l/h

Natural gas | LPG | Solar

### Talk to us today:

0845 450 2865 | [sales@hamworthy-heating.com](mailto:sales@hamworthy-heating.com)

[hamworthy-heating.com](http://hamworthy-heating.com)

@heatingatwork



Heating *at work.*



# Saving the world's energy

With over 40 years' experience of making water heaters for the commercial and large domestic sector, A.O. Smith invests in energy saving and efficient ways to produce hot water without compromising on comfort levels. A.O. Smith combines the natural resources of sun and air with revolutionary technology to provide integrated water heating solutions which are less dependent on fossil fuels. By using thermal solar, condensing, and heat pump technology, A.O. Smith provides your hot water in the most energy efficient way.

 **Smith**

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

# POWER COMPLEX

With datacentres becoming more energy efficient, the focus is now on decarbonising the energy supply. Hurley Palmer Flatt's **Robert Thorogood** looks at the alternatives

In a climate of increasing regulatory pressure on the design of new buildings including – and in particular – datacentres, it is essential to address energy consumption and sustainability objectives in the next five years. There will be a clear opportunity to apply creative and even radical solutions to the ways in which our datacentres will receive energy in future, and to the sources from which that energy will actually come.

Our reliance on technology and the growth in IT use will continue and, while predictions for datacentre growth cannot be exact, research suggests the growth trend will be upwards over the next five years, both in the construction of new datacentres and in the number of zettabytes of data storage required.

The growing demand for energy in the sector puts extra pressure on governments wary of the demands on an overstretched National Grid.

Of course, there's nothing new about the regulatory pressure on end users, co-location providers and other organisations to reduce their power use and minimise their carbon

footprint. The industry has become very good at addressing inefficiencies. Recent focus has been on minimising losses by using alternative cooling systems and UPS technologies and making use of free cooling from the local climate. Designers have also maximised the efficiency of systems over the whole IT load profile, particularly at part load, for example by matching the profile of how a client is loading up a datacentre from design stage onwards.

In tackling energy waste, the sector has generated some stunning results: power usage effectiveness (PUE) is regularly being delivered below 1.25, when at full capacity, and energy use has dropped per unit power delivered to IT loads. But the pressure is still on. IT loads continue to rise as demand grows, despite virtualisation and better use of datacentres from an IT perspective – for example where the same server is used to run multiple applications at the same time, such as an email server that is also used to process web hosting

The fundamental IT load is not going to disappear with increasingly efficient datacentres, even if a PUE of 1.0 were achieved.

Even taking into account the new methods of calculating PUE, the power or energy to feed the IT load still needs to be provided.

The new PUE calculation is now significantly different. Crucially the current definition from the Green Grid, the industry-wide organisation set up to provide the metrics for improving resource efficiency, recognises the use of diverse energy sources on a datacentre site, and not solely electricity. This new calculation increasingly opens up more possibilities for using alternative energy sources, such as natural gas or hydro.

The latest volley of energy directives indicate that action needs to be taken soon to address energy use and sustainability.

The EU's 2020 targets for the UK's share of energy drawn from renewable sources in gross final consumption should see a rise from 1.3% in 2005 to 15% by 2020. EU Member States are also subject to Article 9 – an energy performance directive that all new buildings must be almost zero carbon by 2020.

The implications of this are that the technical, environmental and economic

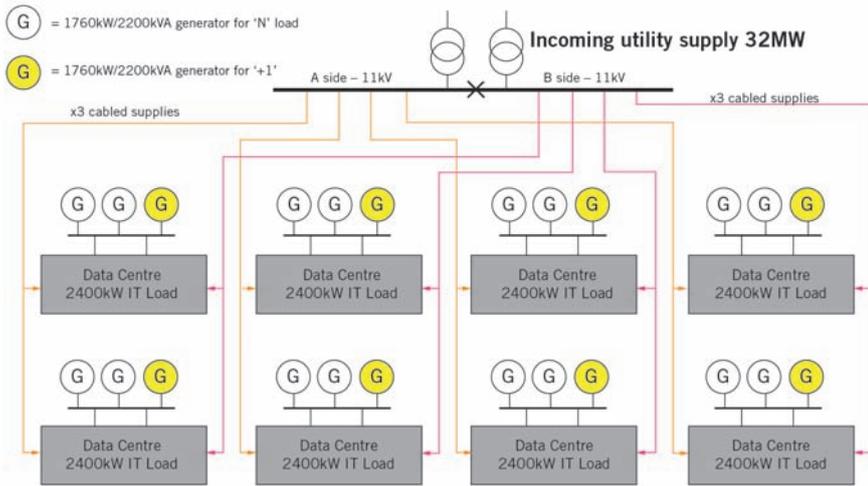


Figure 1: Datacentres with individual gas generators

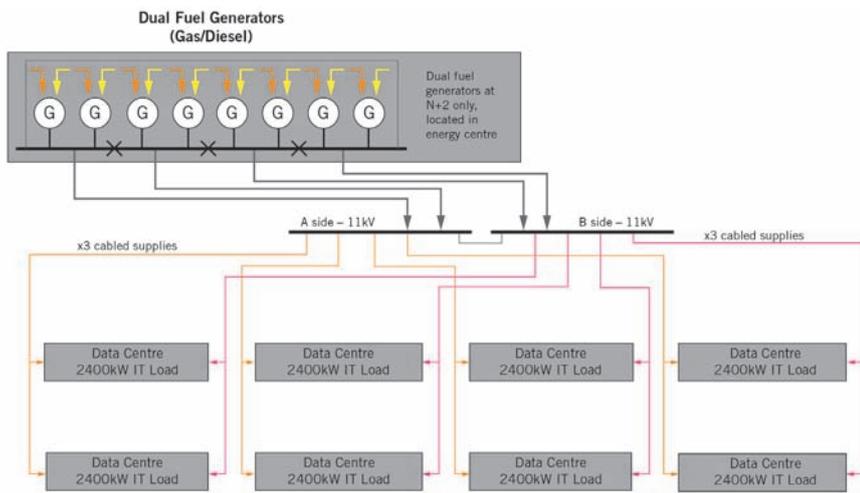


Figure 2: Centralised power generation using gas and diesel

- feasibility of high-efficiency alternative energy systems will need to be taken into account before construction begins on a datacentre or other development. These may include:
  - Decentralised energy supply systems based on energy from renewable sources
  - Co-generation (far from ideal because the provision of heat is of no use to a datacentre, unlike a hospital or office)
  - District or block heating or cooling, particularly where it is based entirely or partially on energy from renewable sources
  - Heat pumps.

While the best solution will always be specific to user requirements and location, the rule of thumb is that energy required should be generated locally or on site, avoiding potential loss of energy through grid distribution.

One recent high profile example of this is Google's 10-year power purchase agreement to acquire the electricity output of a Swedish wind farm. The energy will power its datacentre at Hamina in Finland, and is the second such agreement brokered by the tech giant.

Energy/fuel options might also include other

non-combustion sources, such as photovoltaics or tidal; combustion sources including natural gas or methane, diesel, biodiesel, and biomass fuel; and alternative fuel sources such as methane produced from anaerobic digesters, or hydrogen produced from biomass gasification.

The size of datacentres is increasing. Typically, over the last few years, IT loads of between 5MW and 20MW have been common but, with scaling using modular build-outs, sites with IT loads of 25MW to 100MW are now being planned or proposed. The question to consider is whether current principle designs scale up to these larger build-outs?

I would ask whether we need to think radically about how power is provided to a site, recognising also the preference, if not requirement (as it will be in the EU) from 2019, to have new-build sites that are carbon neutral.

### Dual fuel solution

One extremely radical solution to the challenge of creating a new build carbon neutral datacentre could focus on changing the way in which the infrastructure to a facility is formed.

This might involve centralising and combining the standby generation by using dual fuel engines – in this case gas and diesel (Figure 2). Contrast this with Figure 1, which shows a build-out of multiple datacentres, each with their own more conventional IT load, UPS, cooling and generator plant.

The benefits of the dual-fuel solution is that the requirement for a large – say 132kV – utility connection, something which takes years to provide and plan, can be completely dispensed with. Power generation using this onsite dual-fuel gas and diesel solution de-risks from the electricity grid (and the gas grid is much more robust).

It is certainly food for thought, but one thing is certain – the next five years we will see a major change in attitudes towards the standard ways in which energy/power is provided to datacentres in Europe, and the solutions we apply will also have to change radically. CJ

### References:

- 1 Researches drawn from Dominion Virginia Power, Belady/Microsoft and Cisco predict increasing energy demand, increasing construction and increasing zettabyte requirements for Cloud and Traditional data centres in the short to medium term.
- 2 EU Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009.
- 3 EU Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010.

● **ROBERT THOROGOOD** is an executive director at Hurley Palmer Flatt

“The latest volley of energy directives indicate that action needs to be taken soon to address energy use and sustainability

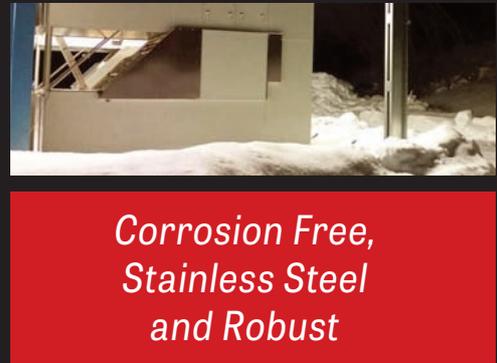
Portsmouth 2MW 2011



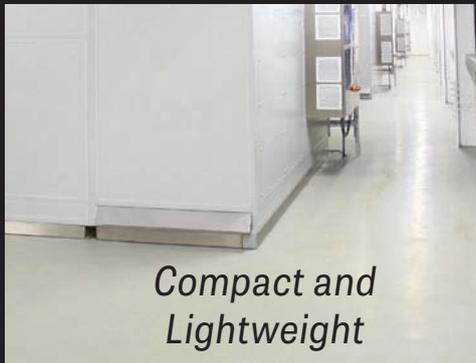
6 Years R&D  
4 Years Field  
Deployment



Hayes 3.6MW 2014



Corrosion Free,  
Stainless Steel  
and Robust



Compact and  
Lightweight



Dublin 2.8MW 2013



Rackspace, Crawley 8MW 2014



Bavaria, Germany 2MW 2015

UK [www.excool.co.uk](http://www.excool.co.uk)  
Germany [www.excool.de](http://www.excool.de)  
Sweden / Norway [www.dct.no](http://www.dct.no)

Innovation  
First



...just add water



Docklands 5.4MW 2015



**Offering a more diverse and Versatile range for every application**



**Water Cooled Packaged Solutions:**

- Console units**
- Vertical ducted**
- R410a – HFC**
- Horizontal ducted**
- 1.5 to 90kW (nominally)**
- BMS Compatibility**



**Featured Product:**  
**Tranquility Large TCV Series**

**Product Uses & Key Benefits:**

Ideal for commercial and industrial applications. Seven capacities to choose from: nominal duty range 20kW to 88kW. Galvanized steel cabinet – epoxy coated front panels. Microprocessor controls as standard - LonWorks, BACNet, Modbus options. Right or left piping arrangement. Dual refrigerant circuits.



Approved UK Distributors:  
Medal Aircon Accessories Ltd.,  
Suite 5 LMH Business Park,  
Harlescott Lane, Shrewsbury SY1 3AH

Tel: +44 (0) 1743 466333  
Fax: +44 (0) 1743 466334  
sales@climatemasteruk.com  
www.climatemasteruk.com



**GEA Adia-DENCO®**  
**Energy efficiency for data centre cooling**

The GEA Adia-DENCO® cooling system uses indirect free cooling in combination with adiabatic humidification without the need for compressor-based refrigeration.

**A brand change in heat exchange.**

GEA Heat Exchangers is launching a new brand in summer 2015

**GEA Denco Systems**

Phone: +44 1432 277277

sales.enquiry@gea.com

www.gea-hx.com, http://denco.gea-hx.com/





# BANKING SAVINGS

Reconciling the demands of datacentre cooling with the growing clamour for energy efficiency is a big challenge for building services engineers. **Gareth Holden** explains how his firm, Excalibur Energy, made this possible for a major UK bank, cutting annual carbon emissions by 400 tonnes

“A project that improves both efficiency and resilience will get support from all parties and have a much better chance of progressing”

**T**he datacentre sector has a significant incentive to improve the energy efficiency of its server farms and computer rooms.

In July 2014, datacentres joined 50 other energy-intensive industries became eligible for Climate Change Agreements (CCAs), meaning attractive rebates on the Climate Change Levy (CCL) are available, if tough energy efficiency targets are achieved.

Excalibur Energy’s experience working for a major UK bank demonstrates that it is possible to improve the performance of existing systems while enhancing resilience – the foremost concern of bank staff when upgrading ICT infrastructure.

The project proved that performance issues can be resolved without resorting to disruptive and costly wholesale plant replacement.

### Ejection seat

Typically, datacentres rely either on packaged cold water chillers or computer room air conditioning (CRAC) units, which reject heat from their refrigeration compressors to water-cooled condensers and dry coolers located external to the building. A constant cooling

requirement means the equipment needs to operate across a wide range of ambient temperatures. Effective heat rejection is critical to both energy efficiency and resilience.

The requirement for resilience is where all datacentre energy projects start. Indeed, a major hurdle for any scheme is convincing operational staff that any modifications to improve energy efficiency will not affect system integrity. A project that improves both of these will get support from all parties and have a much better chance of progressing.

Electronically commutated (EC) motor driven fan technology has already been used extensively in CRAC units to reduce energy consumption in datacentres. We have pioneered the retrofit of EC axial fans to overcome many inherent problems associated with both dry coolers and chillers.

The renewal of the UK high street bank’s datacentre involved replacing 108 AC axial fans fitted to 18 dry coolers with high-efficiency EC fans. The existing coolers were fitted with low-speed units, which limited their performance. Our initial survey showed that dry cooler capacity could be doubled from 400kW to 800kW as a result of the increased airflow from the EC fan. The existing fans were nearing the end of their useful life, so replacing them ticked the resilience box. The project also had to provide an acceptable return on investment.

EC fans represent the latest technology in both motor and blade design – the difference in blade design of the existing AC fans (see Figure 2) and the blade type that come as part of the replacement EC fans (see Figure 1) is a

major factor in increasing efficiency. This and the lower losses of the permanent magnet EC motor mean that, on this project, for the same absorbed power, the EC fan generated 100% more airflow, while achieving a 79% energy reduction at the same airflow.

Another area not often appreciated as a cause of energy inefficiency is the concept of short circuiting. This is where hot air discharged from the dry cooler or condenser re-enters the heat exchanger. It is often caused by obstructions – such as buildings or louvres – preventing efficient heat rejection, worsened by the poor ‘throw’ of low-speed fans.

The temperature of air into the dry cooler can be increased by 10K as a result of short circuiting, so that on a 35°C day, the system is effectively operating at 45°C, which exceeds design conditions. The EC fans generate an increased throw that overcomes these high ambient issues, often preventing the need for expensive plant replacement.

On this project, the increased dry cooler capacity meant that for any ambient temperature, a lower water temperature could be maintained. This, in turn, allowed the CRAC unit compressors to be operated at a reduced discharge pressure, increasing refrigeration efficiency and reliability.

Typically, for every 3K reduction in condensing temperature, compressor efficiency increases by 9%. Considering that the absorbed power of the compressors is five-times that of the dry cooler fans, it is clear that optimising heat rejection is critical to energy performance.

The existing AC fans were operated using a simple step control, which is perfectly common across the industry. But with a set temperature of 14°C for the majority of the year, all fans operated at 100% because the required temperature could not be achieved.

EC fans – by contrast – allow speed control between 0 and 100%. Using cooling load



**Figure 1:** The aerodynamic EC fan has aerofoil-shaped swept blades with winglets, and a serrated trailing edge

and water temperature as references, water temperature was optimised to maintain the most efficient fan and compressor energy consumption at all times.

The datacentre remained operational during the eight-week, with no requirement for temporary cooling. We also carried out pre and post-monitoring to validate both the increase in performance and improvement in energy efficiency. This data-led approach was particularly important for building confidence with project champions.

The work has improved the bank’s energy efficiency: a cut in carbon emissions of more than 400 tonnes a year is helping to achieve CCA targets, resulting in CCL rebates.

It is also a project that qualifies for 100% tax allowances under the Enhanced Capital Allowance scheme, and one that delivered a return on investment of less than three years. Most importantly, we guaranteed an increase in cooling capacity and more resilience. For the frugal bank manager it’s the ideal scenario. **CJ**

**GARETH HOLDEN** is managing director at Excalibur Energy



**Figure 2:** The datacentre’s existing AC fans were nearing the end of their useful life



BUILDING PERFORMANCE AWARDS 2015  
**WINNER**

## Engineered to perform

Our cooling systems are designed to amplify performance



FIND OUT MORE

Making the most of the environment in which they compete, Airedale cooling solutions respond with less effort, to deliver industry-leading energy efficiency and guaranteed uptime.

Scalable to grow with demand and intuitive to adapt with load, Airedale systems measure, monitor and reduce energy consumption 24/7, helping you meet your business challenges.

**Maximise efficiency, amplify performance**

Contact us today



+44 (0) 113 239 1000  
connect@airedale.com

www.airedale.com/cibse  
@AiredaleAC

# Improve your building's green certification rating with Climaveneta HVAC solutions!



Climaveneta's premium efficiency products reduce the environmental impact of buildings, improve their energy performance and cut down operating costs.



## Sustainable HVAC solutions for perfect comfort and highest efficiency

Buildings have extensive impacts on the environment. During their construction and occupancy they use resources and generate waste: increasing energy efficiency is one way of dealing with this situation. This is true at Central Saint Giles, Renzo Piano Building Workshop's first completed project in the UK. Its high-performance façade is part of a highly-sustainable design, to meet the client's brief for high-performance offices. The low-energy building has strong sustainability credentials. It achieves BREEAM Excellent standards also thanks to 3 FOCS-W high-efficiency water-cooled Climaveneta chillers. The HVAC capability complies with the consultant's design intent and also ensures accelerated return on initial investment, which was a key stipulation, and greatly reduced CO<sub>2</sub> emissions.

Learn more about our solutions





# TECHNICAL SYMPOSIUM 2015

## Simple buildings, better buildings?

Delivering performance through engineered solutions



16 – 17 APRIL  
UNIVERSITY COLLEGE LONDON

The CIBSE Technical Symposium 2015 will tackle the question “Are simple buildings better buildings?” Leading industry specialists will be presenting:

- peer reviewed papers and presentations on cutting edge research,
- practical designs, case studies and innovative solutions.

This excellent value event is essential for building services practitioners, researchers, academics and those who design, construct and maintain buildings.

Book now at:

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

@CIBSE #CIBSEsymposium



Hosted by:



Sponsored by:



In association with:



Claim over 5 hours  
CPD per day:



DELABIE

# Professional development



## The CIBSE Journal CPD Programme

Members of the Chartered Institution of Building Services Engineers (CIBSE) and other professional bodies are required to maintain their professional competence throughout their careers.

Continuing professional development (CPD) means the systematic maintenance, improvement and broadening of your knowledge and skills, and is therefore a long-term commitment to enhancing your competence. CPD is a requirement of CIBSE and the Register of the Engineering Council (UK).

*CIBSE Journal* is pleased to offer this module in its CPD programme. The programme is free and can be used by any reader. This module will help you to meet CIBSE's requirement for CPD. Equally, it will assist members of other institutions, who should record CPD activities in accordance with their institution's guidance.

Simply study the module and complete the questionnaire on the final page, following the instructions for its submission. Modules will be available online at [www.cibsejournal.com/cpd](http://www.cibsejournal.com/cpd) while the information they contain remains current.

You can also complete the questionnaire online, and receive your results by return email.

## Hot water provision in commercial applications – minimising legionella risk and maximising system efficiency

This module looks at reducing the risk of legionella in commercial hot water systems and maximising system efficiency with continuous flow water heaters

The control of the legionella bacteria and avoiding the risk of incidents of Legionnaires' disease (and Pontiac fever) are justifiably regarded as essential for both the products and the systems designed for the servicing of buildings. The impact of poorly designed or operated hot water distribution systems poses a significant risk.

More than 50 species of legionella have been identified<sup>1</sup>, and half of these can cause infection that may be either asymptomatic or result in one of the forms of legionellosis. However, practically all of the cases of infection reported throughout Europe are caused by legionella pneumophila (Lp).<sup>1</sup> Lp is present in the environment – in soil and water – and survives and thrives in many potable hot water systems. Legionella infections only occur through direct exposure to aerosols/droplets from an environmental source colonised by the legionella bacteria – there are no reported or documented cases of Legionnaires' disease associated with person-to-person transmission. Legionella grows in warm, stagnant water in natural and artificial water systems – in particular, cooling towers, evaporative condensers, hot and cold water systems and spa pools. These environments – as well as being ideal for growth – may also provide the means by which aerosols/droplets are generated and

the organism dispersed into the atmosphere.<sup>2</sup> So, a significant potential danger is at the point of hot water delivery, and there are numerous reports of Lp being present in 10% to 50% of sampled taps and showers in Europe and the United States.<sup>3</sup> To provide an indication of the impact of UK exposure to legionella in recent years, the number of cases of legionellosis in the UK has remained reasonably constant, at between 300 and 400 per year, as shown in Figure 1 (with a slight, unexplained dip in 2011).

For the most recently available data – collected in 2012 – of the confirmed cases

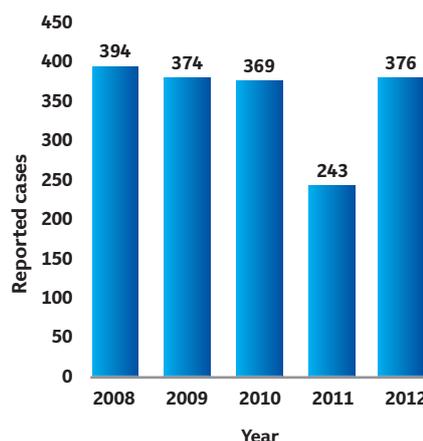


Figure 1: Number of cases of legionellosis reported in UK, 2008-2012 (Data source: *Annual epidemiological report 2014. Respiratory tract infections\**)

of Legionnaires' disease, just over half were considered to have been due to exposure in the community and healthcare facilities, with the remainder being associated with travel abroad. This apparent figure of under 200 annual cases derived from a UK source is likely to be an underestimate<sup>5</sup> of the true incidence of legionellosis, as symptoms are often similar to the influenza virus and other types of bacterial pneumonia, and routine laboratory tests will not readily identify the legionella bacteria.

The group at greatest risk from contracting legionellosis is older males with underlying health problems such as heart conditions and diabetes. The susceptibility of this group is thought to be associated with industrial occupations and lifestyle-related risk factors, such as smoking.<sup>2</sup> The historic England and Wales fatality rate is just over 10% for community-acquired legionellosis and around 25% for nosocomial (healthcare) related. However, infections in the UK are erratic, and in many cases a specific source of infection is difficult to trace.

As identified in Figure 2, the legionella bacteria will multiply abundantly between the temperatures of 20°C and 46°C – a range that coincides with temperatures that are acceptable for supplying potable hot water. It is notable that 'cold' water services can often

be in environments that allow them to rise to a high-risk temperature. The most favourable temperature for the multiplication of legionella is approximately 37°C. Above 70°C, the bacteria will be killed almost instantly, and at a temperature of 60°C, 90% of the legionella pneumophila have been shown to be killed in two minutes (compared with several hours at around 50°C). Below 20°C, legionella becomes dormant but ready to multiply when the opportunity presents itself.

Figure 3 shows the interesting effect that the thermal resistance of pipe insulation has in prolonging opportunities for non-flowing hot water temperatures to drop to the most critical temperatures. For the higher resistance, better insulation (shown as Type 1) keeps the water hotter for a longer period; but, as it cools, it will also mean that the water temperature will remain for a greater time in the range where legionella will multiply.

This problem in water distribution systems is exacerbated where there is accumulation of sludge, rust, scale and particulate deposits that act both as a haven for bacteria and, as biofilms develop, provide nutrients.

### Approved Code of Practice L8 – Legionnaires’ disease. The control of legionella bacteria in water systems

In the UK, HSE L8<sup>7</sup> gives advice on reducing the risk from exposure to legionella bacteria. The L8 revision in 2013 removed the technical guidance (which was Part 2 in previous editions), and published this separately as HSG274.<sup>8</sup> HSG274 outlines measures that, together, meet the relevant statutory safety requirements, including: identifying and assessing sources of risk; preparing a scheme to prevent or control risk; implementing, managing and monitoring precautions; keeping records of precautions; and appointing a manager responsible for others. This guidance is split into three parts that consider specific applications for the control of legionella bacteria: part 1 – evaporative cooling systems; part 2 – hot and cold water systems; and part 3 – other risk systems. These are all freely downloadable from the internet and provide extensive, essential, very practical, and well-illustrated guidance.

### Prevention of opportunities for legionella proliferation during design

HSG274 part 2 provides comprehensive guidance for the design, commissioning and operation phases of a commercial hot water system. The recommended design aspects are abstracted below – more comprehensive details are available in HSG274 part 2.

There should be an adequate supply of hot water, particularly at periods of peak demand,

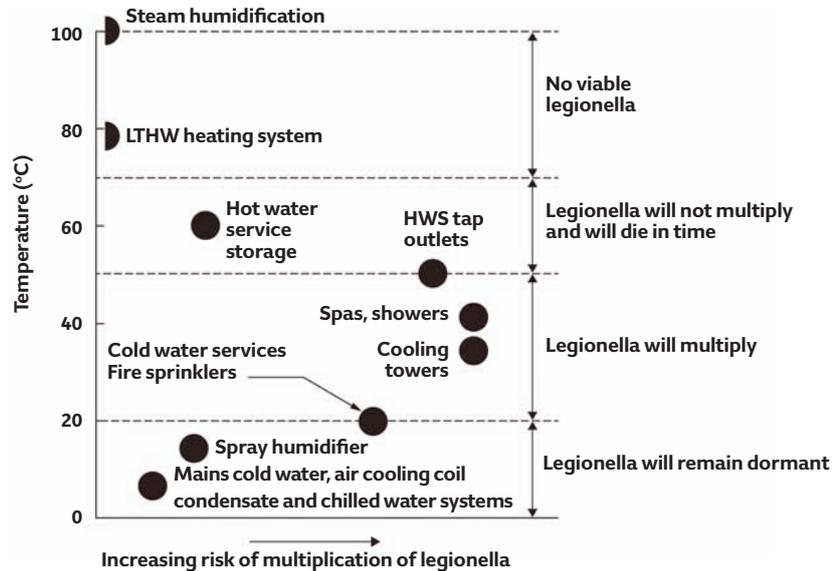


Figure 2: Typical system operating temperatures and the risk of legionella proliferation (Source: CIBSE AM13:2013<sup>6</sup>)

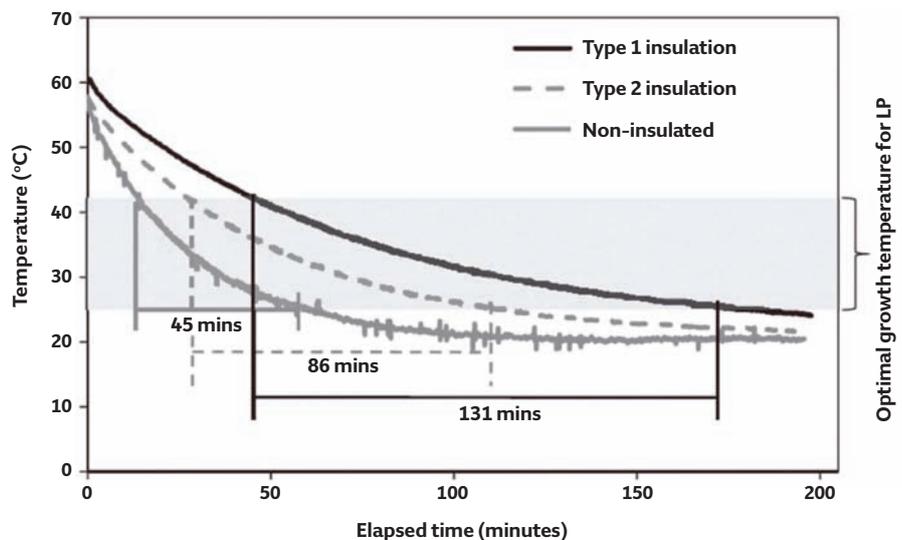


Figure 3: Heat loss during stagnation of hot water in 1.25cm diameter copper pipes, with and without insulation at room temperature (Source: Bedard<sup>9</sup>)

while avoiding excessive storage and ensuring a supply temperature of at least 60°C from the heat source and/or storage vessel (calorifier). In buildings where stored water is not ‘essential’, consideration should be given to direct mains systems – this could be provided through continuous flow hot water systems or ‘point of use’ heaters. Modular high output continuous flow hot water heaters are very capable of providing thousands of litres of hot water per hour, without the need for storage.

If a calorifier is employed, it should meet the normal daily fluctuations in hot water use, without any significant drop in target supply temperature. Also, the temperature in the base of the vessel should be monitored and must be drainable to remove accumulated sludge and particulate matter. The distribution system should be thoughtfully designed to avoid water stagnation by ensuring flow through all parts of the system, and particular care should be

taken to prevent risk temperatures in system components that support microbial growth. Low-use outlets should, for example, be installed upstream of frequently-used outlets, to maintain frequent flow.

Hot water temperatures at an outlet should reach 50°C (55°C in healthcare premises) within one minute of turning on the tap. This will require a recirculation loop in most commercial systems that should be designed to give a returning temperature of at least 50°C (55°C in healthcare premises) – there should be temperature measurement points so that this may be monitored. Circulating pump design and the correct commissioning of balancing valves are key issues to ensure flow throughout all parts of the hot water system – particularly the hot water return legs – to avoid long lengths of stagnant pipework that are likely to be at a lower temperature.

Where a traditional indirectly heated hot

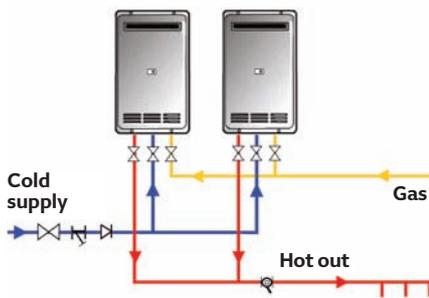


Figure 4: Continuous flow hot water system has no storage of hot (or warm) water, substantially reducing the opportunity for any Lp growth (Source: Rinnai UK)

water calorifier is employed, cold water will typically enter at the base of the calorifier, creating an area below the coil where the initial blended water temperature may support microbial growth and provide potential breeding ground for legionella. This may be mitigated with a shunt pump to mix the water in the calorifier to ensure a temperature of at least 60°C is achieved throughout the vessel for at least one continuous hour a day. This will, unfortunately, reduce the energy effectiveness of the system.

All system materials chosen should reduce corrosion, prevent excessive scale formation and not readily support microbial growth. In hard water areas, softening of the cold water supply to the hot water distribution system should be considered – this can reduce the risk of scale being deposited, the risk of scale accumulation within the system pipework and components and, if used, in the base of the calorifier.

The design should ensure reasonable access to all pipework sections and active system components for inspection and maintenance purposes, with valves located sensibly for practically useful isolation. Any energy efficiency or water conservation measures should be assessed carefully at the design stage, to ensure the control of legionella is not compromised.

**Instantaneous water heaters**

By using instantaneous water heaters, as shown in Figure 4, the potential legionella hazards inherent in stored water systems are avoided as – by design – they do not store any volume of hot water but are still able to supply large commercial demands. The incoming cold water is instantaneously heated to 60°C, beyond the temperature at which the bacteria can multiply, and that heated water is not resident in the hot water generating equipment for prolonged periods. Without the need for calorifiers or other storage vessels, the volume of hot water in the system is reduced and, as these systems do not include a standing store of water, they do not require a daily ‘pasteurisation’ cycle using shunt pumps.

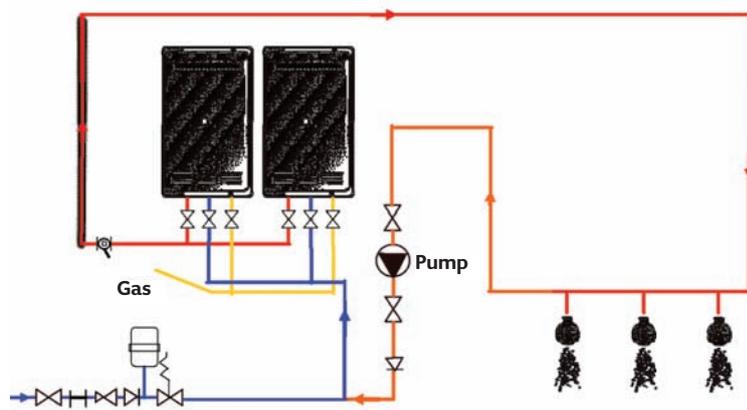


Figure 5: Continuous flow with recirculation (Source: Rinnai UK)



Figure 6: A pair of continuous flow water heaters installed to produce in excess of 1,400 litres per hour of hot water at 60°C (Source: Rinnai UK)

However, regardless of whether the hot water is provided by a continuous flow water heater, in larger systems – where there is a need for recirculation pipework (as illustrated in Figure 5) – there is inherently increased system water volume and opportunities for ‘dead-legs’. When taps or shower-heads stop running, after use, the final branch pipework will be full of cooling water capable of breeding legionella bacteria, so appropriate safeguards must be put in place – such as self-draining shower heads.

**Thermal disinfection**

The hot water system – particularly rarely used shower heads or terminal fittings – will still require regular checking and disinfection. When the building is not in occupation – for example, weekends or at night – thermal disinfection of hot water services can be carried out by raising the temperature of the whole contents of the circulating water to 60°C (or above) for at least an hour. To meet the requirements of HSG274 thermal disinfection, every hot water outlet throughout the system must then be flushed and allowed to flow for five minutes at full temperature. To be effective, the temperature at the hot water generator should be maintained to ensure that the

temperature at the outlets does not fall below 60°C. In the case of a storage calorifier, this could necessitate the whole volume of stored water being raised to a high temperature – beyond normal safe temperatures that prevent scalding at outlets – to undertake disinfection, then that stored water temperature would need to be reduced (or the water drawn off and discarded) before normal building occupation.

However, with a continuous flow system, such as in Figure 6, the electronic control is such that the temperature can be instantly raised – potentially, to beyond 75°C and within a tolerance of +/- 1K – to undertake disinfection. The temperature is controlled based on the incoming water to the continuous flow water heater and so, as with normal operation, it will modulate (typically down to around 50 watts), only consuming the energy required to meet the instantaneous flow requirements. Following the disinfection procedure, the flow temperature can then, just as swiftly, be returned to 60°C – ready for safe building operation.

© Tim Dwyer, 2015.

**References:**

- 1 Currie, SL, et al, ‘Legionella spp. in UK composts – a potential public health issue?’, *Clinical Microbiology and Infection*, Volume 20, Issue 4, April 2014.
- 2 *Legionnaires’ disease in England and Wales 2012*, Public Health England, 2014.
- 3 Bedard, E, et al, ‘Temperature diagnostic to identify high risk areas and optimize legionella pneumophila surveillance in hot water distribution systems’, *Water Research*, 71, 2015.
- 4 ECDC Surveillance Report, *Annual epidemiological report. Respiratory tract infections*, 2014.
- 5 Whiley, H, et al, ‘Uncertainties associated with assessing the public health risk from legionella’, *Frontiers in Microbiology*, September 2014.
- 6 CIBSE TM13 *Minimising the risk of Legionnaires’ disease*, CIBSE, 2013.
- 7 HSE L8 *Legionnaires’ disease – The control of legionella bacteria in water systems*, UK Health and Safety Executive, 2013.
- 8 HSE HSG274 *Legionnaires’ disease Technical guidance*, UK Health and Safety Executive, 2013.

Turn over page to complete module ➔

# Module 75

April 2015

**1. What is the most favourable temperature for legionella pneumophila reproduction?**

- A 37°C
- B 50°C
- C 55°C
- D 60°C
- E 70°C

**2. In the example shown in Figure 3, for how long is the water at a temperature that suits optimal legionella pneumophila growth while it loses heat to its surroundings with**

**Type 1 insulation?**

- A 0 minutes
- B 45 minutes
- C 86 minutes
- D 131 minutes
- E 200 minutes

**3. In non-healthcare applications, at what temperature should hot water return from a hot water service recirculation loop?**

- A 37°C
- B 50°C
- C 55°C
- D 60°C
- E 70°C

**4. When undertaking thermal disinfection of a hot water system, what temperature is required in the whole circulating system for one hour?**

- A 37°C
- B 50°C
- C 55°C
- D 60°C
- E 70°C

**5. What is the tolerance available in the output temperature of a good quality, continuous flow water heater?**

- A +/- 1K
- B +/- 2K
- C +/- 3K
- D +/- 4K
- E +/- 5K

Name (please print) .....

Job title .....

Organisation .....

Address .....

.....

.....

Postcode .....

Email .....

**Are you a member of:**

CIBSE

If so, please state your membership number

(if available) .....

Other institution

(please state) .....

**To help us develop future CPD modules, please indicate your primary job activity:**

Building services engineer

Mechanical engineer

Electrical engineer

Commissioning engineer

Energy manager

Facilities manager

Other (please give details).....

If you do NOT want to receive information about Rinnai, the sponsor of this CPD module, please tick here:

By entering your details above, you agree that CIBSE may contact you from time to time with information about CPD and other training or professional development programmes, and about membership of CIBSE if you are not currently a member.

Please go to [www.cibsejournal.com/cpd](http://www.cibsejournal.com/cpd) to complete this questionnaire online. You will receive notification by email of successful completion, which can then be used to validate your CPD records in accordance with your institution's guidance.

Alternatively, you can fill in this page and post it to:

**N Hurley, CIBSE, 222 Balham High Road, London, SW12 9BS**

**Watching paint dry isn't something we always enjoy.**

**However it is something we are rather good at.**



**No one has a keener eye for perfection than Vaillant Commercial.**

You'd be amazed at how much time we spend inspecting the finish of our boiler panels. Checking for the tiniest imperfection or impediment. Ensuring the colour-matching is flawless. It's not just the paint job we take a long hard look at. Every part, inside and out, is closely scrutinised to achieve the perfect result - something that never gets boring.

To see our attention to detail in action call **0845 602 2922**  
or visit **[vaillantcommercial.co.uk](http://vaillantcommercial.co.uk)**

## Staying warm in a cold climate

We can all feel a bit miserable when the temperature drops, but if you're a rhino – native to the northern part of the Indian sub-continent – the climate at Edinburgh Zoo must be a particular shock. So Grundfos Pumps stepped in to help Bertus and Samir (right) feel cosier in their UK home by designing an energy efficient heating solution for their recently installed 4m x 4m swimming pool. It incorporates a MAGNA3 pump, which helps to maintain the rhinos' pool at 32°C. The Grundfos MAGNA3 range is designed for circulating liquids in a range of applications and is simple to install. It has unique features, and achieves savings of up to 75% compared with a typical installed circulator – so it will actively contribute towards the 30% energy- and emissions-saving strategy that Edinburgh Zoo has in place.



● Call 01525 85 00 00, email grundfosuk@grundfos.com or visit [www.grundfos.com](http://www.grundfos.com)

## Stokvis Econoflame replaces original at Surrey hotel

After nearly 30 years' reliable service at a large hotel in Surrey, one of the original Stokvis Econoflame R18 gas boilers has been replaced. The boiler plant at the Holiday Inn, in Guildford, is maintained by Economy Heating Services, and the company had no hesitation in recommending a modern Stokvis Econoflame R6539, fully modulating, gas-fired boiler. It offers the first response to demand from the hotel's 168 bedrooms, kitchens and pool.



● Call 020 8783 3050 or visit [www.stokvisboilers.com](http://www.stokvisboilers.com)

## Super-efficient HVAC with Frese BIM models

Building information modelling (BIM) is transforming how buildings are designed – so valve manufacturer Frese is making its dynamic balancing and pressure, independent-control valves available digitally for architects,

designers and facilities managers. Stephen Hart, managing director (above), said: 'The ability to design systems featuring efficient valves like the Frese OPTIMA Compact, which can improve efficiency by up to 50% in BIM – and can be installed on site, without the heating system needing to be manually balanced – means there are immediate cost savings at the design stage.'

● Visit [www.frese.co.uk](http://www.frese.co.uk)



## Infinity KBM water heaters offer low-NOx, efficient solution

Rinnai's new Infinity KBM condensing water heater is the lowest NOx rated, continuous-flow appliance available in internally and externally mounted models. It has been tested to below 20 ppm NOx, with a NET efficiency of 107.7%. The Infinity KBM is the first heater of its kind to use pre-mix burner technology, and the 1600 model is available with a hot-water production capacity of 16.2l of temperature-controlled hot water per minute, raised at 50°C from a single unit. All units, at just 28kg, are easy to handle. They are also renewables ready.

● Visit [www.rinnaiuk.com](http://www.rinnaiuk.com)



## Atlantic boosts efficiency of university's ring main system



University College London (UCL) has installed new boiler plant in its Torrington Place building. The plant, supplied by Atlantic Boilers, of Lancashire, operates at 95°C flow and 75°C return, and contributes to the UCL ring main that serves

scores of buildings. It leads all other ring main plants running at 95/75°C and raises the overall efficiency. The system was specified by Fowler Martin, of Ingatstone, and installed by Fredericks, of Dartford.

● Email [info@atlanticboilers.com](mailto:info@atlanticboilers.com) or visit [www.atlanticboilers.com](http://www.atlanticboilers.com)



## Rural Energy MD elected to Wood Heating Association board

Paul Clark, the managing director of biomass company Rural Energy, has been elected to the newly created board of directors of the Wood Heating Association (WHA). The election of the eight-strong board is a major step forward for the WHA, which is a subsidiary of the Renewable Energy Association, and which was established in its current form in May 2014. Julian Morgan-Jones, chairman of the WHA, said: 'We're extremely pleased to welcome Paul to the new board of directors.'

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



## SenerTec specialist team strengthened with Gary Stoddart appointment

SenerTec has bolstered its team of specialists with the appointment of Gary Stoddart as general manager.

Stoddart (above) has spent the past 30 years at Baxi Commercial, having joined the company as a commercial service engineer with Potterton Commercial in 1985. His many roles have included national service manager and technical manager. Stoddart will head up a team of three engineers, four sales managers, a technical officer and a service manager.

● Visit: [www.baxicommercial.co.uk/products/Baxi-SenerTec-UK.htm](http://www.baxicommercial.co.uk/products/Baxi-SenerTec-UK.htm)

## Pick and mix your training with new Hamworthy course on hot water



Hamworthy Heating has added a new CIBSE-accredited continuing professional development (CPD) seminar to its offering.

The new course on domestic hot water (DHW) best practice covers all aspects of DHW systems – from sizing to safety, and legislation to legionella. All of the Hamworthy CPD courses are free to attend and can be delivered at a time and place to suit the customer's requirements.

● Call 0845 450 2865, email [marketing@hamworthy-heating.com](mailto:marketing@hamworthy-heating.com) or visit [www.hamworthy-heating.com/cpd](http://www.hamworthy-heating.com/cpd)



## Faucets of the Caribbean

Add an exotic touch to your kitchen with the latest tap from Francis Pegler.

After the launch of the Araya bathroom brassware range comes the latest addition to the collection, in the form of a stylish kitchen tap. Its pillar is emphasised by curvaceous lines, which flow into an easy-to-operate handle. The eight-piece, design-led Araya range shares its name with – and is inspired by – the dramatic landscapes of a Caribbean peninsula. It offers sleek contours and minimalistic styling, and all products are supported by a 10-year guarantee.

● Visit [www.pegleryorkshire.co.uk](http://www.pegleryorkshire.co.uk)



## Remeha Commercial names new national sales manager

Remeha Commercial has appointed James Porter as its national sales manager. Porter joined Remeha Commercial in 2012, first as area sales manager and then as national business development manager. In his latest role, he will be responsible for Remeha's experienced sales team, and for driving the growth of business within the UK. Porter's experience in the heating sector includes sales managerial positions within Ferroli Commercial, Pipe Center and Biasi UK.

● Call 0118 978 3434, email [boilers@remeha.co.uk](mailto:boilers@remeha.co.uk) or visit [www.remeha.co.uk](http://www.remeha.co.uk)

## Toshiba wins top accolade at National ACR Awards for refrigerant leak-protection system

Toshiba Air Conditioning achieved a double triumph at the National ACR Awards 2015. It won the coveted Air Conditioning Product of the Year award for its pioneering refrigerant leak-detection and isolation system. It was also highly commended in the Marketing Initiative of the Year category. Toshiba's total refrigerant management and containment system isolates the section of pipework containing a leak, enabling the rest of the system to continue functioning as normal.

● Visit [www.toshiba-aircon.co.uk](http://www.toshiba-aircon.co.uk)



## Making the connection at St Helen's

Wieland Electric's structured wiring system, Metalynx2, has been used for the connection of power and lighting in the newly redeveloped 5-7 St Helen's Place, Bishopsgate, in London. Installed and specified by The Designer Group, the Metalynx2 allowed for maximised productivity. It offers a wide range of benefits, which include compact design for easy installation, and is made for the efficient installation of lighting circuits and other power requirements that are located above ceilings – all pre-wired and pre-tested off site.

● Visit [www.wieland.co.uk](http://www.wieland.co.uk)

## Energy efficiency headlines at Trinity Mirror

Remeha boilers are improving the energy efficiency of Trinity Mirror's printing facility in Watford. Contractor Labrum Engineering specified three high-efficiency Remeha Gas 610 Eco Pro condensing boilers, supplied with plate heat exchangers, because of the reliability, efficiency and quality of the products. With new pipework, upgraded controls and an advanced building management system, the refurbished system will deliver energy savings of at least 30%.

● Call 0118 978 3434, email [boilers@remeha.co.uk](mailto:boilers@remeha.co.uk) or visit [www.remeha.co.uk](http://www.remeha.co.uk)



## SWEPs launches its highest-capacity BPHE

SWEP has launched the largest model in its brazed plate heat exchanger (BPHE) range – the B649, which can take up to 10MW. The B649 has been developed for applications

that demand close-temperature approaches at high operating pressures, and is available in three pressure classes, including a high-pressure (25 bar) class. Its capacity matches that of gasket heat exchangers, which enables customers to use the technology's benefits in larger installations.

● Call +46 (0)768 908 115 or visit [www.swep.net](http://www.swep.net)

## Rinnai water heaters netted for Padel Nation

The hot-water solution for the flagship venue of a new sports craze hitting the UK, is being provided by Rinnai. Padel tennis is the second most popular game in Spain after football, and Padel Nation, in Birmingham, is the premier UK location for the sport.

The decision was made to install an Infinity HDC 1500i heater on secondary return at the site, to eliminate any need for storage and reduce energy bills significantly.

● Visit [www.rinnaiuk.com](http://www.rinnaiuk.com)



## Vent-Axia's 'simple solution' to poor air quality

Ventilation specialist Vent-Axia has welcomed research on indoor air quality (IAQ) issues in the UK. More than half of the respondents to a YouGov survey had suffered mould or condensation in their homes. A study by Prism & Waverton Analytics, meanwhile, shows that many households are at risk of health problems because of poor IAQ. Lee Nurse, marketing director at Vent-Axia, said: 'Continuous ventilation is a simple solution to air-quality problems.'

● Call 0844 856 0590 or visit [www.vent-axia.com](http://www.vent-axia.com)





## Myson's ULOW-E2 is an asset with renewables

Myson's ULOW-E2 is proving popular with specifiers

and installers for its ultra-high efficiency and versatility in pairing with renewable and conventional heat sources. Because of its ability to switch between static and dynamic operation, the ULOW-E2 produces impressive outputs from compact sizes, making it one of the most efficient heat emitters. Designed to work with lower system temperatures, it is perfect for use on its own and in hybrid applications with underfloor heating.

● Visit [www.myson.co.uk](http://www.myson.co.uk)

## Product selector graces new Condair website

Condair, formerly known as JS Humidifiers, has launched a new website with features that include a product-selector tool and psychrometric calculator. The product selector guides users who are seeking to purchase a humidifier through a series of multiple-choice questions. As they progress through the criteria, a shortlist of humidification systems is presented and refined – depending on the user's requirements – until, finally, an ideal humidifier, or shortlist of products, is suggested for their project.

● Visit [www.condair.co.uk](http://www.condair.co.uk)



## Condair MK5 steam humidifiers fitted in Antarctica

The British Antarctic Survey has recently fitted two Condair MK5 steam humidifiers into the sleeping modules of its new Halley VI research station, on the Brunt Ice Shelf. The humidifiers are helping to suppress electrostatic shocks and reduce the risk of airborne infection for the scientific team. The units use snow meltwater as their water source, and were selected for their reliability, continuity and proven operation in the Antarctic.

● Visit [www.condair.co.uk](http://www.condair.co.uk)



## Klima-Therm announces appointments

Wimbledon-based air conditioning and chiller specialist Klima-Therm has announced two further appointments as part of its strategic growth plan.

Ian MacDowall joins as project sales manager from Toshiba Carrier UK. With 23 years' experience, he has particular expertise working with large chilled-water plant and related equipment. Meanwhile, Andy Spruth has been appointed as regional sales manager, focusing on the London area. He has many years' experience in air conditioning sales, project management and building services.

● Call 020 8971 4195 or email [info@klima-therm.co.uk](mailto:info@klima-therm.co.uk)



## ELCO UK gas boilers in London regeneration project

ELCO UK has supplied five R606 floor-standing condensing gas boilers to a regeneration project in Alperton, Greater London. The development, at 243 Ealing Road, comprises 441 high-quality, mixed-tenure apartments in seven glass towers, plus 13,300ft<sup>2</sup> of commercial space. The residential developments had to achieve Code for Sustainable Homes Level 4, while commercial and community floor space had to achieve BREEAM Excellent. The R606 boilers' emissions easily exceed the requirements for the best BREEAM score.

● Visit [www.elco.co.uk](http://www.elco.co.uk)



## Jaga launches Oxygen DCV BIM files

Jaga Heating Products, makers of energy efficient radiators, has released the latest addition to its Revit and building information modelling (BIM) product files: the Oxygen Demand Controlled Ventilation (DCV) system. These 3D digital-rendering and data files – downloadable from the Jaga website or BIMstore – include Oxygen Refresh Units, dampers, grilles, Oxygen CO<sub>2</sub> Sensor, and Oxygen Smart Switch. They help architects and engineers to incorporate the most suitable heating and ventilation solutions.

● Call 01531 631 533, email [jaga@jaga.co.uk](mailto:jaga@jaga.co.uk) or visit [www.jaga.co.uk](http://www.jaga.co.uk)



## Poole buys from Ideal Commercial Boilers

Ideal Commercial Boilers has supplied two Evomax 70kW wall-hung condensing boilers on a Frame and Header Kit to Poole Housing Partnership (PHP). The boilers have been installed as part of a heating-system refurbishment at PHP's five-storey HQ, and are reducing carbon emissions and running costs, while optimising heating control. Evomax is Ideal Commercial Boilers' most efficient boiler, with seasonal efficiencies of up to 97.2%, exceeding those stipulated in Part L2 of the Building Regulations.

● Email [commercial@idealboilers.com](mailto:commercial@idealboilers.com) or visit [www.idealcommercialboilers.com](http://www.idealcommercialboilers.com)



## Ideal Commercial Boilers in the shop window

Ideal Commercial Boilers has launched a permanent exhibition stand at The Building Centre, in Store Street, London, allowing new and existing customers to experience the company's heating solutions easily for themselves. The stand features the new Logic heat interface unit (HIU), launched in October 2014, and the Evomax wall-hung condensing boiler. Visitors can pick up literature about the company's product range, or meet with Ideal Commercial Boilers representatives to discuss heating solutions.

● Email [commercial@idealboilers.com](mailto:commercial@idealboilers.com) or visit [www.idealcommercialboilers.com](http://www.idealcommercialboilers.com)





## Allen returns to GEZE UK as national sales manager

GEZE UK has continued its expansion programme with the appointment of Spencer Allen, who re-joins the company

as national sales manager for window technology systems. Allen (above) first joined GEZE in 2006, before leaving last year for a brief stint with Delta Ventilation. In his new role, Allen will be responsible for growing sales of window technology systems across the UK, and will work with architects, contractors and other specifiers to ensure they select the right solution for each project.

● Call 01543 443 000 or visit [www.geze.co.uk](http://www.geze.co.uk)

## CP Electronics launches new ceiling rose

Lighting controls manufacturer CP Electronics has launched its six-pole ceiling rose, VITM6 ROSE. This offers quick and easy installation, and completes CP's popular range of Vitesse Modular lighting connection systems. Designed to offer significantly improved space for wiring, the 16A-rated VITM6-ROSE can be connected simply to CP's Vitesse Modular dimming marshalling box via the appropriate leads. The VITM6-ROSE can be either free-sitting or secured to a BESA/conduit box, and offers the installer an additional 15mm depth when fixed within a BESA box.



● Visit [www.cpelectronics.co.uk](http://www.cpelectronics.co.uk)

## Free training courses from Marflow Hydraulics

Continuing professional development (CPD) training on Pressure Independent Control Valves (PICVs) will be run by Marflow Hydraulics in 2015. The first courses take place in spring, in Manchester and London, with more dates planned for October. These free, half-day sessions are designed to provide delegates with knowledge of how PICVs work, of innovative pipe layouts, and how to make systems more economical, including the introduction of electronic balancing. Immediate registration is recommended because places are limited.

● Call 0845 643 9096, email [training@marflow.co.uk](mailto:training@marflow.co.uk) or visit [www.marflowhydraulics.co.uk/events](http://www.marflowhydraulics.co.uk/events)



## Super-low-energy house depends on Marmox Thermoblock

RM Developments, which specialises in PassivHaus projects, has used Marmox Thermoblocks to eliminate cold bridging at a project in Yorkshire. Since Fabric

Energy Efficiency Standards (FEES) were incorporated in Part L of the Building Regulations, Thermoblock is increasingly being used by specifiers to tackle thermal linear losses at ground-floor and upper-level junctions. Its composite construction surrounds micro-columns of concrete with high-performance insulation to create a horizontal barrier to heat loss.

● Call 01634 835 290, email [sales@marmox.co.uk](mailto:sales@marmox.co.uk) or visit [www.marmox.co.uk](http://www.marmox.co.uk)

## AMP receives long-service award from Toshiba to mark a decade of achievement

AMP Air has been recognised by Toshiba as one of its most successful air conditioning distributors. After a decade of growth and success, the company was presented with a special award at Toshiba's recent strategy conference, held in Manchester. The company is creating an enlarged Toshiba training facility at its Welwyn Garden City headquarters, to offer the full range of theoretical and practical Toshiba air conditioning courses.

● Call 01707 378 670, visit [www.ampair.co.uk](http://www.ampair.co.uk) or follow @amp\_aircon



## EcoMESH adiabatic air inlet cooling

EcoMESH is a unique mesh and water-spray system that improves the performance of air cooled chillers, dry coolers and condensers, and refrigeration plants. It reduces energy consumption, eliminates high-ambient problems, is virtually maintenance free, and can pay back in one cooling season. The EcoMESH concept is based on intermittently spraying water onto a mesh placed in front of the heat reduction surface. This reduces power consumption by as much as 30-40%.

● Call 01733 245 511 or visit [www.pcmproducts.net](http://www.pcmproducts.net)

## Systemair provides London luxury

One Tower Bridge is on one of the last great riverside sites in London. It offers 5-star luxury living in the most exciting city in the world, and benefits from having energy-saving ventilation products, specified and supplied by Systemair. A Menerga swimming pool AHU and Systemair Topvex HRU, with integrated cooling, serve the luxury spa and gym facilities, while EC fans with demand control provide added ventilation to the apartments.

● Call 0121 322 0850, email [info@systemair.co.uk](mailto:info@systemair.co.uk) or visit [www.systemair.co.uk](http://www.systemair.co.uk)



## Timóleon saves 18th-century barn from sledgehammers

The owners of a Grade II-listed building were told that it would have to be almost gutted because of a problem with the heating system. However, the building was spared a fate thanks to the underfloor heating range by Timóleon. The overlaying project was completed in just three weeks. Timóleon's ToronFloor system, a rapidly laid and versatile approach to fitting pipework, was used on the upper floor. On the ground floor, the specification switched to LowBoard, which has a total installed depth of just 15mm.

● Call 01392 363 605, email [chris.weaver@timoleon.co.uk](mailto:chris.weaver@timoleon.co.uk) or visit [www.hydronek.co.uk](http://www.hydronek.co.uk)



# PRODUCTS & SERVICES

Telephone: 0207 880 7633 Email: greg.lee@redactive.co.uk



Creator Alex Mardapittas, with David Blunkett, MP, and Angela Smith, MP

## Powerstar launches energy-storage solution

Voltage optimisation brand Powerstar has announced the launch of a new UK-manufactured energy storage system from EMSc (UK).

Powerstar Virtue uses patented voltage-optimisation technology and harnesses the induced negative power feedback to the supply to charge a storage medium. The energy savings made from the voltage-optimisation system are diverted into the Powerstar Virtue energy-storage system, and can then be used at the most beneficial time for the electricity user.

● Call 0114 2576 200 or visit [www.powerstar.com](http://www.powerstar.com)



## Airedale improves efficiency at BAE

BAE Systems, a major supplier to the Ministry of Defence, required a cost-effective solution to increase cooling performance and deliver energy efficiencies in computer room air conditioning at its Warton site.

Airedale's multidisciplinary team of engineers and controls experts helped to upgrade more than 70 Denco and Airedale precision air conditioning units in more than 30 computer rooms. The British manufacturer has significant experience of project-managing complex retrofit projects, often involving hot work in critical environments. The project has resulted in annual savings of around £350,000.

● Visit [www.airedale.com](http://www.airedale.com)

## Cool-Therm puts focus on health and safety

Cool-Therm, the expanding air conditioning specialist, is updating the health and safety knowledge of its staff as part of a company-wide training initiative. Installation engineers, and service and support staff recently attended an occupational health and safety skills refresher at a company 'away day'. The training was based on the nationally recognised Institution of Occupational Safety and Health Working Safely programme, to ensure Cool-Therm maintains the high standards of working practice required under its accreditation to BS OHSAS 18001.

● Call 0117 961 0006 or email [enquiries@cooltherm.co.uk](mailto:enquiries@cooltherm.co.uk)



# DIRECTORY Your guide to building services suppliers

Telephone: 020 7880 7633 Email: greg.lee@redactive.co.uk

## Air Conditioning

**CLIVET®**

For total solutions in air-conditioning

E: [info@clivet-uk.co.uk](mailto:info@clivet-uk.co.uk)  
W: [www.clivet.com](http://www.clivet.com)  
T: 01489 572238  
W: [www.versatemp.co.uk](http://www.versatemp.co.uk)

## Air Conditioning

**PAYING TOO MUCH FOR DAIKIN PARTS?**

Space Air have been supplying genuine Daikin parts since 1980.

Call now for the best prices and availability!

**01483 252 214**

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

## Air Handling

Manufacturer of high quality bespoke AHU's. Specialists in refurbishment and site assembly projects.

Rapid delivery service available.

**Aircraft Air Handling Ltd**  
Unit 20, Moorfield Ind Est,  
Cotes Heath, Stafford, ST21 6QY  
Tel: 01782 791545 Fax: 01782 791283  
Email: [info@aircraftairhandling.com](mailto:info@aircraftairhandling.com) Web: [www.aircraftairhandling.com](http://www.aircraftairhandling.com)

## Controls/BMS/Controllability

**Birling Consulting Ltd**  
Professional Services:

- BMS Design & Specification
- System design for controllable energy efficient operation
- Integration of Low Carbon Technologies
- Controllability Reviews
- PM, Reports, Guides, Advice, etc.

See website for latest publications.

**Graham P Smith CEng FCIBSE MInstMC**  
T: 01548 830672  
E: [grahambirling@aol.com](mailto:grahambirling@aol.com)  
W: [www.birlingconsulting.co.uk](http://www.birlingconsulting.co.uk)

## COMING SOON!

**CIBSE ONLINE SUPPLIERS DIRECTORY**

For year long coverage on [cibsejournal.com](http://cibsejournal.com), contact:  
[greg.lee@redactive.co.uk](mailto:greg.lee@redactive.co.uk)  
020 7880 7633

## LST Radiators

**autron LST Radiators**  
Low Surface Temperature radiators to suit all budgets and applications

- Easy installation – ready assembled
- BSRIA tested
- Antimicrobial surfaces
- Energy efficient
- Attractive yet functional design

BSRIA

Call 01787 274135  
[www.autron.co.uk](http://www.autron.co.uk)

## Pump Packages

**AquaTech Pressmain**  
Leaders in fluid pumping equipment and controls

- Water Pressure Booster Sets
- Pressurisation Units
- Water Storage Solutions
- Tank Level & Temperature Controls

Other products include Hydraulic Shock Control, Pressure Vessels and a Bespoke Design Service

Head Office: 01206 215121  
Manchester: 0161 226 4727  
[www.aquatechpressmain.co.uk](http://www.aquatechpressmain.co.uk)

# HILSON MORAN

Hilson Moran is a leading firm of engineering consultants providing a comprehensive range of services in conjunction with the built environment. Active in all sectors of the construction market, the company undertakes new build and refurbishment schemes in the public and private sectors.

We are currently seeking Principal and Associate level Mechanical and Electrical Design Engineers to be based at our London and Farnborough offices. Working on challenging and prestigious schemes you will work in one of our world class Design groups, delivering high quality services to clients and providing the most suitable technical and commercial solutions, enabling us to deliver projects on time to the standards we are renowned for.

If you are an enthusiastic individual with a relevant degree in Mechanical or Electrical engineering, chartered status or have the desire to become chartered by CIBSE or IMechE and have relevant experience we would love to hear from you.

In return we offer a competitive salary, private healthcare, life assurance, 25 days annual leave, performance related bonus, flexible core hour start and finish times, season ticket loan, cycle to work scheme, discounted private mobile phone, discounted software for home use and an Employee Wellbeing scheme.

**For further details please contact Lisa Anderson, Recruitment Co-ordinator on 01252 550558 or send your CV to careers@hilsonmoran.com**

## The Newcastle upon Tyne Hospitals NHS Foundation Trust

### DIRECTORATE OF ESTATES AND FACILITIES DEPARTMENT OF ENGINEERING PRINCIPAL ENGINEER - COMPETITIVE SALARY - TRUST SENIOR STAFF APPOINTMENT AND

### ESTATES MANAGER OPERATIONS (HIGHER LEVEL) HOSPITAL ENGINEER 2 Posts Band 8B- £46,164-£57,069

The Newcastle upon Tyne Hospitals NHS Foundation Trust is one of the largest NHS Trusts in England. The Foundation Trust offers a wider range of specialist health services than any other. The Trust employs over 13,000 staff and have been treating patients in the North East, and beyond, for over 100 years. The Trust is recognised nationally as a centre of excellence for healthcare and includes the world famous Institute of Transplantation. The Trust strives to deliver modern healthcare with a personal touch.

The Estates and Facilities Directorate is seeking to recruit three highly motivated and flexible senior engineers to join the Estates and Facilities Management Team in the Trust. The appointment of a Principal Engineer oversees all engineering services within the Trust and the appointment of Estates Managers Operations shall be site specific at the Freeman Hospital and Royal Victoria Infirmary, implementing the Trust's estate strategy and operational plans. The Trust has a substantial portfolio of estates and the post holders would work on operational engineering maintenance, estate management and capital development projects managing the engineering input.

For the Principal Engineer appointment you will have a degree level qualification in Mechanical or Electrical Engineering and be registered as a Chartered Engineer with the Engineering Council plus corporate membership of either the IMechE, the IET or CIBSE. The post holder will have gained senior engineering management experience in an operational environment and will display a sound knowledge of management and workforce management techniques along with a flare in solving complex engineering problems in both clinical settings and building services mechanical and electrical applications.

The two Estates Managers Operations appointments shall provide essential engineering management for a large diverse technical and craft workforce supplemented with external contractor support. It is essential that the post holders hold a degree level qualification in Mechanical, Electrical or Building Services Engineering and are registered Chartered Engineers or Incorporated engineers with the Engineering Council. Along with membership of either the IMechE, the IET or CIBSE. The two foregoing appointments are excellent first senior management posts for aspiring progressing engineers who wish to make a career in NHS Estate Management.

For further information please contact Doug Ward, Director of Estates and Facilities Management on 0191 2231666 or via email les.dixon@nuth.nhs.uk

**IMPORTANT NOTE ON COMPLETION OF REFERENCE SECTION OF APPLICATION FORM**  
All references from current and previous employers, will be sought and must cover a minimum of 3 years employment. Therefore, when completing the reference section of your application form, please give the address, telephone number and work email address of each of your current/previous line managers that cover 3 years employment. Failure to complete this section may result in your application not being processed.

Candidates who are shortlisted for interview will be contacted by email, and will be required to complete on-line psychometric tools in advance of the assessment process. You should check your SPAM folders as well as your inbox.

This post is subject to the Rehabilitation of Offenders Act (Exceptions Order) 1975 and as such it will be necessary for a submission for Disclosure to be made to the Disclosure and Barring Service to check for any previous criminal convictions.

**Application form and job description available on-line at: [www.nhs.uk/jobs](http://www.nhs.uk/jobs)**

Search using Job Reference Number:

317-2015-6466 - Principal Engineer; 317-2015-6467 - Estates Manager Operations

Closing Date: 19<sup>th</sup> April 2015

Interview Date: 14<sup>th</sup> May 2015 for Principal Engineer and 18<sup>th</sup> May 2015 for Estates Managers Operations

THIS TRUST OPERATES A "NO SMOKING" POLICY  
IF YOU HAVE NOT BEEN CONTACTED WITHIN 4 WEEKS OF THE CLOSING DATE, YOU  
SHOULD ASSUME YOUR APPLICATION HAS BEEN UNSUCCESSFUL




**JOURNAL CIBSE JOBS**  
The official magazine of the Chartered Institution of Building Services Engineers

**Are you looking for experienced staff?**

Then advertise to the professionals

With over **20,000** CIBSE members receiving the magazine, **15,000** receiving the e-newsletter and over **7,500** unique visitors to the jobsite, many companies are successfully filling vacancies with highly qualified candidates using **CIBSE Journal Jobs**.

Our experienced recruitment team will help you all the way giving you the best chance to find **your perfect candidate**.

To reach CIBSE members contact the recruitment team now at [paul.wade@redactive.co.uk](mailto:paul.wade@redactive.co.uk) or call on 020 7880 6212



**conrad consulting**  
technical recruitment specialists

## further your career

### **BIM Manager (MEP) Cambridge**

£35,000-£45,000 Plus Benefits

An instantly recognisable name within the building services industry are looking for an experienced and well-rounded BIM Manager to take charge of the team in their Cambridge office. If you are at a Senior level and looking for the next step then this is the position for you, giving you the opportunity to take your proven track record of Revit MEP and leadership to the next level

### **Lead Electrical Design Engineer Central London**

£38-£42 per hour

Two of the leading consultancies in the UK have joined forces to work on a ground breaking project within the UK. We are currently recruiting for a Lead Electrical Engineer who will be at the forefront of this project. The contract is estimated to last around 18 months, with the possibility of a transfer when this has come to fruition.

### **Associate Mechanical Worcester**

£50,000 Plus Car Allowance

Our client has a fantastic opportunity open for an Associate to join their ever growing business. Heading up the M&E team, you will be a technically sound engineer with a strong ability in new business acquisition.

Joining the executive team it will give large scope to help build and drive the M&E operations forward, whilst developing your own team of engineers. This role comes with an excellent benefits package, including flexi-time.

### **Senior BIM Technician York**

£35,000-£45,000 Plus Benefits

We are currently recruiting for a senior level BIM Technician with a broad experience using Revit MEP and working to BIM Level 2 Compliance. With projects ranging from rail through to high end industrial, you will be working as part of one of the top architecturally lead steel manufacturers in the world.

### **Associate Director Glasgow**

£50,000 Plus Benefits

A leading global engineering consultancy is looking to expand Scottish operations with the appointment of an Associate Director. Ideally Chartered, you will be looking to help build excellent client relations as well as project manage some of Scotland's most prestigious projects. Potential candidates will have exceptional team management and project leading skills. You will also have strong experience working in a global matrix organisation, and possess a Masters in a relevant subject.

### **Principal Electrical Design Engineer Birmingham**

£45,000 Plus Benefits

This role is for a well-known building services consultancy that operates worldwide. Due to extensive growth plans, a Principal is required to deliver high quality design to a range of key clients. Working within a plethora of sectors, you will lead your own team of engineers to ensure projects are met to all deadlines and within the company's renowned work ethos. This is a challenging but rewarding role to potential designers looking to step up from a senior position.

### **Associate Building Services Engineer (Mech or Elec) Colchester, Essex**

£60,000-£65,000 Plus Benefits

A renowned, award winning engineering consultancy who have a large office in Colchester is currently looking for an Associate Building Services engineer to lead a large team of MEP Engineers and Technicians.

This is a fantastic opportunity to work in an autonomous role on some pioneering building services projects.

### **Fire Engineers (All Levels) London, Leeds, Manchester**

£30,000-£70,000 Plus Package DOE

A number of multi-disciplined engineering consultancies are seeking Fire Engineers at Intermediate, Senior and Associate level.

### **Associate Director - Mechanical Surrey**

£60,000 Plus Benefits + Car Allowance

This is a unique opportunity to join a medium sized building services consultancy who are renowned for working on high profile construction projects in London. This consultancy is fast moving and ambitious, making this a very exciting opportunity for someone wanting to progress within a company to a very high level.

### **Associate Electrical Engineer (Stadia + Leisure Projects) City of London**

£55,000-£60,000 Plus Benefits + Car Allowance

A large international multi – disciplined practice are currently looking for an Associate Electrical Engineer to lead a small team of engineers. This select team work on predominately iconic stadia and leisure projects, working with some of the top AJ100 architectural practices. This is a great opportunity to work on exciting international projects.

### **Associate Mechanical Engineer Buckinghamshire**

£50,000 Plus Benefits Package

An award winning building services and sustainability consultant is looking for an Associate level Mechanical Engineer to lead a team of engineers on high profile commercial and residential projects in the South East. This is an ambitious and progressive consultancy which makes this a great opportunity for someone wanting to combine their engineering knowledge and business acumen.

Find more jobs online at  
**conradconsulting.co.uk**

For more information about any of these positions, please contact **george@conradconsulting.co.uk** or call **0203 1595 387**

For a confidential chat, call us 8am to 8pm on 0203 1595 387

**b-a-r** beebey anderson recruitment

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

**Public Health Engineer**  
London, circa £40p/h

A Public Health Engineer is required within a very busy international consultancy office. Their London office is focussed on some of the most prestigious developments in London, and you will be working on a 7\* London hotel. You should be familiar with the design of PH services and have previous experience in a site based role. Flexible working/part-time is an option with this position. Ref: 2456/MA

**Principal Mechanical Engineer**  
London, £48 - £58k + car + benefits

A top 5 UK consultancy are looking for a strong technical leader to oversee the delivery of some of their highest profile projects. You will have at least 10 years' experience and have excellent technical knowledge of mechanical engineering with the ability to drive a team to deliver excellence. This role would suit an ambitious individual who wants to progress to an associate level in the near future. Ref: 2487/CB

**Mechanical Design Engineer**  
Berkshire, circa £37p/h

A top 10 international consultancy requires the services of a Mechanical HVAC Engineer to work in their Laboratories division. You will be working on a bio medical research facility from concept to completion. You must have experience designing Labs or similar projects. Ref: 2443/MA

**Public Health Engineer**  
London, £28 - 35k + benefits

An exceptional opportunity for a public health specialist to join an international environmentally focused building services consultancy. The company recognises that its standing within the industry is underpinned by its staff, and so actively supports engineers in progressing their career and personal development through exposure to high profile projects, mentoring, client exposure, and CPD courses. Ref: 2442/JA

**Senior Mechanical Design Engineer**  
London, £38 - £40 p/h

An enticing opportunity has become available for an enthusiastic and technically well rounded engineer. The company has won a number of leisure, commercial and retail projects in the Middle East and UK. The right candidate will be technical competent, client facing, with the ability to hit the ground running. Ref: 2499/KB

**Senior Electrical Design Engineer**  
London, £40 - £53k + benefits

This is a fantastic opportunity to join an international consultancy that has been established for over 40 years. The London office work on a variety of projects including mission critical, residential, hotels, and leisure schemes. The company are very focused on training, development, and recognition and hold annual awards for their staff to promote excellence and hard work. Ref: 2245/JA

Thinking of your future

www.b-a-r.com



**M&E Design Engineers**

London | to £43LTD | ref: 7397

Our client is looking to add M&E design engineers, for 12 months or more, to interdisciplinary teams which aim to produce integrated, holistic and sustainable solutions. The ideal candidate will be Chartered with extensive healthcare experience.

**MEP Design Engineers**

Essex | to £55K | ref: 7406

An international consultancy are looking for MEP design engineers to manage the design of services on a variety of large scale residential and commercial projects. These permanent positions will involve some management, client facing and mentorship. Chartered status would be preferred.

**M&E Design Engineers**

London | to £50K + Bens | ref: 7347

This is a fantastic opportunity for dynamic and career-driven Intermediate/Senior level mechanically or electrically biased design engineers to progress to the next stage in their career. This award-winning consultancy is involved in a range of high profile projects including international stadiums and airports.

**Mechanical Design Engineer**

Bristol | to £50K + Bens | ref: 7373

Living up to their reputation as 'the World's Most Admired Company' is easier when you have the passion for excellence of this consultancy. Shaping the world's infrastructure as a global leader, they are looking to add a Mechanical Design Engineer to a growing Bristol team of outstanding consultants.

**Senior Electrical Design Engineer**

London | to £45LTD | ref: 7359

A leading contractor is looking for an Electrical Design Engineer for 6-12 months to work on a prestigious rail project in the Capital. Ideally chartered, the successful candidate will have a proven history in yielding high quality results in the rail sector. Previous contractor based experience preferred.

www.blueprintrecruit.com/vacancies

02392 603030

cv@blueprintrecruit.com

**Head of Consultancy Services**

Building Services Consultancy, Jersey

Our client is a Channel Islands based consultancy practice providing impartial building services and environmental consultancy services, specialising in the design of high quality, low energy and sustainable solutions within the built environment, providing a wide range of services to Clients on projects ranging in size and complexity, from domestic dwellings through to major commercial and industrial projects.

The role of Head of Consultancy Services is responsible for the day to day management and performance of the business and for leading a team of professional Design Engineers based in both Jersey and Guernsey.

The successful post holder will lead the design teams to ensure that projects are successfully and profitably delivered to the required specifications demanded by clients as well as providing design services as and when required.

Candidates will be able to demonstrate:

- Experience & Management skills in leading a professional team
- Ability to lead and manage client interfaces
- Ability to report on business activities and performance at a senior management level
- A industry related degree
- Minimum of 5 years operating at a senior level within a consultancy practice with appropriate design skills
- Membership of a professional body such as CIBSE and the Engineering Council to CEng level
- Conversant with modern IT systems and design software packages, including AutoCAD / Hevacomp / Cymap / Amtech / BIMs
- Excellent and relevant project management skills in delivering and managing projects from inception through to completion
- Strong communication skills, able to relate well at all levels within an organisation

The successful postholder will be capable of working closely with a team of like-minded dynamic engineers and will drive the success of the business, developing the business and the skills of the team to ensure future successes. Inter-island travel will be required, as will a team working ethic and flexibility to ensure project deadlines are met.

This is a unique opportunity for a high calibre Design Engineering professional in a managing capacity to drive the success of the business or for the right candidate to step up into a management role. The successful postholder can enjoy the fantastic quality of life that Jersey offers in a role that offers challenge and opportunity alike.

Applicants should apply personally to Bob Hassell for a confidential discussion about the position.

Hassell Blampied Associates, Anley House  
Anley Street, St Helier, Jersey JE2 3QE  
E bob.hassell@hassellblampied.com  
T 01534 750100  
www.hassellblampied.com



# Events & training

## NATIONAL EVENTS AND CONFERENCES

**Technical Symposium**  
16-17 April, London  
Book now for the 2015 Technical Symposium  
[www.cibse.org/symposium](http://www.cibse.org/symposium)

## CPD TRAINING

For more information, visit [www.cibse.org/mcc](http://www.cibse.org/mcc) or call **020 8772 3640**

**Practical controls for HVAC systems**  
9 April, London

**Running projects effectively**  
14 April, London

**Designing heating and chilled pipe systems**  
16 April, London

**WRAS Water Regulations**  
21 April, London

**Building services explained for FMs**  
21-23 April, London

**Fire risk assessment to PAS 79**  
23 April, London

**Electricity at Work Regulations explained**  
24 April, London

**Energy strategy reports**  
24 April, London

**Building services overview**  
28 April, London

**Electrical services explained**  
28-30 April, Birmingham

**Mechanical (HVAC) services explained**  
28-30 April, Leeds

**Air conditioning and cooling systems**  
29 April, London

**Practical LV fault analysis**  
30 April, London

**Energy Building Regulations: Part L**  
30 April, London

## ENERGY ASSESSOR TRAINING

For more information visit [www.cibse.org/events](http://www.cibse.org/events) or call **020 8772 3616**

**LCC operations (DEC training)**  
21-23 April, London

**RHI metering requirements**  
21 April, London

**ISBEM**  
28 April, London

**Energy Savings Opportunity Scheme (ESOS) training**  
29 April, London

## CIBSE GROUPS, REGIONS AND SOCIETIES

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

**ANZ Region – NSW Chapter: NSW Case Studies 1**  
7 April, Sydney

Three projects will be presented in various stages of design, construction and operation, with the intention to revisit these as they progress through the project life-cycle.

**SoPHE: Installation and best-practice forum**  
7 April, London

Forum with contractor group HDPE drainage pipework systems.

**HCNW Region: Restrain your services – design for seismic zones; and AGM**  
9 April, London

Martin Deveci – a European expert and ASHRAE voting member on the subject – will cover design practice and requirements for resilient and, above all, safer buildings.

**HCNW Region: Boat race, Blue Sky workshop and YEN HCNW launch**  
11 April, London

A workshop to explore what CIBSE members want from the region. This is an excellent opportunity to generate feedback, while watching the boat races.

**West Midlands Region: Case study – by royal appointment**  
15 April, Birmingham

An evening seminar presented by Chris Taylor, from British Gas.

**Ireland Region: Half-day masterclass in building services, and awards dinner**  
16 April, Dublin

The masterclass will include speakers from academic and industry backgrounds, and will cover current issues relating to building services engineering in Ireland.

**Southern Region: AGM and update presentation on Legionnaire's disease guidance**  
16 April, Chichester

**YEN London: Leading projects in 2015 the debate**  
22 April, London

From all our collective experience, who do we think should lead projects as standard – the mechanical team or the electrical team? How will leading projects change in 2015? Join us for a lively panel debate.

**West Midlands Region: A significant step to nearly zero?**  
22 April, Birmingham

An evening seminar presented by Riccardo Bragoli, from Cundall.

**Yorkshire Region and IHEEM: Joint BIM event**  
22 April, Leeds

A joint event between the IHEEM and CIBSE, focusing on BIM and its practical application within a healthcare environment from

a building services perspective, and how lessons can be applied within other sectors.

**WIBSE – Improving management skills**  
22 April, Manchester

Part two of the leadership series, with speaker Imelda O'Keefe.

**Merseyside & North Wales Region: AGM and seminar**  
23 April, Merseyside

Waste to energy seminar and AGM.

**YEN South West Region: Charity pub quiz**  
23 April, Bristol

Charity pub quiz, with all proceeds being donated to testicular cancer charity, It's In the Bag.

**CIBSE Membership briefings**  
27 April, Cardiff

11 May, Milton Keynes  
These briefings will focus on applications for the Associate and Member grades, and registration with the Engineering Council at the Incorporated Engineer and Chartered Engineer levels. The sessions are an opportunity to meet members in your region, with a CIBSE presentation covering the main points of the application and interview process.  
[www.cibse.org/briefings](http://www.cibse.org/briefings)

**North East Region: AGM**  
28 April, Newcastle upon Tyne

**HCNE Region presentation and AGM**  
28 April, Brentwood

With guest speaker Nick Mead, president elect, and AGM.

**Yorkshire Region: AGM and technical seminar on CIBSE LG7**  
29 April, Wakefield

Evening seminar and AGM.

**Society of Light and Lighting masterclass**  
30 April, Bristol

This year's masterclass series theme is 'Light for Life', focusing on the relationship between light and wellbeing. With speakers Helen Loomes, Trilux; Kevin Stubbs, Thorn; Darren Smith, Philips; and Dan Wills, Helvar.  
[www.cibse.org/sll](http://www.cibse.org/sll)

## Free Energy Savings Opportunity Scheme CPD briefing: 14 April

CIBSE Energy Savings Opportunity Scheme (ESOS) Lead Assessors are required to complete five hours of CPD, in addition to any CPD requirements as a Low Carbon Consultant (LCC) or other scheme member. How will you satisfy this requirement?

At this early stage of the scheme, getting to grips with the practical requirements of ESOS can seem daunting. The CIBSE certification helpdesk knows only too well about the challenges you face, so let us help you with a free-to-attend, dedicated ESOS CPD briefing.

Register today for a half-day (morning) session exclusively for CIBSE ESOS Lead Assessors.

The session will cover:

- A review of the latest official guidance
- Details on audits to BS EN16247, particularly Part 4, Transport
- An introduction to BS50001 and ESOS
- FAQs – the typical questions received by the helpdesk and the solutions available
- Introductions to relevant software providers.

Places are strictly limited and will fill up fast. The event is free to attend thanks to our event sponsors: IES, DigitalEnergy, Enistic and Property Tectonics – all will be showcasing their software on the day.

Attendance will allow you to claim up to three hours of ESOS CPD.

This event is exclusive to fully-qualified CIBSE ESOS Lead Assessors. If you would like more information about becoming an ESOS Lead Assessor visit [www.cibseenergycentre.co.uk/esos](http://www.cibseenergycentre.co.uk/esos)



# ENGINEERING KNOWLEDGE ON THE MOVE

*CIBSE Journal* is now available as an  
Android, Apple and Amazon app

GET THE  
CIBSE APP:  
NOW  
ALSO ON  
ANDROID!



Find out more at: [cibsejournal.com/app](http://cibsejournal.com/app) or  
search CIBSE in the store below



➔ See it online via [www.cibsejournal.com](http://www.cibsejournal.com)

# 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.

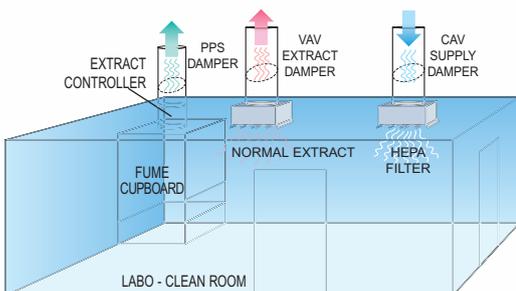


### DPM PRESSURE SENSOR

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 +/-1Pa. Fume cupboard face velocity to 0.5m/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-propelene control and shut off valve incorporating the CMR Venturi Nozzle. This is essential when dealing with corrosive extract air especially from fume cupboard systems.



PPS Damper

### PRECISION COMPONENTS FOR VENTILATION AND PROCESS CONTROL

# CMR CONTROLS

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

22 Repton Court, Repton Close,  
Basildon, Essex SS13 1LN. GB  
Website: <http://www.cmr.co.uk>

Tel: +44 (0)1268 287222  
Fax: +44 (0)1268 287099  
E-mail: [sales@cmr.co.uk](mailto:sales@cmr.co.uk)

