

CIBSE



JOURNAL

The official magazine of the Chartered Institution of Building Services Engineers

November 2014

1920s Revival

Arup restores Sydney's Jazz Age gem

WITH THIS
ISSUE
*Products
Special*

OPPORTUNITY KNOCKING
ESOS audits must make a
case for energy efficiency

CITY CONNECTIONS
Energy networks in
King's Cross and
Birmingham

INDIRECT

Modular Data Centres by

excool
SPACE

COMING SOON

www.excool.space.com

LEARN MORE AT:
DatacenterDynamics
CONVERGED
London 19 - 20 November 2014
STAND No.
411

Excool's indirect adiabatic and evaporative cooling system eliminates the need for refrigerant cooling for UK installations resulting in exceptionally low pPUE.



2014 Excool being installed in data centres totalling in excess of 100MW
BRILL award from the Uptime Institute using Excool's cooling technology
New 600KW 400m² customer demonstration test facility opened



2014 Profile Park achieves Tier III Certification using Excool technology

2014 LONDON2 achieves Tier III Design Certification of Design Documents using Excool technology

November 2014 LAUNCH OF EXCOOL SPACE

Contents

NEWS

6 News

ESOS assessors; sustainable skills gap; BPA finalists; UK's 'greenest' commercial building; ASHRAE focuses on homes

12 CIBSE News

Employers of the year; CIBSE board nominations; Young Lighter finalists

OPINION

16 Feedback

Saints march in over LEDs; CIBSE's LinkedIn group discusses BIM

18 Circular policy

Hywel Davies looks at EU initiatives that will affect building services

20 BREEAM for healthcare

The rating assessment tool does not take account of healthcare buildings' specific needs, says Gordon Hudson

22 Lifecycle planning

Will Borthen examines how you balance the risk of failure against the cost of replacing equipment



Product Special

Round-up of industry regulations including the zero carbon housing standard, F-Gas and ESOS. Plus, a review of the finalists in the Energy Saving Product of the Year category of the 2015 Building Performance Awards.



Features

24 The Persuaders

Can the Energy Savings Opportunities Scheme convince large organisations to invest in long-term measures to cut their fuel use?

26 Lighting up the awards

New categories were in the spotlight when judges pored over the entries for the CIBSE Building Performance Awards 2015

30 Taking the long view

CIBSE's new *Guide M* provides comprehensive information on the management and maintenance of operational buildings

34 Bright young things

Building services engineers went head-to-head to be CIBSE ASHRAE Graduate of the Year

SPECIAL FEATURES

● Industrial/commercial heating & cooling

39 A plan for all seasons

Autumn's switch-on signals the start of increased energy use – does it have to?

42 COVER FEATURE

The art of the possible

Innovative engineering transforms Beaux Arts beauty into hi-tech real estate

50 Access all areas

Heat networks in London's Kings Cross and Birmingham needed widely differing strategies

58 Fat lot of good

Heating buildings using biodiesel

LEARNING

65 CPD

Radiant heating with low temperature hot water

CLASSIFIED

70 Products

A round-up of systems and services for the industry

PEOPLE AND JOBS

74 Appointments

Jobs at jobs.cibsejournal.com

77 Q&A

Nigel Achurch, estates and facilities manager, Bedfordshire Police

78 Looking ahead

Young Lighter of the Year and LuxLive; Energy Management Exhibition at London's ExCel

The Renewable Solutions Provider
Making a World of Difference

Can a heat pump deliver community heating, reduce running costs and qualify for RHI? ...ecodan can



Mitsubishi Electric's Ecodan heat pumps are specifically designed for community heating schemes or any commercial building that requires space or water heating.

Using proven heat pump technology to deliver effective, low carbon heating, our Ecodan systems provide a simple, renewable solution that rivals traditional heating systems.



Certificate Number: MCS HP0002
Product Reference: PUHZ-W50VHA-(BS)
PUHZ-W85VHA2-(BS), PUHZ-HW140VHA2/YHA2-(BS)
PUHZ-SW40VHA, PUHZ-SW75VHA
PUHZ-SW120VHA, CAHV-P500YA-HPB



- Centralised or decentralised solutions to help achieve renewable energy targets
- Capital cost financing available
- Easy to design, install and maintain
- Fully scalable and can work independently or in conjunction with other systems
- Optimised systems from 4kW to 688kW
- MCS approved and qualifies for the Renewable Heat Incentive
- Both air source and ground source systems are available

For more information please call: **01707 282880**
email: heating@meuk.mee.com
or visit: heating.mitsubishielectric.co.uk



Air Conditioning | Heating
Ventilation | Controls



You Tube View our Ecodan for multi-dwelling buildings video at: [mitsubishielectric2](https://www.youtube.com/channel/UCm3t3UW1111111111111111)

For information on attending one of our free commercial Ecodan seminars please contact us at heating@meuk.mee.com or register online at www.mitsubishielectricevents.co.uk/ecodanseminars



www.cibsejournal.com

Editorial

Editor: Alex Smith
Tel: 012 2327 3520
Email: asmith@cibsejournal.com
Senior Reporter: Liza Young
Tel: 012 2327 3529
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, insidetrack
James Fisher, e3 consultant, FläktWoods
David Hughes, consultant
Philip King, director, Hilsen 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)12 2347 7411. 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 1759-845X

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 Worldnet Shipping NY Inc, C/O Air Business Ltd / 155-11 146th Street, Jamaica, New York, NY 11434. 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, NY 11434.

Cover image: Peter Bennetts



Save and prosper

The impending Energy Savings Opportunity Scheme has the potential to transform much of the UK's corporate property estate, as well as its transportation and industrial activities.

It requires large companies with more than 250 employees (or large turnovers or balance sheets) to carry out an energy audit of their business by 5 December 2015 (and every four years thereafter). The assessment will spell out the most cost-effective measures that can be taken to cut energy use and, in so doing, reduce utility bills.

Making these assessments mandatory is a good first step by the government, but they will only be worthwhile if companies carry out the energy-saving recommendations in the report. Otherwise, in the words of Professor Andrew Geens, head of CIBSE Certification: firms will be 'wasting their money'. Official estimates put the average cost of an assessment at £17,000.

The government has now announced the approved Lead Assessor bodies. Among those listed is CIBSE Certification, which already has a register of professionals qualified to carry out ESOS evaluations.

It is the expertise of the ESOS Lead Assessors that will make or break the scheme. They must make a compelling case on which chief financial officers can act, which means making a watertight

case for investment for each energy-saving measure. The scheme requires audits to be signed off by a board member, so the document will at least reach those with the power to make decisions.

In October, we reported on the publication of the consultation document for the Code of Practice for Heat Networks. This month, we take a look at two large city centre

developments at King's Cross, London, and central Birmingham.

The projects are very different. The King's Cross scheme, developed by Argent, has been started from scratch, and the loads on the partially-developed estate are not yet large enough to use the two large CHP units fully. In Birmingham, two existing energy networks are being connected and expanded to provide a district energy system for new developments such as Birmingham Library and the latest flagship store for John Lewis.

Birmingham provides something of a blueprint for King's Cross, as the system includes chilled water for air conditioning. It will be interesting to see how Argent deals with the undoubtedly huge cooling requirements of Google when it relocates its UK headquarters to King's Cross in the next few years.



Alex Smith, editor
asmith@cibsejournal.com

In brief

ARUP TO ADVISE TOKYO 2020 GAMES

Arup will help the Japanese city of Tokyo to prepare venues and infrastructure for the 2020 Olympic and Paralympic Games. It will provide advice on transport, security, sustainability and legacy, as well as a review of the Games masterplan.

In partnership with Aecom, it will also provide guidance on the delivery strategy for design and construction, from preparation stage through to the post-Games legacy.

SUSTAINABLE CITY AWARDS ANNOUNCED

Entries are now invited for the 14th annual Sustainable City Awards, run by the City of London Corporation.

British towns and cities will be judged on their environmental impact, the quality of life they offer, and their 'future proofing', based on sustainability criteria.

The award will go to the UK city that makes best use of its renewable energy sources, encourages 'green bonds' to raise finance for environmental projects, and uses government investment for research and development in sustainable practice.

Entries close on 1 December 2014, and the awards will be held at the Lord Mayor's residence, The Mansion House, on 23 March 2015. To apply, visit: www.cityoflondon.gov.uk/sca

US ISSUES 'FINAL RULE' FOR ENERGY SAVING

As part of President Obama's energy-saving strategy, the US Department of Energy has issued a 'final rule' that requires all new and refurbished federal buildings to meet defined energy and water performance targets. These targets are verified by recognised green-building certification schemes.

By requiring reassessments at least every four years, the rule – which comes into force this month – is designed to ensure energy and water savings continue 'well beyond the initial building opening or retrofit'.

ARUP INSTRUMENTAL IN NEW SCIENCE FACILITY



The University of Bristol's new £56.5m Life Science building has been opened by broadcaster and naturalist Sir David Attenborough.

Arup developed the M&E engineering strategies for the 13,500m² building, and worked closely with the on-site contractor to provide technical advice.

Construction work began in July 2011, and the

building – which provides facilities for science research and teaching – has been designed to achieve a BREEAM Excellent rating.

Several design features reflect the research being carried out inside: the exterior of the building has a 20m-high living wall, while a greenhouse – capable of recreating tropical conditions – is on the roof.

CIBSE's ESOS assessors will take hassle out of audits

● Approved professionals cover transportation and industrial activities

CIBSE Certification's Register of Low Carbon Consultants has become one of the first schemes to be approved for the Energy Savings Opportunity Scheme (ESOS) by the Environment Agency.

ESOS applies to UK organisations that employ 250 people or more – or have a turnover in excess of €50 m – and requires them to provide four-yearly reports on energy use,

and their plans for energy-efficiency improvements. Initial reports are due on 5 December 2015.

Around 10,000 organisations – covering up to 200,000 buildings – are expected to be included, and will need to carry out an energy audit to comply with the scheme. ESOS implements Article 8 of the EU Energy Efficiency Directive. The audit must be signed off by an ESOS Lead Assessor, unless the organisation has third-party ISO50001 certification for all their energy use.

To become a CIBSE ESOS Lead

Assessor, applicants must first be CIBSE Low Carbon Consultants. They can then apply to be added to the ESOS Lead Assessors Register.

'CIBSE's major focus is on the energy performance of buildings, making us a clear choice for clients whose main energy use is in buildings,' a CIBSE statement said. 'However, clients will find a suitable ESOS Lead Assessor [on the register], whatever their energy mix.'

For details about how to become a CIBSE ESOS Lead Assessor, visit www.cibseenergycentre.co.uk/esos

● More on ESOS on page 24.

Poland's Targońska is Graduate of the Year

Hoare Lea's Emilia Targońska was named the CIBSE ASHRAE Graduate of the Year 2014 during a ceremony held at the Institution of Mechanical Engineers (IMechE) on 9 October.

She received her award from CIBSE President Peter Kinsella and ASHRAE President Tom Phoenix during the CIBSE Young Engineers' Awards, sponsored by Daikin UK, Kingspan Tarec and Ruskin Air Management. Kaizen Design was named CIBSE Employer of the Year for



its record of investing in the education and progression of young engineers.

Each of the eight Graduate of the Year finalists had to give a presentation – 'How is technology transforming the way we, as engineers, work' – to an audience of more than 160, and a judging panel that included the presidents of CIBSE, ASHRAE and the IMechE, and last year's Graduate of the Year, William Holley.

For more on this year's award winners and finalists, turn to page 12 for employers and page 34 for graduates.

Government advisers reject Paterson 'lights out' claim

● Former Environment Secretary criticised after call to scrap climate targets

The Committee on Climate Change (CCC) has rejected a call from former Environment Secretary Owen Paterson for the UK to 'rip up' the Climate Change Act.

Paterson told the Global Warming Policy Foundation that the country's target to reduce carbon emissions by 80% by 2050 was unrealistic and too expensive, and would lead to widespread power blackouts. He also claimed that the UK would have to 'close down the economy' to hit carbon-reduction targets.

Paterson disputed many of the key scientific findings around climate change, and claimed there had been no global temperature increase for 18 years. He urged the government to scrap the targets from the Climate Change Act, and to focus on shale gas, combined heat and power (CHP), small nuclear reactors, and demand management.



Paterson urged government to scrap carbon targets

OLU SCARFF / GETTY IMAGES

claim that the UK was the only country pursuing such aggressive carbon-cutting targets, by pointing to similar laws in 66 other states.

'The UK Climate Change Act is seen as world-leading, with many more countries seeking to emulate its approach,' a CCC statement said. '[The response] to climate change will be most effective and lowest cost where policy can create an environment of certainty and transparency. [The Act] maintains the flexibility to meet emissions targets in whatever way proves best, but it makes a legal commitment to action that sets a clear direction for business.'

The committee also said there was 'no fundamental conflict between decarbonising and keeping the lights on, and that the country was building additional power-generation capacity.

'We can fully decarbonise while still growing the economy, based on technologies that are known about today, and have been proven to work,' the committee said.

However, the committee of independent experts – who provide guidance to government departments – said 'short-term, unpredicted fluctuations in temperature are to be expected', but that temperatures 'are still increasing on the timescales relevant for identifying long-term climate change risks, which determine the need to reduce emissions'. It said investment in carbon reduction was boosting the economy, and rejected Paterson's

Politicians face renewables test

The renewable energy industry has launched a series of 'key tests' for the UK political parties ahead of next year's General Election.

Energy trade bodies – including the Renewable Energy Association, the British Photovoltaic Association, Scottish Renewables, and the Solar Trade Association – have launched a renewables campaign, and published a manifesto. The party leaders are challenged to:

- Support the Climate Change Act
- Set a new renewables target of 30% of UK energy by 2030
- Back the independent Committee on Climate Change's recommendation to set a binding target for low carbon electricity by 2030
- Fund the Renewable Heat Incentive for new applications after 2016
- Boost the UK's Renewable Transport Fuel Obligation to reach the 10% renewable energy target for transport by 2020
- Reform the EU Emissions Trading Scheme, to ensure the market takes account of all sectors' polluting cost of carbon emissions.

Members of the public are being encouraged to write to the party leaders to encourage them to take these



ZHANCAOAN/GIS7692733/SHUTTERSTOCK

principles into the election. 'We need consistent and strong backing for renewable energy – not only to cut carbon emissions and tackle climate change, but also to harness the opportunities for growth and jobs, and reduce our reliance on dirty fossil-fuel imports from insecure parts of the world,' said Action for Renewables' chairman, Tony Juniper.

'I hope voters will contact the party leaders and ask them to support our manifesto – because none of these technologies can flourish without political backing.'

Sustainable skills gap grows

Only 13% of businesses say they are confident they have the skills to compete successfully in a sustainable economy, according to the Institute of Environmental Management and Assessment (IEMA).

In a survey of more than 900 businesses – carried out by the IEMA – 65% of businesses said they had not even carried out a strategic evaluation of the skills they needed, while 63% admitted they spend less than £100 per head a year on environmental training.

The research suggests that businesses' ability to compete is being compromised by a lack of environmental and sustainability skills.

Only 25% of business leaders are fully capable of addressing the sustainability agenda, according to the survey, and – in 72% of organisations – investment in environmental and sustainability skills is less than for other disciplines. The report also pointed out that more than 50% of companies said they were not able to recruit professionals with the right level of sustainability skills.

River could heat European Parliament

The potential of 'big water' heat pumps – that extract heat from natural sources, such as rivers and lakes – needs to be exploited more, according to renewable energy experts.

Scottish engineering firm Star Renewable Energy designed and installed a 90°C district heat pump in Drammen, Norway. The company claims the Neatpump is the world's largest zero-carbon water heat pump installation, and that it has helped the city to slash its fuel consumption by 85%, using heat from a nearby fjord.

Star believes other companies and governments should consider big-water heat pumps. 'In Brussels, heat harvested from the river Senne could provide enough energy to warm the European Parliament, and cut CO₂ output by 11,050 tonnes a year,' Star director Dave Pearson told the recent European Heat Pump Association conference.

In brief

SCOTS DEMONSTRATION PROJECTS SOUGHT

Construction Scotland is inviting firms to supply details of low carbon projects that can be promoted – via a free-to-access database – to international researchers and practitioners, and can demonstrate emerging best practice.

The new online resource, to be launched early next year, will be promoted by Construction Scotland as a ‘shop window for Scotland’s achievements’. It will also link Scottish knowledge, skills, and experience ‘with sources of potential new business, both at home and overseas’.

To register your interest, email: johneaston@SUSTaim.com

GLEN JOINS MANSFIELD POLLARD FROM VIRGIN

Air management specialist Mansfield Pollard – which supplies energy efficient ventilation and sound-management equipment – has appointed Andrew Glen as sales and marketing director.

He formerly held commercial management roles at Tetley Tea and Virgin, where he developed the commercial operations of the group’s life science’s business in the UK and internationally, including a spell of more than four years in Qatar.

Finalists revealed for CIBSE Building Performance Awards

● **Lighting and building control systems feature among accolades for first time**

Shortlists for the 14 categories of the 2015 Building Performance Awards have been revealed.

The finalists were announced at CIBSE’s new Leadership in Building Performance event at the QEII Conference Centre, in London.

The awards are unique within the industry, in that they do more than examine the design of projects and products.

‘What sets these awards apart is that they are focused very firmly on assessing how buildings perform,’ said chair of judges, and CIBSE technical director, Hywel Davies.



The Q-bot underfloor insulation robot is among the shortlisted entries

The panel of expert judges said they were impressed with the quality and reach of entries for this year’s awards, with three Australasian entries shortlisted by the judges in the International Project of the Year category.

The new Lighting for Building Performance category had many strong projects – displaying evidence of post-occupancy evaluations and recyclability – and Davies said ‘any of the shortlisted entries would be worthy of winning the category’.

On judging day, the industry experts rated highly those entries that provided evidence of user satisfaction, as well as a full year’s performance data.

The overall carbon champion – which will be announced at the Building Performance Awards on 10 February 2015 – really ‘showed the way’, and demonstrated what could be done at a time when energy security and capacity are uncertain.

For the full report, see page 26.

September was hottest since records began

The hottest September for 135 years has been recorded by two US meteorological offices.

The National Oceanic and Atmospheric Administration (NOAA) said temperatures around the globe had averaged 15.72°C throughout the month. NASA’s data also showed that September had beaten all previous records.

According to NOAA, it was the fourth monthly record this year. It said 2014 was on track to be the warmest year on record, after the first nine months matched the previous warmest year on record, 1998.

September was also the fifth month in a row that the Earth’s oceans had broken monthly heat records.

Aluminium switch for Mitsubishi Electric

Mitsubishi Electric has revamped its City Multi VRF air conditioners by replacing copper tubes in the heat exchangers with flat aluminium piping.



The manufacturer says the heat-transfer properties of aluminium mean the units offer a 27% annual saving, compared with previous models.

The flat pipe contains channels that help to deliver 26% more contact with the refrigerant, and 30% more piping per area. The aluminium heat exchangers in the City Multi YLM VRF range of air conditioners are also protected against corrosion by a zinc coating.

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

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



No cash available for NHS energy efficiency projects

DoH official urges hospitals to seek alternative funding

The NHS has been urged to seek private-sector funding for energy efficiency upgrades to meet cost-saving targets.

A study by cost consultants EC Harris has identified £1.5bn of savings the NHS could make by improving efficiency across its estate. This was a key topic at the Healthcare Estates Conference in Manchester last month. Delegates urged the Department of Health (DoH) to renew the publicly funded £50 m pilot programme, run by several trusts last year, to trial energy-saving strategies, and to bolster the department's own Encode guidance.

However, DoH spokesman Peter Sellars told the conference that there was no 'capital spend available at the moment', although 'the ministerial team are always asking us to do more about the energy efficiency agenda'.

He said the programme had been a great success, with trusts able to reinvest the energy savings in frontline patient care. As a result, the DoH is looking at ways to extend the lessons learned across the whole NHS, although – with no government money available – Sellars urged trusts to look for alternative sources of funding,



Tameside Hospital

such as the Green Investment Bank.

'Evidence shows that the way we currently manage our estates is not sustainable,' he told the conference, organised by the Institute of Healthcare Engineering and Estates Management (IHEEM).

He said the current annual bill for NHS estates management was £7.2bn, rising at almost 8% every year, despite current austerity measures.

'The efficiency improvements seen in the private sector are driven by technology and innovative solutions, and that's what we need to replicate in the NHS,' said Sellars, who is head of NHS estates and facilities policy.

The DoH has identified huge discrepancies between the best- and worst-performing trusts, and Sellars said it was intent on broadening energy efficiency best practice, based on analysis of the £50 m pilot programme.

IHEEM president, Greg Markham, said estates professionals needed to 'talk to trusts in commercial language' when pitching for funding.

See page 20 to find out why few healthcare buildings gain BREEAM certification.

Adexsi buys fire-safety firm

Smoke and natural ventilation specialist Adexsi has acquired fire-safety product supplier Ateliers Boullet.

The €10m company, based in Paris, has 48 employees, and manufactures glass fire walls, mobile fire curtains, and fire doors. It will become an independent part of the global Adexsi group, which produces more than 80,000 smoke-ventilation and natural daylighting units every year in its three factories.

The Adexsi group includes the Souchier, Hexadome, SIA and Langethermo brands, providing roof and façade ventilation systems and associated controls. It has a strong presence in the UK through its Adexsi UK subsidiary based in Cardiff. Growing export markets, particularly in the Middle East, are also being managed by the UK operation.

New 'kitemark' for building performance

Property firms have launched a 'kitemark' scheme to measure the performance of existing buildings against economic, environmental and social-sustainability criteria.

The creators of the scheme say that 'despite the plethora of tools and rating systems available to measure the energy and environmental performance of buildings, few – if any – are yet able to evaluate these sustainability aspects, with little consensus even over a methodology to measure operational energy in use'.

Therefore, JLL, Bennetts Associates, Stanhope, Skanska Infrastructure Services, and RPC have launched their own scheme to evaluate 'only those aspects of the building that could have some impact on its investment performance, including location, energy performance, ongoing resource use, economic potential, and occupant wellbeing'.

They say it is vital that the 'kitemark' is simple, but avoids the temptation to 'amalgamate the appraisal into one common denominator, producing an overall score or rating system'.

Thatched roof is a nod to the past on building for the future

The University of East Anglia has topped out the UK's 'greenest' commercial building.

UEA claims the Enterprise Centre has less than a quarter of the embodied carbon of traditionally designed buildings, thanks to its sustainably sourced materials.

The £11.6m centre, developed by the Adapt Low Carbon Group, incorporates: 98% recycled steel in its reinforced concrete foundations; 58 tonnes of recycled newspapers as insulation; and timber sourced from Thetford Forest. Old chemistry-lab desks are even used for external cladding. Its Norfolk reed thatched roof will provide natural insulation.

Electrical power is provided by 480 m² of solar panels, supplying 43.58Mw/hr in the first year.

Built by Morgan Sindall and designed by architect Archetype, the centre is expected to achieve

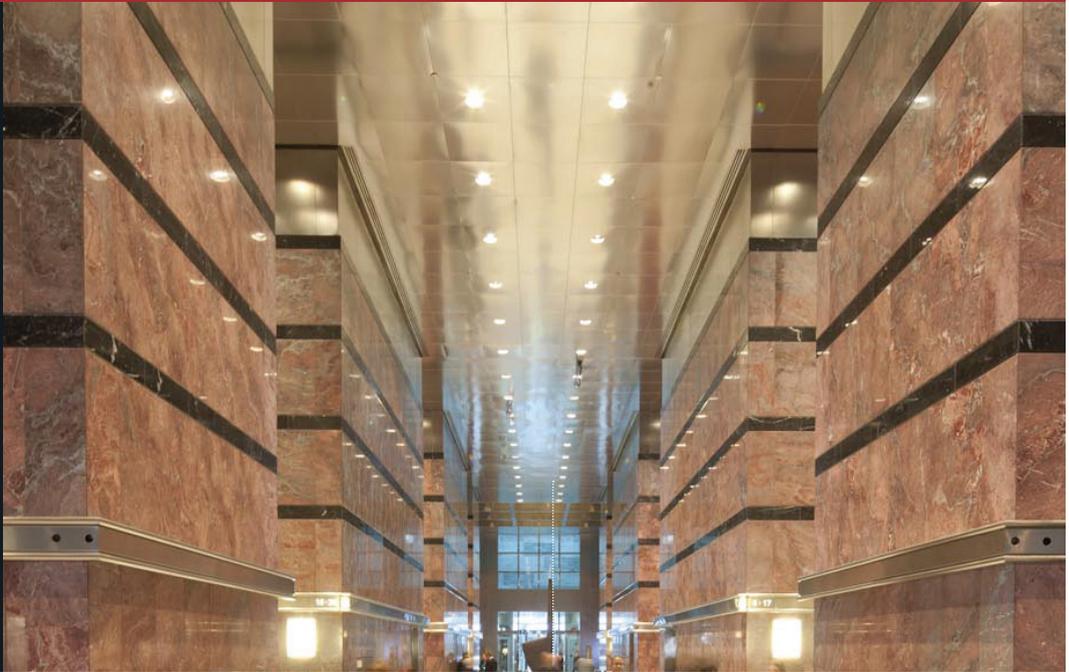


BREEAM Outstanding and Passivhaus certifications.

Ben Humphries, lead architect, said: 'It was always a building without boundaries. It will be a building that demonstrates an approach that is in harmony with the environment, and delivers a sense of health and wellbeing.'

ICONIC CANARY WHARF TOWER SWITCHES TO LEDS

Future Designs has installed a bespoke LED lighting system in One Canada Square, London, that has reduced the building's carbon use by 44%. The landmark 50-storey skyscraper required a new lighting solution for its reception space; however, the ceiling space was a maze of ductwork and very shallow voids. Future Designs, therefore, created a fitting that was shallow enough to avoid clashing with pipework and ceiling fixings, but with a high lumen output to allow the floor – 9.5m below – to be perfectly illuminated. Cano, which has two variants – a single 3000-lumen, and twin 6,000-lumen LED, downlighter – is designed to be energy-saving and low-maintenance.



ASHRAE turns its attention to homes

The US technical society ASHRAE intends to put greater emphasis on its work in the residential sector.

The society has revamped its strategy to take into account the growing importance of energy and indoor air quality to homes.

It points out that residential buildings consume a fifth of all the primary energy used in the US – and more than half of all energy used by buildings. 'Similar trends are also observed in other parts of the world,' it adds, with the residential sector accounting for 26.2% of energy use in the EU.

'Those figures reflect big energy use. They also present big opportunities for sustainability,' said ASHRAE president, Tom Phoenix.

'From economic, environmental and energy

security perspectives, a sector responsible for this much energy consumption requires significant attention.

'Just as importantly – because we typically spend nearly 90% of our time indoors, and most of that time is in the home – the indoor environments of residential buildings have a very significant impact on health, productivity and comfort.'

Household air pollution, from indoor combustion for cooking and heating, is estimated by the World Health Organization to result in more than four million deaths a year worldwide – nearly 8% of the total – predominantly in developing economies.

ASHRAE has, therefore, announced it is 'exploring its role in residential, looking at

how it can contribute most effectively to the improvement of the performance of residential buildings'. It has released a report, *ASHRAE and the Residential Construction Market*, which contains a series of recommendations for its board of directors.

Phoenix said the move into residential was part of the society's new strategic plan, and will lead to ASHRAE working with organisations that specialise in the residential sector.

'We look forward to working with new partners to develop technology, perform research and educate owners, builders and designers to improve the residential built environment,' said Phoenix.

The report and additional information can be found at www.ashrae.org/residential

Ventilation with the windows wide shut!

www.sav-systems.com

AirMaster direct heat-recovery ventilation units are well suited to the ventilation of SEN schools. All potential sources of noise are thoroughly neutralised:

- Breakout noise at 80% throughput = 30dB(A) @ 1m
- No distribution ducting and therefore no duct noise
- Modulating CO₂ control to optimise alertness by occupants
- Elimination of draughts, rain, insects, pollen and traffic noise!

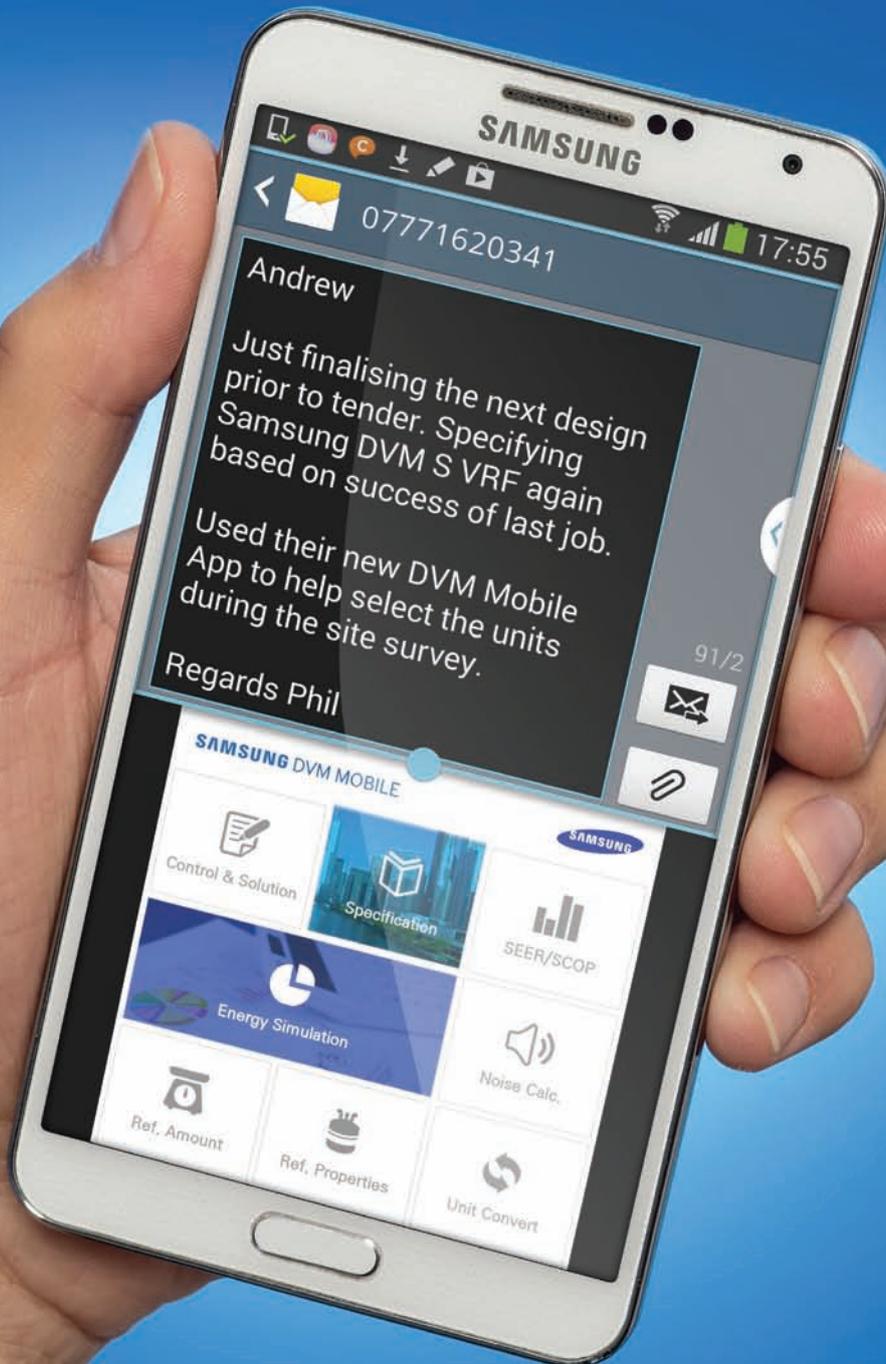


AirMaster. Providing support and solutions to the challenges of SEN school ventilation. Tel: **+44 (0)1483 771910** or email: info@sav-systems.com



SAMSUNG

The solution doesn't always
come from where you'd expect



Available on the
App Store

Available on the
Android Market

Download the DVM Mobile App for convenient on site access to unit specifications, SEER/SCOP, refrigerant charge calculations and much more.

To find the perfect Samsung solution to your specification, email: businessUK@samsung.com

Air conditioning and
heating solutions

Big turnout for uplifting symposium

More than 100 delegates from around the world attended the Symposium on Lift & Escalator Technologies in September.

The two-day conference was organised by the CIBSE Lifts Group and the University of Northampton, and 23 speakers presented their papers.

During a session on control systems, Stefan Gerstenmeyer sparked a debate about reverse journeys and whether they are permissible.

Water balance lifts

The session on the history of the industry was opened by Dr Lee Gray, who took the audience through American and European books about lifts published between 1890 and 1940, and highlighted some flagrant plagiarism before the modern rules on referencing.

David Cooper looked at the four remaining water-balance lifts in the UK, while Dr Gina Barney spoke on the history of traffic control, from FAPB types to the current vogue for hall call allocation (destination control).

In the session on standards and guidelines, environmental health officer Laura Smith discussed lifting operations and lifting equipment regulations (LOLER) for care homes.

Lost art of modernism

On the second day, Roger Howkins looked at the lost art of modernisation, and what he described as 'legalised vandalism' of some older lifts.

Michael Bottomley presented a paper on the modernisation of a paternoster, while Giuseppe De Francesco talked about selecting the right door for different applications.

Dr Rory Smith presented a paper on under-lifted buildings in the Middle East, illustrating the problems that can be caused if the number of lifts is incorrect.

The 2015 event will be on 23-24 September, and authors are invited to submit abstracts by 30 April 2015. To read papers from previous years, visit www.liftsymposium.org

Employer of the Year awards winners revealed



CIBSE President Peter Kinsella presents the awards to Kaizenge Design...



Max Fordham...



and to NG Bailey

● Commitment to engineers' training rewarded for Kaizenge Design, Max Fordham and NG Bailey

Kaizenge Design has won the CIBSE Employer of the Year Award 2014, after also being crowned winner of the small company category.

Max Fordham won the medium company award, and NG Bailey the large company prize.

The awards – which were presented alongside the Graduate of the Year accolades at the Institution of Mechanical Engineers, in London (see page 34) – recognise employers that have shown excellence and innovation in developing the engineers of the future.

Each winning company showed commitment to championing newly qualified engineers in the building services industry, and in supporting them in employment and education.

Kaizenge Design was named the overall winner for its outstanding record of investment in the education and progression of young engineers.

'We are very grateful for the recognition of our investment and development of our young engineers, which will result in the successful growth of our company,' said company director Rob Hunter.

The awards – sponsored by Daikin UK, Kingspan Tarec and Ruskin Air Management – were presented by CIBSE President, Peter Kinsella, and ASHRAE President, Tom Phoenix. The winning companies received a trophy, plus £1,000 of CIBSE training vouchers.

Special-interest group will help cities of the future to be greener

The Adaptive Cities Group has been set up by CIBSE to help minimise negative impacts on the Earth's resources.

The group will encourage collaboration with other professional bodies across the industry, and focus on interdisciplinary thinking about delivering holistic, city-level solutions.

CIBSE members have a huge influence over approaches to building design, procurement, construction, operation and maintenance, which can minimise the contribution to climate change.

The Adaptive Cities Group will provide:

- Leadership and knowledge to its members and the wider built-environment community,

addressing the provision of new buildings and the refurbishment of existing stock

- A focus within CIBSE to develop integrated building fabric and engineering systems solutions, responsive to changes in the external environment, and designed for continuous adaptability to match users' needs
- A mechanism to engage with other built-environment professional bodies and interested parties, to develop wider-scale solutions covering groups of buildings, and the associated services and utilities they require.

For further information about the new CIBSE group, email groups@cibse.org

Inaugural lecture champions 'less is more' light philosophy



Jonathan Speirs



Burj Al Arab

● **Mark Major gives first talk in memory of Jonathan Speirs**

The first annual Jonathan Speirs Memorial Lecture took place at the Glasgow City Chambers in September, when Mark Major – fellow founder of Speirs+Major – gave the inaugural address.

Jonathan Speirs was an inspirational lighting designer, and the lecture – established by the Society of Light and Lighting (SLL), and organised by SLL Scottish regional representative Tony Ownsworth – was set up to promote his vision and passion.

The theme was 'Light + Dark = Architecture', suggesting that

the creation and revelation of architecture is not just about light, but also about darkness – and something in between.

Major said that, often, less can be more when it comes to lighting design. When you look at the most beautifully-lit projects – and the most awe-inspiring buildings – the idea behind the lighting is often quite simple.

Major highlighted Speirs' time in lighting design, both at LDP – where the men worked in the mid-1980s – and the early years of Speirs+Major. He illustrated the practice's philosophy and approach using images and projects, such as the Burj Al Arab.

Major wanted to make the

philosophy clear and simple: it's about light, darkness, change, the passage of time, the movement of light, the connection between natural and artificial light, and how that changes over time.

Major also talked about projects the practice has completed since Speirs' retirement in 2010. 'I think Jonathan would be proud of what has been achieved. The philosophy we established all those years ago is still guiding us.'

Major and fellow trustees have set up the Jonathan Speirs Scholarship Fund, which offers support to architects to make the transition to lighting design. For details, visit www.jssf.org.uk

Resource efficiency guidance published

CIBSE, in collaboration with WRAP, has produced a new publication that reflects the growing desire to create resource-efficient and more circular economies.

TM56, which will be officially launched on 4 December at the NUS HQ in London, explores the impacts of building services on manufacturing, construction, maintenance, and disposal of equipment at end of life. It describes the principles of resource efficiency, and sets out opportunities for improving heating, cooling, ventilation, lighting, and lifts and escalators.

Sarah Clayton, head of products and services at WRAP, said: 'What we build, how we build it, and the products we use will come under enormous pressure to be energy efficient. However, some products use more energy in the extraction of raw material and the manufacturing process than they potentially save.'

CIBSE's published guidance is available for free to members at www.cibse.org/knowledge

● For more, see the *CIBSE Journal* resource efficiency supplement (March 2014).



Around the Regions CIBSE North West

CIBSE North West Region – which has existed since CIBSE's inception in 1927 – is primarily based in Manchester, with other events held in Preston.

The Young Engineers Network (YEN) North West was established in 2011 and helped to revive the region. The committees comprise representatives from firms such as BDP, Morgan Sindall, Arup, Hoare Lea, URS and

Cundall, Max Fordham, Merebrook and eco-I. SOPHE, the Society of Light and Lighting, and WiBSE are also active in the North West.

The region has attracted manufacturer backing for activities, which it is hoped will contribute towards an annual dinner. It is also looking to diversify by increasing activities around electrical and other areas of the profession. It would like to grow links with colleges – in particular, the new University Technical College in Oldham, which developed its curriculum with CIBSE – and wants to work more closely with structural and civil engineers, town planners, acousticians, landscape architects, and other professionals.

More information about regional activities is available at www.cibse.org



What NOMA's refurbished Hanover building will look like (left) and YEN NW members on the roof of Manchester's Co-op building

Key projects:

- NOMA development
- Refurb of Manchester Town Hall and central library
- Manchester City FC's new academy.

2015 symposium reviewers sought

Volunteers are needed to peer-review papers for the CIBSE Technical Symposium 2015.

Around 50 authors will be submitting papers, all of which will need to be reviewed.

Any Members or Fellows willing to help should send a short overview of their practical areas of technical expertise to symposium@cibse.org

The symposium will be held on 16 and 17 April 2015 at University College London. For more information visit www.cibse.org/symposium

Young Lighter finalists revealed

Four finalists in the Young Lighter of the Year award have been announced.

Janna Aronson, from Lichtkompetenz GmbH, James Duff, from Arup, Katerina Konsta, Atkins Global, and Veronika Labancova, Isometrix, will present their papers to a panel of industry experts on 20 November, at LuxLive. To watch the finalists' videos, visit www.cibse.org/sll

The Society of Light and Lighting will be on stand D60 at LuxLive on 19 and 20 November – see www.luxlive.co.uk

All change at CIBSE HQ as institution seeks nominations

● Nominations for officers, board and council members

New CIBSE officers, board members and council members are elected each year to take office from the AGM in May.

Officers and elected board members serve on the board – the Institution's governing body – which is made up of seven officers (president, president-elect, three vice-presidents, honorary treasurer and immediate past president) and five elected members.

The Council of the Institution is a much larger consultative body, which advises the board on Institution policy. It is composed mainly of representatives of the regions, societies, groups and standing committees, but also has elected members.

Members may nominate candidates for vacancies arising in May 2015; the board is required to nominate candidates for all vacancies. This year, the board's nominations are:

- President-elect** John Field CEng FCIBSE
- Vice-presidents** Paddy Conaghan



CIBSE headquarters in Balham

CEng FCIBSE, Stephen Lisk FCIBSE FSLL, Tadj Oreszczyn CEng FCIBSE

Honorary treasurer Stuart MacPherson CEng FCIBSE

Board members Lynne Jack CEng FCIBSE FSoPHE, Yuen Pak Leung FCIBSE

Council members Colin Ashford LCIBSE, Mariana Trusson LCIBSE.

Biographical notes for candidates, and qualifying criteria for each position, are available in the members' section at www.cibse.org Rules for nominating candidates – set out in the Royal Charter, by-laws and regulations – are as follows:

Fellows, members, associates and licentiates may submit

nominations for president-elect, vice-president and honorary treasurer, and for elected board members. The candidates must be supported by 10 nominations from fellows, members, associates and licentiates.

Fellows, members, associates and licentiates may nominate people from those grades for council positions. Graduates, companions and affiliates (including students), may nominate people from those grades for membership of council. Candidates for council must be supported by five nominations from members in the appropriate grades.

Nominations must be received by 30 January 2015.

New members, fellows and associates

FELLOWS

- Bradley, Stephen Peter**
Makati, Philippines
- Chau, Kam Fai**
Kowloon, Hong Kong
- Crayford, Paul James**
Dubai, United Arab Emirates
- Lai Ping, Kuen**
Kowloon, Hong Kong
- Pau, Wai Keung**
Kowloon, Hong Kong
- Robinson, Simon Edward**
Leeds, UK
- Ross, Stuart John**
Torpoint, UK
- Troft, Christopher Noel**
Hertford, UK
- Weatherall, Peter Joseph**
Bexley, UK

MEMBERS

- Abdullah, Fathi Kamal**
Abu Dhabi, United Arab Emirates

- Chan, Wing Tai Boris**
Tai Po, Hong Kong
- Chan, Chi Wai Declan**
Ma Wan, Hong Kong
- Chan, Chi Wing Vincent**
Fanling, Hong Kong
- Hill, Anthony**
Wigan, UK
- Hon, Yee Lam Joe**
Tsuen Wan, Hong Kong
- Huang, Hung Man**
Mongkok, Hong Kong
- Jenkinson, James**
Cottesloe, Australia
- Knight, Aurore Marie Simone**
Dubai, United Arab Emirates
- Lam, Chi Keung Elvis**
Kowloon, Hong Kong
- Lee, Ka Ki**
Tseung Kwan O, Hong Kong

- Leung, Chi Ho**
Hung Hom, Hong Kong
- Livingstone, Stuart**
Adelaide, Australia
- Lo Ka Kit, Tsuen**
Wan, Hong Kong
- Locke, Darrell Richard**
Tonbridge, UK
- Maga, Grazyna Anna**
Sydney, Australia
- Mak, Man Kin**
Kowloon, Hong Kong
- Mansel-Thomas, Laura**
Colchester, UK
- Mulvey, John**
Brisbane, Australia
- Murphy, Gavin**
Auckland, New Zealand
- Ngan, Ho Yan Vicky**
Western, Hong Kong

- Poli, Ruggero**
Rome, Italy
- Pong, Chi Hung**
Kowloon, Hong Kong
- Tang, Ming Fai**
New Territories, Hong Kong
- Tang, Ho Lun**
Aberdeen, Hong Kong
- Whitley, Daniel**
Dubai, United Arab Emirates
- Wong, Chun Ying**
Quarry Bay, Hong Kong
- Yeung, Kam Chung**
Shaueiwan, Hong Kong

ASSOCIATES

- Hawkins, David**
Reading, UK
- Mohammed, Taufiq Ahmed**
Doha, Qatar

LICENTIATES

- Atkins, Leon**
Darlington, UK

- Baker, Kevin**
Haverhill, UK
- Bhardwaj, Vikram**
Bracknell, UK
- Bradshaw, Adrian Stephen**
Bristol, UK
- Harilal, Grisha**
Northampton, UK
- Hodges, Stuart Arthur Phillip**
Birmingham, UK
- Mallender, Robert**
Chesterfield, UK
- Mallett, Tom James**
Birmingham, UK
- Nicholson, John**
PO Box 120397, United Arab Emirates
- Richardson, Gareth**
Morley, UK
- Warsop, Alex**
Croydon, UK

Bosch inside. Efficiency that works.



District heating networks, served by a centralised heating plant, are the ideal solution for providing multi-residential buildings with energy-efficient heating and hot water systems. Bosch Commercial and Industrial Heating offers a complete system solution for any district heating requirement with outputs from 50kW to 38,000kW.



BOSCH

Invented for life

Bosch's extensive product portfolio includes:

- ▶ High-efficiency commercial and industrial gas- or oil-fired boilers
- ▶ Combined heat and power (CHP) modules with outputs ranging from 12kWe to 400kWe
- ▶ Heat interface units (HIU) for enhanced control in each property or area
- ▶ Compact multi-water heater cascade systems up to 600kW
- ▶ Gas absorption heat pumps and solar thermal panels.

For more information please call 0330 123 3004 or visit www.bosch-industrial.co.uk

@ Feedback

This month, Journal readers react to our football-themed article and the advantages of CHP

Yellow card

My attention was recently drawn to your journal [*Hotel and Leisure* supplement], and its October 2014 cover page, 'Chelsea install league's first LED lighting'. Whoever did your research for this article has got it completely wrong. The first club to install and use LED lighting – not just in the Premier League, but throughout Europe – was little old Southampton FC. You might have heard of them as they currently sit second to Chelsea in the Premier League [at time of writing]. How can a journal for the Chartered Institute of Building Services Engineers get such a simple fact wrong? Do you not think you should have checked to ensure the sole fact of this front page, and it's relevant inside article, were correct?
A simple Southampton FC fan

Over the line

I would like to bring to your attention the inaccurate piece in your magazine recently. It stated that Chelsea FC is the first club in the league to install LED floodlights, when, in fact, it was Southampton FC.
Dan Tibot

Note from the editor:

Looks like we scored an own goal on the cover of our *Hotel and Leisure* special. While correct in saying that Chelsea FC was the first to play under their new LED floodlights, Philips has confirmed that Southampton FC was the first club to install LED floodlights.

Heating up savings

Your readers may be interested in our proposals – demonstrated in our CHP project for 423 flats for the Roupell Park Estate, in Lambeth – to retrofit the UK domestic sector's gas boilers, and their radiators, to heat networks with 20,000 500kW condensing CHPs at local 11kV to 415V transformers.



GINES ROMERO / SHUTTERSTOCK

We propose the pressure-controlled heat networks that were used in Odense, Denmark, where consumers enjoy low-cost heat with the water that circulates from district heating condensers – the same water being circulated through the original emitters in the end users' heating systems, without the need for intermediate pressure-reducing heat exchangers. By maintaining low return temperatures, more energy is extracted from the fuel by condensing flue gases – and there may be capital savings, from installing return piping without insulation, which can improve the overall economics of heat networks.

Fitting return-temperature limiters to all domestic heat processes allows consumers to meet design conditions, or to deliver return water at a lower temperature, while minimising the flow they take from the system. This will save money through a volume-based tariff charged on an Exergy basis. The product delivered to the consumer is water at a flow temperature, with heat energy potential that is a function of its return temperature.

The Heat Networks Code of Practice is a great step forward and all involved have my congratulations.
William Orchard FCIBSE
See full explanation and diagrams at •••••

I am a BIM advocate, but a pukka BIM project with M&E will cost 20% more to deliver, not less

The CIBSE LinkedIn group discusses whether BIM really will reduce costs by 20%

Janet T Beckett

So the government thinks by waving its magic BIM wand it can change in four years what this industry has resisted for 30 years (or more) – AND reduce costs? I am a BIM advocate, but delivering a pukka BIM project with M&E will cost around 20% more to deliver, not less. The cost benefits could come later, but that's the tricky bit, as anyone who works in construction will tell you.

Tersam Lal

No way, BIM always costs more for the contractor, consultant and client. But it's peace of mind for those who cannot visualise.

Colm O hAonghusa

Unless people have the rigorous systems in place to track the full life-cycle costs, then the 20% saving won't be measurable.

Rob Walston

I think people are confusing the cost of implementing BIM with the savings it could generate. The government is looking down the road at the reduced waste in construction, the reduced 'double-designing' at every step, the reduced risk, and better cost certainty (over-running projects and costs spiral out of control very quickly).

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.

WARMER WINTERS
Perfect
COOLER SUMMERS

The NEW highly efficient...

KXZ

The new KXZ VRF system delivers high performance cooling and heating for all commercial applications with a compact system offering the highest level of design flexibility.

Also with **Variable Temperature and Capacity Control** technology **VTCC**, the new KXZ can also increase energy savings of up to **34%*** offering one of the best efficiency ratings in the market.

mitsubishikxz.eu



 **MITSUBISHI**
HEAVY INDUSTRIES, LTD.

Our Technologies, Your Tomorrow

*34% energy savings are based on comparison with a KXZ standard model with VTCC vs. a KXZ standard model both under partial load condition.

CIRCULAR POLICY



Our guide to regulations in this month's Products Special summarises UK policies affecting building services – but there are also several EU-led initiatives on the horizon that are worth looking out for. **Hywel Davies** peers through the regulatory telescope

Readers will be familiar with the Energy Performance of Buildings Directive, the Ecodesign Framework Directive – plus its various offshoots – and the F-Gas Regulation. Manufacturers, at least, will also know about the Construction Products Regulations. Then there is the Energy Efficiency Directive, the Renewables Directive, and directives covering lifts, gas appliances, pressure vessels, machinery, and low-voltage equipment.

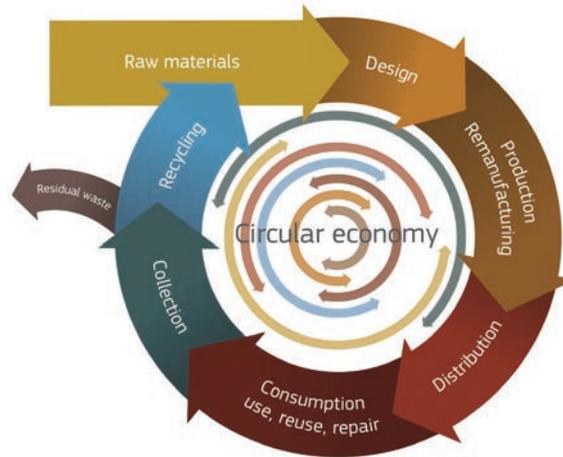
All these have emerged from Europe in recent years, and seek to harmonise product standards to remove technical barriers to trade, or to introduce EU-wide policy on energy and climate change. So what is currently being developed that may affect the building services sector?

The first item to note is the recent European Commission (EC) communication *Towards a circular economy: A zero-waste programme for Europe*. This supports the *Europe 2020: Strategy for smart, sustainable and inclusive growth*, which seeks to address the pressures on resources, and the environmental concerns that have been identified as key long-term trends affecting growth in the EU.

It also supports the thematic objective of the 7th EU Environment Action Programme, which aims to turn the European Union into a resource-efficient, competitive, low-carbon economy. As part of the 'enabling framework' for this programme, there is a resource-efficiency road map, which sets out what the EU aims to do over the next few years. There is quite a to-do list, including:

- The Green Employment Initiative
- A Green Action Plan for SMEs
- Progress report on the Road Map to Resource Efficiency.

A specific waste-reduction plan includes measures to: define waste targets for



Representation of a circular economy, in which the aim is zero waste

As well as energy security, we need to think about material security.

a 'recycling society'; boost recycling of domestic waste; 'further promote the development of markets for high-quality, secondary raw materials'; and clarify the calculation method for recycled materials.

There is a discussion about simplifying aspects of the Waste Framework Directive – particularly in relation to SMEs and small quantities of waste – but also the suggestion of annual reporting of waste data, and benchmarking national methodologies for measuring waste.

In addition, a proposal to tackle construction and demolition waste by encouraging recycling will be achieved by including a requirement in 'a framework for the assessment of the environmental performance of buildings'. We don't know what this entails yet, but a further round of regulatory requirements for our sector looks likely.

There is also a suggestion of EU action to promote the recycling of critical raw materials, defined as those whose 'production is concentrated in few countries'. It is not spelled out, but the issue here is the preponderance of

rare earths – those scarce elements that make many modern gadgets, such as smartphones, tablets, PCs, and electrical appliances work – in China.

Just as we are increasingly at risk of being held over a barrel for our energy supplies – or put in a difficult negotiating position over gas – so we run the risk of China controlling the vast majority of rare-earth raw materials. As well as energy security, we need to think about material security.

To address this, the EC promotes efficient use and recycling of critical raw materials in the Raw Materials Initiative. It has set up a European Innovation Partnership on Raw Materials.

In summary, resource efficiency will be of increasing importance. For CIBSE members wanting to know more, help is at hand. The latest addition to the Knowledge Portal is *CIBSE TM56 Resource Efficiency of Building Services*, which covers all of these issues. It also gives guidance on how to increase resource efficiency in projects – and, in many cases, how to save other project resources, too.

It is available to members through the Knowledge Portal – www.cibse.org/knowledge – as a benefit of membership. For those who want to be prepared for some of the things that will, undoubtedly, result from the EU activity described here, this is an ideal place to start. For those who have not yet registered to use the portal, this is the ideal reason to start making use of this online resource, and to access the accumulated knowledge of CIBSE.

Non-members can also obtain TM56 from the Knowledge Portal at www.cibse.org/knowledgeportal. The PDF version costs £50.50 and the book £55.00.

● **HYWEL DAVIES** is technical director at CIBSE www.cibse.org

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**TM 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
t @cmdltd
in company/cmd-ltd



BREEAM FOR HEALTHCARE NEEDS SERIOUS ATTENTION



Only 15% of NHS buildings receive BREEAM certification. Mott MacDonald's **Gordon Hudson** MCIBSE says the rating assessment tool does not take account of healthcare's specific design issues

In 2008, the Department of Health embedded BREEAM into the design process for healthcare buildings. The aspiration to improve the sustainability and performance of NHS buildings has been, and still is, admirable. However, research by myself, John Holmes and Graham Capper – both from the School of the Built Environment, at Northumbria University – shows that it isn't working.

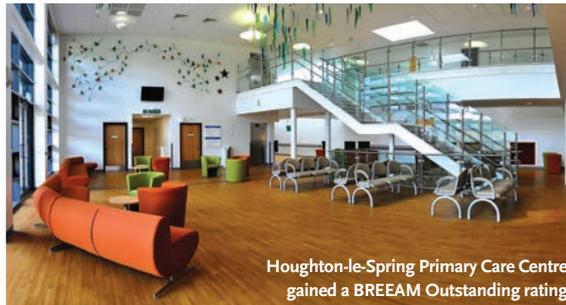
The research revealed that only 15% of NHS buildings had achieved BREEAM certification. Is it time to change the way we assess healthcare buildings and, thereby, encourage and recognise greater sustainable design?

Of the 110 NHS buildings that were BREEAM certified, 52% received an Excellent rating and 37% a Very Good. However, consider how many UK office developments have received an Outstanding rating – 19. Houghton-le-Spring Primary Care Centre is still the only healthcare building to achieve this.

As its designer, we at Mott MacDonald are very proud of this – but the achievement draws attention to practices on projects. While design and delivery teams sign up to the BREEAM approach, our research suggests that most work to the standards, and not to surpass them. The certified projects have crept over the 55 or 70 hurdles for Very Good and Excellent.

BREEAM replaced the healthcare-specific NHS Environmental Assessment Tool (Neat), which was used to benchmark existing premises and to improve the environmental sustainability of new designs.

Neat included credits for specific healthcare issues/considerations – such as stakeholder consultations and access to services, and management of clinical waste. It also included many of the same criteria as BREEAM: management, transport, materials,

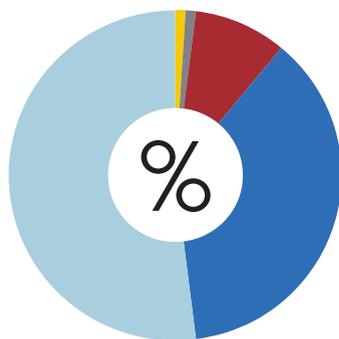


Houghton-le-Spring Primary Care Centre gained a BREEAM Outstanding rating

Registrations and certifications¹

Item	Registered	Certified	%
England	616	101	16
Wales	66	6	9
Scotland	45	3	7
Ireland & Northern Ireland	10	0	0
UK	737	110	15

The BREEAM for Healthcare¹ 2008 figures from the BRE indicate that, in the period up to 9 February 2012, there were 737 NHS buildings registered across the UK and Ireland. However, only 15% of these (110) were certified. The breakdown by region is as shown above.



■ Outstanding 1% ■ Pass 1% ■ Good 9%
■ Very Good 37% ■ Excellent 52%

The breakdown, by BREEAM ratings, of the 119 projects is shown above

energy, land use and ecology, pollution, internal environment, and water.

Neat was self-assessed rather than independently audited, and one of the reasons for moving to BREEAM certification was the desire for commonality across building sectors.

The sector-specific BREEAM healthcare credits, introduced in 2008, were not mandatory, and not universally used. They were revised in favour of a generic assessment criteria used across all building sectors in 2011. There are relics of the healthcare criteria in 2011 BREEAM, but they lack the muscle needed – the 'arts' section was the only 'distinguishing' feature of healthcare left.

With no healthcare-specific hoops to jump through, designers have designed to standards that only partially apply – healthcare is, in fact, a field with very particular requirements and constraints. Credits for daylighting levels, views out, and natural ventilation are not routinely achieved. Scope for 'Excellent' scores is limited to energy performance, rather than other innovative design features.

In a sector with notoriously tight budgets, going beyond the minimum to obtain points when they will not contribute to improved patient care is understandably a low priority. But it might also be that BREEAM has made design of buildings too prescriptive, stifling creativity and innovation.

Assessment methods intended to promote sustainable buildings need to liberate and reward project teams to design facilities that are not only energy efficient and well connected, but also provide the best environment for patients and staff. Owners should be liberated to take a more active role in deciding which aspects of the design should be prioritised. We should be seeking to invite innovations that have the potential to transform healthcare provision. The box-ticking scenario to get something 'over the line' is not the best way to create the change we need.

In a sector with tight budgets, going beyond the minimum to obtain points when they will not contribute to improved patient care is a low priority

References

¹ BREEAM for Healthcare, School of the Built and Natural Environment, Northumbria University, Newcastle upon Tyne, <http://bit.ly/1CVW18r>

● **GORDON HUDSON** CEng MCIBSE is a divisional director at Mott MacDonald

**When testing we never
overlook the small things.**

**Or the very small things
for that matter.**



When it comes to quality control, no one is more testing than Vaillant Commercial.

Take this capacitor. First it is tested for imperfections. Once it has passed we then test the module it is used in, but only after checking the testing tools themselves. Then when it is fitted into the boiler we test it again for 100% functionality. Some would call the whole process a test of patience. We call it standard practice.

To find out why our commercial heating products and services always pass the test call 0845 602 2922 or visit vaillantcommercial.co.uk

LIFECYCLE PLANNING – THE CRYSTAL BALL

How do you balance the risk of failure and the cost of replacing equipment? This is the task for industry professionals who manage capital investment and lifecycle budgets, says **Will Borthen**

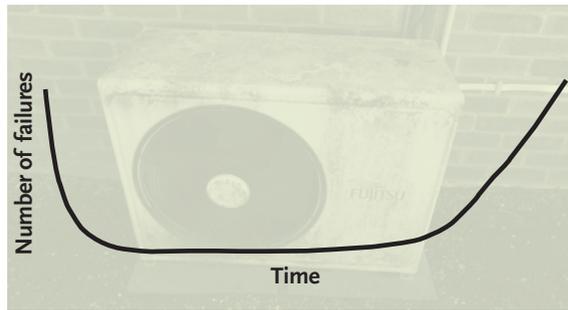
Nothing lasts forever, and all M&E plant and equipment will need to be replaced at some point. However, predicting when something will need replacing is often easier said than done.

Average life expectancies for various elements of plant are available in CIBSE Guide M, but these don't really take into account the wide variety of building use, or the local environment. A lift in a busy hotel, for example, will suffer a great deal more wear and tear than a similar lift in a semi-occupied residential block.

Likewise, a heavily used chiller on the roof of a building by the sea will endure more environmental impact than a similar one hundreds of miles inland. So, if frequency of use and the conditions in which the plant is working have such a bearing on its life expectancy, how can we accurately predict when it will need replacing?

The honest answer is we can't – but we can make an assumption about the impact of use and environment on the lifecycle of an asset.

The standard model for representing equipment failure over time is the bathtub curve (see diagram), where a high percentage of breakdowns are likely in the early stages of an asset's life, followed by a steady period with



The bathtub curve: the standard model for representing equipment failure over time



The life of an asset may only be as long as the next failure if a spare part cannot be obtained

none. Then – as the asset reaches the end of its life – failures increase and become more frequent.

Problems in the early stages are generally identified in the factory, as part of the pre-distribution testing process. A manufacturer's warranty should also cover any premature faults. Therefore, we only need to worry about those arising near the end of a product's life. Should the asset be replaced before the line starts its upward trend? Or should you wait until the line is at the far right of the graph to ensure the asset is definitely at the end of its life?

This is a decision that has to be made by all stakeholders. A balance has to be struck between the cost of replacing an asset, and the cost of failures. For some organisations, the

cost of a new boiler, lift or chiller is far less than the costs associated with an item of plant breaking down. The cost of plant failure can mean the loss of sales revenue, manufacturing time, reputation, or financial penalties imposed by clients. Once the impacts have been calculated, the ideal balance of asset risk and longevity can be used to inform lifecycle planning decisions.

Identifying the number and frequency of failures allows us to say, approximately, where the equipment is on the curve. Most firms managing large buildings use a helpdesk to log reactive maintenance calls, so data is available and accessible. However, identifying the reason for a breakdown might easily be lost because limited information is recorded. Speaking to maintenance staff or reviewing engineers' notes are the best ways to understand the pattern of failures, but – with national or global property estates – that can be difficult.

Clearly, how plant and equipment is looked after has a large bearing on performance, and can extend its life significantly if conducted to a high standard. However, the reality of maintenance costs means it is often cheaper to replace an asset than to repair it, so the incentive for full-maintenance regimes is less of a



The local environment can have a bearing on plant life expectancy



priority for many organisations. Cost pressures on outsourcing contracts can often mean less skilled engineers are employed, leading to a reduced quality of maintenance. For these reasons, it is important that the right investment is made in maintenance, and a good management structure is in place to ensure planned preventative maintenance is carried out to the correct standards and frequencies.

Changes in government policy – such as ozone-depleting substances regulations and the European Energy-related Products (ErP) Directive – can also have a significant effect on lifecycle budgeting, especially when changes in technology mean older equipment becomes obsolete and can no longer be maintained effectively.

The availability of spares is a key part of lifecycle planning, because the life of the asset may only be as long as the next failure if a spare part cannot be obtained. Constant dialogue with manufacturers is necessary to ensure you know when spares become scarce.

To predict the life of an asset, we must first take the benchmark life expectancy, from internal data or from CIBSE. This value can then be increased or reduced to account for variables such as use, environment, and the level of maintenance. Information can be gathered to plot where an asset lies on the bathtub curve, then – according to strategy plans and finances – a replacement can be arranged.

Telereal Trillium's specialist in-house fabric and M&E surveyors look at the condition of its buildings and plant each year, to collect data about recent failures, and check their condition, use and environment – then they adjust the lifecycle plan accordingly.

This ensures the most accurate financial forecasting, minimal reactive replacements of equipment, and optimal operational effectiveness.

● **WILL BORTHEN** is lead capital investment manager at Telereal Trillium

SLAVE TO THE MACHINE



Engineers fall in love with new technology, but is that always a good thing, asks David Fitzpatrick

There is a delicious irony about a group of young engineers ringing alarm bells about the potential dangers of computer technology.

The latest crop of impressive young professionals took to the stage at the CIBSE ASHRAE Graduate of the Year awards last month, to compete for first prize of a trip to the ASHRAE Conference in Chicago.

It is always a pleasure to hear what the current cream of our young engineering talent has to say, and my own company – Ruskin Air Management – is delighted to be a sponsor of this important annual awards scheme.

This year, the finalists were challenged to cover the topic: 'How is technology transforming the way we, as engineers, work?'

Mostly in their early 20s, they are from a generation that is regularly accused of being fixated on computer games and social networks, at the expense of more 'human' ways of communicating and interacting.

Yet, almost without exception, each of the eight finalists highlighted the inherent dangers in engineers relying too heavily on computer-aided design tools.

The growth of 3D modelling; BIM and global IT networks has, undoubtedly, transformed our ability to design and demonstrate ideas to clients.

In theory, it is also helping us to eliminate waste, and improve quality in the project delivery process. Yet, the young engineers

– while acknowledging the benefits – were quick to point out that any tool is only as good as the person wielding it.

They were clearly concerned that the generation following them could end up as little more than information cyphers, with only the most flimsy appreciation of the fundamental physics and engineering skills that underpin building services.

All the finalists paid tribute to the founding principles of our industry – and most urged companies to continue investing in the practical, site-based skills

that will always be needed to interpret designs and turn virtual reality into... well, reality.

Architects have always had the jump on building services engineers, because they have a much more

The finalists were quick to point out that any tool is only as good as the person wielding it

visual product to sell. We can now compete with them, thanks to our new visualisation tools – but, at the end of the day, a model is just a model, and it is just one step in the process of producing a working, sustainable building.

Ruskin Air Management is a market leader in air distribution, and fire and smoke control. It combines the Actionair, Air Diffusion and Naco brands. The companies work together to provide complete HVAC solutions for the built environment.





THE PERSUADERS

The Energy Saving Opportunities Scheme requires large organisations to energy audit their buildings, transportation and industrial activities – but will it convince firms to actually invest in energy-saving measures? **Alex Smith** reports



CIBSE TRAINING DAYS

CIBSE low carbon consultants can register to be an ESOS Lead Assessor by taking part in a one-day course about the scheme. Training is available on the following days, and registration should take place two days after attending the programme.

11 December, Manchester

19 January, London

9 February, Leeds

www.cibse.org/training-events

Industry is gearing up for the Energy Saving Opportunities Scheme (ESOS), which comes into force in 2015. The government has updated details of the scheme, and announced the approved list of Lead Assessor registers. These include CIBSE, which now has a register of approved professionals who can carry out ESOS assessments.

ESOS requires all UK organisations to undertake an energy audit, to find out how they can cut energy use from their business. According to the government, the scheme will identify thousands of energy-saving initiatives in buildings, industrial activities, and transportation, which could save organisations more than £31bn between 2015 and 2030. However, that's only if all the recommendations in the ESOS reports are carried out. A more realistic figure, the

government says, would be around £1.9bn, with only 6% of the potential energy-saving opportunities actually being implemented.

To comply with Article 8 of the EU Energy Efficiency Directive, the government has made ESOS audits mandatory for large UK companies and not-for-profit organisations (see panel 'What is ESOS?') – but there is no legal obligation for businesses to carry out the assessor's recommendations.

The challenge for government, and for those making the recommendations, is to make the energy assessments compelling enough for businesses to act on them.

However, Ant Wilson, director at Aecom, fears financial chiefs will keep their hands in their pockets. 'A lot of businesses that believe cash is king will keep it in the bank for a rainy day. The problem is that ESOS is not a 'have to do it.' I'm a fan of whole-life costing, but often the market doesn't do what you want it to do.'

Matt Fulford, director at Inspired Efficiency, believes that clients' actions will depend on the standard of the audit. 'Clients will respond when there has been a really good audit conducted, and the auditor has the



skills to present and communicate their recommendations in an engaging way.'

Professor Andrew Geens, head of CIBSE Certification, says organisations entering this process with the intention of acting on recommendations with a sound economic case, will get far more out of the exercise than simply legal compliance. The money saved by acting should, in most cases, cover the cost of compliance.

The role of the CIBSE Lead Assessors, Geens adds, is to make this compelling case so that organisations get the most out of the legislation. 'CIBSE Low Carbon Consultants have the skills to audit,' he says. 'They have the knowledge to understand the performance of the buildings, and identify energy-saving opportunities.' It's not just about recommending the replacement of inefficient boilers, but coming up with the right solution for that particular building, he adds.

To ensure a good audit, Fulford says clients 'should look for proposals that include a good level of on-site visits, and question the time that auditors will spend on site. They should seek assessors that demonstrate a willingness

to understand their operations thoroughly, as opposed to those that apply computer models to come up with generic answers'.

Geens agrees that the assessor must first establish what the client wants from the audit, and sees a particular opportunity where firms are planning to refurbish buildings anyway.

Richard Whitaker, divisional director of energy and sustainability at Hurleypalmerflatt, agrees: 'If you are undertaking any form of refurbishment, it would be pertinent to use the report, because it offers bespoke solutions for energy efficiency, and every initiative has a business case built against it over its life-cycle.'

The business case is an important element of ESOS, and is intended to persuade chief financial officers that it's appropriate to invest. To comply with ESOS fully, the report has to be seen by a board member of the organisation being audited. 'It's a lot more valuable than a Display Energy Certificate,' says Whitaker (see panel, 'Routes to compliance').

Geens claims the monetary values will have more impact than the description of the technologies. ESOS requires assessors to spell out the payback period, costs, and savings for each initiative – including cost of purchase, installation, maintenance and depreciation.

'It's really important to make the recommendations financially specific to that business,' he says. 'What ESOS is requiring has already been done for those concerned with their energy bills – it's nothing new.'

However, Geens believe ESOS is an opportunity for engineers and organisations to really get to grips with a building's performance. 'Using ESOS gives you the flexibility to cut energy in different ways,' he says. 'There is more than one answer.'

www.cibseenergycentre.co.uk **CJ**



WHICH ROUTE TO COMPLIANCE?

Organisations can comply using a number of methods: Display Energy Certificates (DECs), ISO150001, Green Deal Assessments (GDA) or an ESOS-compliant audit, in which assessors have to follow government guidelines in the ESOS documentation.

The route to compliance will not be the same for all organisations. Those that already have ISO150001 are covered for ESOS, but those that don't are unlikely to use it to prove compliance, because it is expensive and goes beyond what is required.

The small number of commercial GDAs that are carried out means this method can be largely discounted, but DECs could offer a route to compliance for some companies. The issue with DECs, says Andrew Geens, is that you would have to assess every building, which – if you had hundreds – could be prohibitive.

The guidance says it's not necessary to visit every site for an ESOS assessment, only to cover at least their areas of significant energy consumption. The Lead Assessor can work with organisations to determine a suitable sample of assets and activities to examine and visit.

Geens says an assessor might pick the worst 15 buildings, so the easy wins can be identified. If the organisation carried out the recommendations in the report, the assessor could select the next 15 worse-performing buildings for the next phase.



What is Esos?

The Energy Savings Opportunity Scheme (ESOS) is a mandatory energy-assessment scheme for UK companies with: 250 employees; or a turnover of more than €50m; or an annual balance sheet total of €43m.

The government established ESOS to implement Article 8 (4-6) of the EU Energy Efficiency Directive, which applies to businesses and not-for-profit organisations.

Eligible organisations must carry out audits of the energy used by their buildings, industrial processes and transportation, and these reports must identify cost-effective energy-saving measures. To comply with the legislation, organisations must:

1 Measure total energy consumption across

buildings, transport and industrial activities

- 2 Ensure that at least 90% of total energy consumption is subject to either an ESOS-compliant energy audit, a Display Energy Certificate, a Green Deal Assessment, a certified ISO150001 energy-management system, or a mix of all four
- 3 A Lead Assessor must be appointed to carry out and review the energy audits. They may be internal or external, but must be on one of the 13 approved registers
- 4 Notify the Environment Agency that they have undertaken an ESOS assessment. This must be done by 5 December 2015, and then every four years
- 5 Keep records of how they have complied.

LIGHTING UP THE AWARDS

The spotlight was trained on the new categories in the Building Performance Awards 2015. **Liza Young** listened in as the judges pored over the shortlists



Mott MacDonald's energy-efficient lighting at the London School of Economics



Cundall Birmingham's light installation at its head office



Hoare Lea's lighting at its HQ in the Western Transit Shed, King's Cross



CIBSE BUILDING PERFORMANCE AWARDS 2015

Join the best of the industry's talent on awards night to see who will scoop the accolades. The glittering event – on 10 February, at London's Grosvenor House hotel – will celebrate achievements across the built environment supply chain. Don't miss your chance to be there. To book a table, visit www.cibse.org/bpa

Headline sponsor



Entries for the new category of lighting in the Building Performance Awards 2015 dazzled a panel of expert judges in London last month.

The judges said they were delighted to receive so many 'inventive' entries, which would set an example for other buildings to follow.

With so many strong projects – displaying evidence of post-occupancy evaluations and recyclability – Hywel Davies, who chaired the judges, said any of the projects that had been shortlisted would be worthy of winning the lighting category.

Liz Peck, Society of Light and Lighting president elect, visited all the shortlisted entries to assess building impression, as well as energy performance. 'When it comes to lighting, building performance is about people in the space.'

Head of facilities management and Plan A at M&S, Munish Datta, supported looking at performance not just in terms of energy, but also user satisfaction.'

The judges found the entries for New Build Project of the Year (up to £10m)

difficult to split. They were impressed that so many educational establishments featured among the entries.

Overall, submissions for International Project of the Year were well received by the panel. Davies said: 'We saw some genuinely innovative applications, supported by strong, ongoing collaboration, and very thorough monitoring of the performance of a number of the entries.' As CIBSE recently elected its first overseas president – Australia-based Peter Kinsella – it is perhaps only fitting that the judges shortlisted three entries from Australasia.

The New Build Project of the Year (over £10m) category sparked an animated debate among the judges.

Sarah Cary, British Land sustainable developments executive, said: 'Overall, the standard of entries was very high – all the projects demonstrated a commitment to building performance from the outset.'

'What sets these awards apart is that they are focussed very firmly on assessing how buildings perform,' said Davies.

Datta added: 'The projects that set up a target very early on – and stated it at the



Façade lighting, installed by Arup, on Belfast's City Hall



Sainsbury's Project Graphite LED lighting programme

right time – did well. Those that failed to state a target didn't get high marks because I couldn't understand what they were designing to.'

George Adams, CIBSE immediate past president, said that entries with a strong focus on user experience were highly marked: 'We are about making buildings great for people, so evidence of user satisfaction is key.'

The Refurbishment Project of the Year (over £5m) category had a clear winner from the off. Davies said: 'People that did well not only showed evidence of their design choices, but also set out the challenges, and how they are overcoming them.'

'Generally, those who prepared the entries we shortlisted rose head and shoulders above the rest. They provided factual data, not assumed data, which is what the awards are all about.'

Both Building Services Consultancy of the Year categories, (over and up to 100 employees) provoked lively discussions.

Again, judges were most impressed with entries that showed clear evidence of



Max Fordham's Tate Britain Millbank project

user satisfaction with their services. Susie Diamond, founding partner at Inking, said: 'Unlike other categories, this one is more subjective, and depends on how thoroughly – and how well – the entrants write their answers.'

The industry experts said they were most impressed with entries that had strong client testimonials, and that answered the question about their approach to commissioning thoroughly and effectively.

Several commented on the difficulty of getting effective commissioning in practice. Some entries were good in how they dealt with the conceptual stages, but gave much less information with which to assess their delivery of projects.

The judges were also interested to see the breadth of activity being undertaken to bring new engineers into building services and give them the support and initial professional development to help them establish themselves and gain Chartered status.

At the end of the day, the judges – excluding those who had conflicts of interest in any of the categories – looked at the list of overall winners to judge the Carbon Champion of the Year.

They didn't need to spend long deliberating over this; they picked the entry that they felt really 'showed the way', and that demonstrated what could be done to improve building performance at a time when the world's energy security and capacity are uncertain. **CJ**

● The awards will be presented in London on **10 February 2015**.

Lighting in Wm Morrisons, in Thornbury, by Zumtobel Group (Thorn Lighting)



THE JUDGES

- 

Hywel Davies, CIBSE technical director and chair of judges
- 

George Adams, immediate past president, CIBSE
- 

Sarah Cary, sustainable developments executive, British Land
- 

Munish Datta, head of facilities management and Plan A, M&S
- 

Susie Diamond, founding partner, Inking
- 

Alan Fogarty, partner, Cundall
- 

Bill Gething, Professor of architecture, University of the West of England
- 

Mitch Layng, associate director: portfolio energy management, M&G Real Estate
- 

Liz Peck, president-elect, Society of Light and Lighting
- 

Michelle Perry, key account manager, Trox
- 

Will Pitt, design and development manager, NG Bailey
- 

Geoff Prudence, chair of CIBSE FM Group
- 

Mike Ward, associate BSE, Foster + Partners
- 

David White, managing director, Building Services Design

CIBSE BUILDING PERFORMANCE AWARDS 2015 SHORTLISTS

BUILDING CONTROL SYSTEM AWARD

- Barclays Operational Control Centre (BOCC) – Barclays Bank
- BuildingIQ – BuildingIQ

BUILDING PERFORMANCE TRAINING PROGRAMME AWARD

Sponsored by Vaillant



- Growing Up Green – GEA Consulting
- Data Centre Risk and Energy Reduction Programme and Data Centre Client Requirements Workshops – Operational Intelligence
- Establishing a network of air conditioning training centres across UK – Toshiba Air Conditioning

BUILDING SERVICES CONSULTANCY OF THE YEAR (OVER 100 EMPLOYEES)

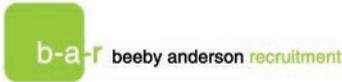
Sponsored by Baxi Commercial



- AECOM
- Atelier Ten
- Atkins
- Hoare Lea

BUILDING SERVICES CONSULTANCY OF THE YEAR (UP TO 100 EMPLOYEES)

Sponsored by Beeby Anderson Recruitment



- BCM (Beverley Clifton Morris)
- CBG Consultants
- Steven A Hunt & Associates

COLLABORATIVE WORKING PARTNERSHIP AWARD

- The team behind Broadcasting House, London – AECOM
- Westborough Academy Zero Carbon Masterplan Refurbishment Project, Westcliff-on-sea – OR Consulting Engineers
- Chiller and Boiler Replacement Project, 1, 4 & 7 Triton Square, London – Regent's Place/Cavendish Engineers

ENERGY MANAGEMENT AWARD

Sponsored by Imtech



- Lilly Research Centre Energy Management Programme, Windlesham – Eli Lilly

- M&G Real Estate Shopping Centre Portfolio – M&G Real Estate

ENERGY SAVING PRODUCT OF THE YEAR

Sponsored by Spirotech



- TurboChill and TurboChill FreeCool Chiller (200-1360kW) with low global warming potential refrigerant R1234ze – Airedale International Air Conditioning
- Demand Logic building energy analysis platform – Demand Logic
- Kooltherm FM Pipe Insulation – Kingspan Tarec Industrial Insulation
- Q-bot Underfloor Insulation – Q-bot
- The Radical radiator – Stelrad Radiators
- EKF Kitchen Box Fan – Vent-Axia

FACILITIES MANAGEMENT OPERATIONS AWARD

Sponsored by Gratte Brothers



- Broadgate Estates London Office Portfolio – Broadgate Estates
- MediaCityUK, 'Low Carbon Productions', Manchester – Peel Media/COFELY GDF Suez
- International Commerce Centre (ICC), Hong Kong – Kai Shing Management Services, Hong Kong

INTERNATIONAL PROJECT OF THE YEAR

- St Louis Art Museum – East Extension, Missouri, USA – Arup
- Christchurch Airport Artesian Heating and Cooling, Christchurch, New Zealand – Beca
- Sheraton Mirage Resort and Spa, Gold Coast, Australia – Climaveneta Spa
- 140W, Melbourne, Australia – Cundall

LIGHTING FOR BUILDING PERFORMANCE AWARD

- Belfast City Hall façade lighting, Belfast – Arup
- Cundall Birmingham – Cundall Light4
- Hoare Lea's head office, Western Transit Shed, King's Cross, London – Hoare Lea Lighting
- Tate Britain Millbank Project, London – Max Fordham
- London School of Economics energy efficient lighting scheme, London – Mott MacDonald
- Sainsbury's Project Graphite, LED lighting programme – Sainsbury's Supermarkets
- Wm Morrisons, Thornbury, Bradford – Zumtobel Group (Thorn Lighting)

NEW BUILD PROJECT OF THE YEAR (VALUE OVER £10 MILLION)

Sponsored by Daikin



- BBC Broadcasting House, London – AECOM
- Orchard Hotel, Nottingham University, Nottingham – Elementa Consulting
- The Quadrant:MK, Milton Keynes – URS

NEW BUILD PROJECT OF THE YEAR (VALUE UP TO £10 MILLION)

- Energy Technologies Building, University of Nottingham, Nottingham – AECOM
- Stratford Library, University of East London, London – AECOM
- Cheddar Woods Holiday Park, Somerset – CD International Building Services Engineers
- Brackenhurst New Library, Southwell – Nottingham Trent University
- Schoolhaus at Grasvenor Avenue Infant School, Barnet – UK Energy Partners
- Oakfield Primary School, Rugby – Willmott Dixon Energy Services/Scape Group

REFURBISHMENT PROJECT OF THE YEAR (VALUE OVER £5 MILLION)

- One Embankment Place, London – ChapmanBDSP
- 61 Lincoln's Inn Field, London – Elementa Consulting
- Premier House, Twickenham – Flatt Consulting
- 123 Victoria Street, London – Land Securities
- Ironmonger Row Baths, London – Max Fordham

REFURBISHMENT PROJECT OF THE YEAR (VALUE UP TO £5 MILLION)

- Bowker Street (A Higher Standard of Domestic Refurbishment), Salford – Contour Homes (part of the Symphony Housing Group)
- Westborough Academy Zero Carbon Masterplan Refurbishment Project, Westcliff-on-sea – OR Consulting Engineers

CARBON CHAMPION OF THE YEAR

Sponsored by Remeha Commercial



The Carbon Champion of the Year is chosen from the category winners and will be presented to the team, project or product that, in the opinion of the judges, has made the most outstanding contribution and commitment to achieving improved building performance.



Climate Plus

LED replacement for linear fluorescent

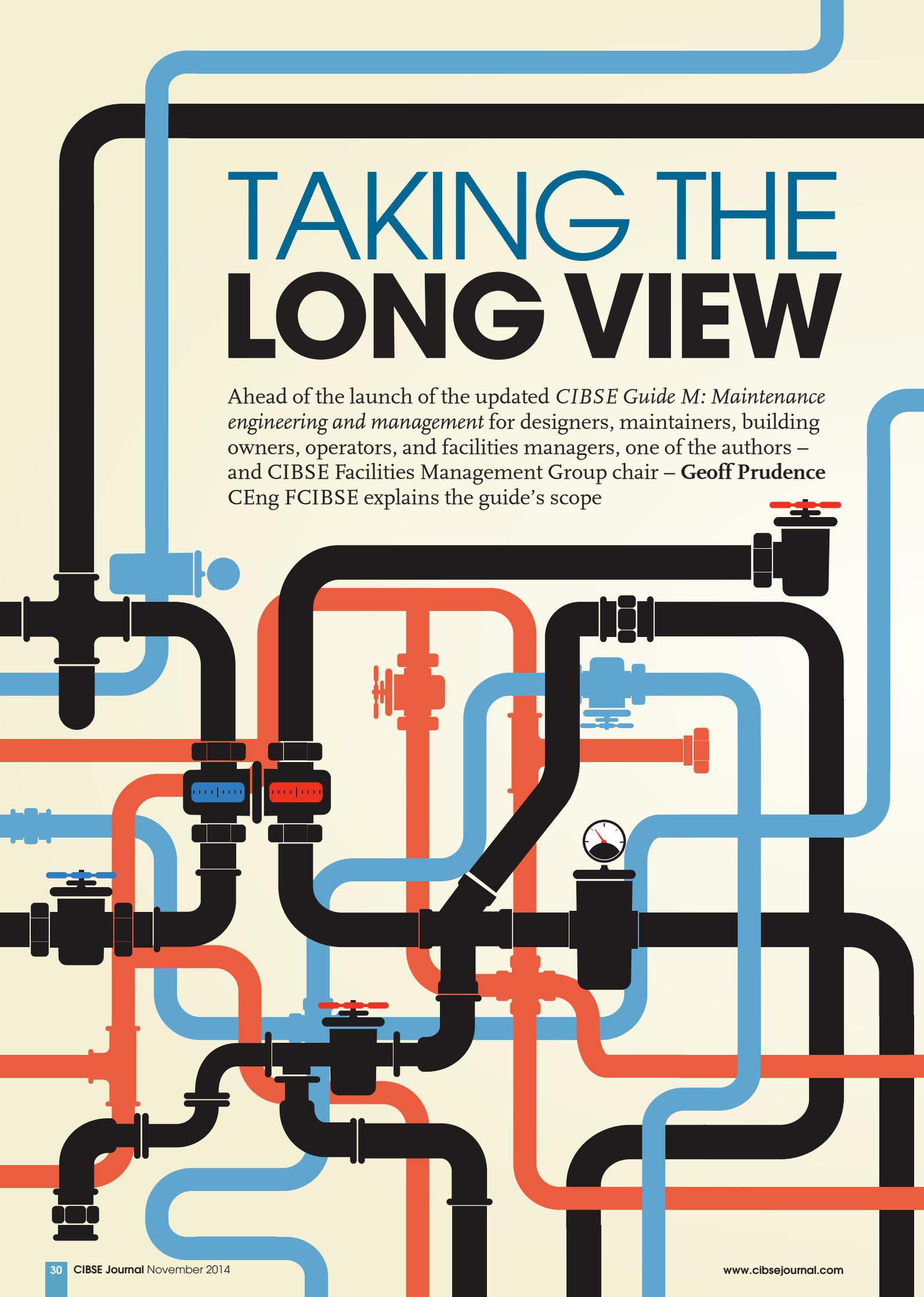
- **Climate Plus** - no maintenance **LED array**
- **50,000 hour lifetime** and **IP65 rated**
- **110 lumens per watt**

- **50% energy & CO² savings** versus fluorescent
- Matches fluorescent appearance

- Polycarbonate body and diffuser with stainless steel anti-tamper clips as standard
- 4ft, 5ft & 6ft, single & twin, emergency, DALI dimmable and corridor function options
- LED tube version also available



For more information contact Luceco on **(01952) 238 100** or visit **www.luceco.uk**



TAKING THE LONG VIEW

Ahead of the launch of the updated *CIBSE Guide M: Maintenance engineering and management* for designers, maintainers, building owners, operators, and facilities managers, one of the authors – and CIBSE Facilities Management Group chair – **Geoff Prudence** CEng FCIBSE explains the guide's scope

Building performance is high on the agenda for organisations that own or operate buildings, and the key to good performance is good management and maintenance.

Guide M is an update, aiming to provide comprehensive information on the management and maintenance of operational buildings. It also aims to inform those who design and construct buildings of the implications their decisions have on effective management and maintenance of services over a building's life.

For the first time, the guide includes an overview of all other relevant documents that are consciously linked to inform best practice.

The update including working in collaboration with the Building Services Research and Information Association (BSRIA), the Building and Engineering Services Association (B&ES) and the Royal Institution of Chartered Surveyors (RICS), to agree a common data structure for the presentation of asset information.

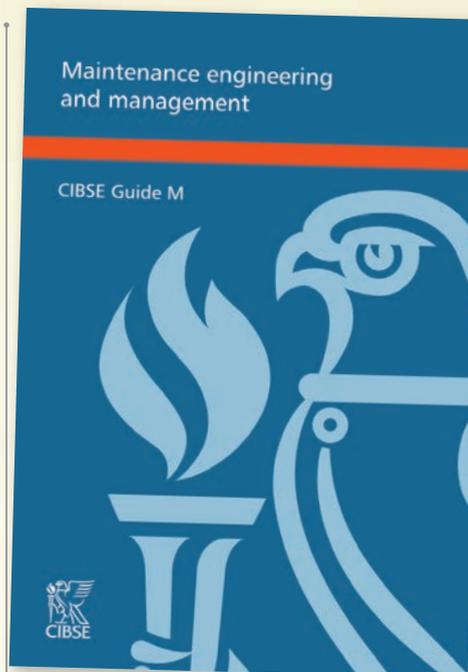
Guide M aims to be the overarching guide, complementing – and aligning with – B&ES's SFG20 and Rics's NRM3 (see panel, page 32). This resulted in the economic life data – structured by system and elements – being numbered to match NRM3, and providing maintenance task references to SFG20.

The new edition also covers UK legislation, aiming to bring it together, and represent it as a subject in its own right. A comprehensive explanation of how to comply with legislation has also been developed, and will be available to download from the CIBSE Knowledge Portal as a benefit of membership.

The guide's chapters are summarised below:

Chapter 2 provides an insight into what should be considered when preparing designs, to ensure that a building services installation can be practically installed and efficiently maintained, and that it will meet the client's written and implied aspirations in the short, medium and long terms.

Chapter 3 gives an overview of operation and maintenance (O&M) strategy, including guidance on setting up a maintenance strategy. It describes techniques that should be implemented, and highlights how decisions



The updated *CIBSE Guide M* will be launched at The Royal Academy of Engineering in London

made during a building's design can impact on the maintenance strategy and the choice of techniques used.

Chapter 4 provides guidance on contracting out maintenance, and discusses the use of standard forms of contracts for procuring maintenance services.

Chapter 5 covers energy-efficiency measures, and introduces renewable energy sources. It emphasises that maintainers are in a strong

position to influence the energy efficiency of a building, and that it should be one of their key duties.

Chapter 6 discusses controls, and their purpose in providing occupants with the ability to regulate their environment and ensuring they understand how the control system operates. Periodic recommissioning is highlighted, along with the benefits of better quality sensors and control equipment.

Chapter 7 is about commissioning, the scope of a commissioning specialist's work, and the commissioning manager's areas of involvement. The need for comprehensive records – and for keeping them updated – is outlined. The chapter includes a designer's checklist for commissioning, plus guidance on decommissioning and mothballing.

Chapter 8 covers handover procedures. It introduces the activities relevant at handover, provides a typical checklist, and gives guidance on defect liability and equipment warranties. The option of phased handover – and the advantages to the client of beneficial occupation – are briefly described.

Chapter 9 has been updated to reflect developments in capturing and presenting information for O&M manuals. Information storage, retrieval and updates are introduced. Building information modelling (BIM) is also discussed as a development that will impact on traditional O&M.



Backlog maintenance

A key part of the new guide is to encourage 'systems thinking' in the design process and when retrofitting existing stock. This means, for example, considering the operational impact and maintenance requirements for an electrical or cooling system, rather than a component-focused approach at the design stage.

One element of this is backlog maintenance – a term used to describe planned, preventative maintenance tasks that have not been completed to schedule, but are required to bring the condition of a maintainable asset up to an acceptable performance level.

It is unfortunate that planned maintenance

– and, therefore, expenditure – must often be deferred or negated as a result of spending cuts to meet overall operating cost limits, or because of a lack of resources.

It is not uncommon for maintenance activities to be considered non-value adding. With the continuing emphasis on health and safety – and legislation on corporate manslaughter firmly in place – if maintenance has to be deferred or negated, the relevant reasoning and instruction should be documented. This will ensure that there is information available if an issue arises as a consequence of maintenance not being carried out.

Added value – effective maintenance strategies and delivery

CIBSE Guide M Maintenance engineering & management

Design standards
Plan of work
BIM/1192.3/4

SFG 20

BS 8544

NRM 3

'Plan, do, check, act –
build, maintain, renew'

Building operational risk management and compliance

© *Effective maintenance strategies and delivery panel* – Geoff Prudence, Sept 2014

➤ **Chapter 10** discusses risk identification within a business to determine which dangers can affect operability. Assessing risk is important to sustaining corporate responsibility, and to understanding the likelihood of unwelcome events occurring, and their impact (harm or loss) on business. The risks are divided into four categories: health and safety; business; design and installation; operation and maintenance.

Chapter 11 focuses on the financial aspects of owning and operating building services installations. It includes information on cost data and its relevance to managing the maintenance of building services. It also discusses the importance of benchmarking.

Chapter 12 provides guidance on the practical application of predicted economic life expectancy and the variation factors that need to be applied. In the tabulated data in Appendix 12, A1 comprises estimates of the economic service life of components that have been aligned to Rics's new rules of measurement (NRM), and to the B&ES SFG20 planned maintenance task schedules. The sources and derivation of the economic life estimates are detailed, and factors that can influence service life are explained.

Chapter 13 describes a technique for auditing maintenance delivery. Performance is assessed under the headings: management; maintenance; communications; health and safety; technical proficiency; and financial management. A qualitative scoring method is proposed, and a procedure for conducting the audit is outlined.

Chapter 14 covers the application of condition surveys to various types of building services installations, as well as the characteristics of different types of surveys.

The benefits of non-intrusive thermal-imaging techniques are explained, as is the need to ensure a consistent approach to surveying and presenting information.

Chapter 15 is an overview of key UK laws relevant to building services and operational management. It does not claim to be comprehensive, and the duty holder should routinely update themselves on the changes to legislation in their country. Requirements for inspection and testing are also considered. An appendix provides a summary of basic requirements for compliance with legislation in the management of a building.

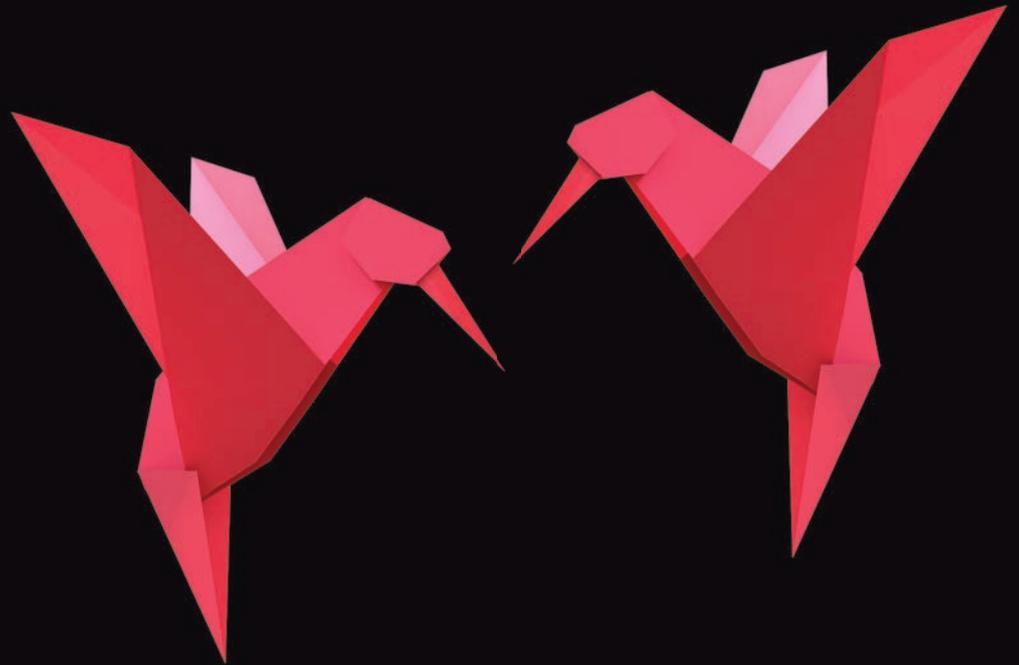
Chapter 16 focuses on health and comfort, and considers the relationship between a building's internal environment and the health, safety and welfare of its occupants, and how engineering services influence these factors. It concentrates on air quality and thermal conditions, but also covers other aspects of occupant comfort.

Chapter 17 discusses the achievement and demonstration of individual and corporate competencies, with the need for a formal training policy. It stresses the importance of ensuring maintenance engineers: keep their skills updated; continue to be aware of health, safety and quality management matters; develop individuals to their maximum potential; and promote participation, ownership and belonging in a job.

After the launch, a feedback process will be set up to showcase clients and organisations already embedding concepts illustrated in *CIBSE Guide M* and other leading best-practice documents.

Guide M will be launched at The Royal Academy of Engineering, London, on 19 November. See www.cibse.org CJ

Engineering excellence, naturally



Our innovative heating and cooling products for home, commercial and industrial applications are skilfully engineered for seasonal efficiency.



Equipped with a range of flexible and energy-saving features – such as our highly reliable screw and scroll compressors, lightweight and modular outdoor units, unique System Free indoor units with ECO motion sensors and anti-bacterial filters – Hitachi has a market-leading heating or cooling solution for every situation. And there's a generous 5-year warranty, naturally.



Building our reputation of quality engineering for over 100 years. Designed for today, engineered for tomorrow.



**Japanese engineering excellence,
naturally.**

To find out more call Hitachi on **01628 585 394**
hitachiaircon.com | hitachiheating.com

*5-year warranty on Set Free and Utopia product ranges.

NEW
Pricing App
hitachiaircon.com/pricing



Back row (from left): Michael Enstone, Emilia Targońska, Kit Stormont, Richard Seaman. Front row: Bryony Turtle, Amelia Ng, James Harker and Charlotte Mercer

BRIGHT YOUNG THINGS

The next generation of young engineers stepped into the spotlight as they went head-to-head to be CIBSE ASHRAE Graduate of the Year. **Liza Young** reports



JUDGING PANEL

- **Tim Dwyer** CIBSE ASHRAE group chair
- **Peter Kinsella** CIBSE President
- **Tom Phoenix** ASHRAE President
- **Mark Hunt** IMechE president
- **William Holley** Graduate of the Year 2013
- **Ellen Salazar** Rumford Club chair

Eight finalists demonstrated their passion for building services when they battled it out for the CIBSE ASHRAE Graduate of the Year title.

The young engineers were judged on their presentation skills while answering the question: How is technology transforming the way we, as engineers, work?

Emilia Targońska, who works for Hoare Lea, took first place at the event, staged last month at the Institution of Mechanical Engineers (IMechE), in Westminster.

In her winning presentation, she recounted how she was inspired to become a building services engineer after watching her father at the drafting table. Her prize is a trip to Chicago in January, to attend the ASHRAE Winter Meeting.

In second spot was Kit Stormont, who studied at the University of Bath and works for Buro Happold in Dubai. He received a cheque for £500 from the Rumford Club.

Aecom's Charlotte Mercer, who graduated from the University of the West of England, was ranked third, and received £250.

Targońska, who first studied at the Warsaw University of Technology in Poland, graduated with distinction after completing a Master's degree in low energy building services engineering at Loughborough University. She joined the London Hoare Lea team in September.

Before this, she worked in Poland with her father on the design of heating, ventilation and air-conditioning systems (HVAC) for various developments. She also completed an internship at the technical department of TA Hydraulics, focusing on pressure control and regulative systems design.

Targońska said watching her father work had sparked her passion for the profession. 'I would watch him for hours as he patiently drew his drawings by hand.'



ASHRAE president Tom Phoenix with winner Emilia Targońska



Runner-up Kit Stormont

'I appreciate how much effort and skill are required to complete even the simplest engineering drawing by hand. It made me realise how much has changed since I was a child, and the huge changes my father has witnessed over his 40-year career as a building services engineer.'

Targońska said one of the biggest changes was evident in the tools that engineers use. In 1968, her father used log tables to do long-hand calculations, and his 2D drawings represented hours spent at the drafting table with pens, pencils, triangles and T-squares.

Forty years on, Targońska uses advanced simulation tools – such as IES software – to create 3D models of buildings to assess their energy consumption and thermal performance with a click of a mouse.

Today, mechanical drawing is virtually obsolete, she said. Using BIM, engineers can create more than just 2D or 3D models. Software now allows them to produce models incorporating all the data that architects, engineers and contractors need to access and update their designs.

Technology has also changed the way engineers collaborate, Targońska said.



Winners, runners-up and full shortlist

Emilia Targońska, winner Loughborough University and Hoare Lea

Targońska completed an environmental engineering BEng course at Warsaw University of Technology, followed by a low energy building services engineering MSc course at Loughborough University.

Her MSc research dissertation was accepted for presentation at the People and Buildings Conference organised by LEARN at London Metropolitan University, and she graduated with distinction. Before starting her MSc, she worked alongside her father, assisting in designing HVAC systems for various developments in Poland.

Targońska joined the Hoare Lea team in London, in September 2014.

Kit Stormont, runner-up University of Bath and Buro Happold

Stormont graduated from the University of Bath in 2012 with a first-class honours degree in mechanical engineering. He joined Buro Happold Engineering as a graduate building services engineer.

He transferred to the Dubai office in 2013 and is now spearheading the use of BIM in the Middle East region, developing the implementation strategy and training colleagues to improve project management and support clients.

Stormont, who is a member of the Buro Happold Young Engineers Forum and CIBSE UAE, is currently carrying out investigative research into natural ventilation in high-rise buildings and its applicability to the Middle East. As a result, he was awarded the CIBSE Ken Dale Travel Bursary.

Charlotte Mercer, third place University of the West of England and Aecom

Mercer graduated from UWE Bristol with a BEng (Hons) degree in environmental engineering and architecture.

At university, she co-founded, and was president of, a branch of the charity organisation Engineers Without Borders. She also sat on the committee for the South West IMechE YEN and co-organised an energy question time for CIBSE and the IMechE. She is a member of the CIBSE YEN London committee, the CIBSE planning committee for next year's technical symposium, and is an ambassador for the Women in Engineering Society. Now a graduate electrical engineer at Aecom, Mercer designs the services for laboratories, research centres, hospitals, data centres, and university buildings.

Michael Enstone Imperial College and Aecom

Enstone is an associate director of Aecom, based in the St Albans office, specialising in low carbon services strategies.

Seven years ago, he started as a graduate engineer with Aecom, which sponsored his Master's degree at Durham University. He worked through Aecom's graduate scheme and became chartered with CIBSE in 2010.

For his part-time MSc in systems engineering at Imperial College, he produced a smartphone app for collecting photogrammetric data to monitor progress and quality on construction sites, graduating with distinction in May 2014.

James Harker London South Bank University and E+M Tecnica

Harker graduated from London South Bank University this year with a BEng (Hons) in building services engineering.

He was an apprentice electrician before studying part-time to become an electrical engineer with E+M Tecnica. Harker made the transition to design in 2009, in Stratford-upon-Avon, and worked on projects, including Westminster Abbey, TFL's Cooling the Tube programme, and the first operational A380 stand at Gatwick Airport.

He has given presentations at various schools, encouraging students to take up a career in the built environment.

Amelia Ng University of Bristol and Arup

Ng studied mechanical engineering at the University of Bristol, achieving a first in eight of nine modules in her final year, coming top of the year in process engineering. Ng was elected vice-president of the University of Bristol Students' Union in 2010-11 and drove the initial development of the Bristol Student Community strategy.

While at Bristol, Ng was active in Engineers Without Borders, developing sustainability workshops for school groups. More recently, she has represented building services engineering at STEMNET events.

Since starting at Arup's London office in September 2012, Ng became a member of the firm's OvaGreen committee, which coordinates environmental initiatives within Arup's offices.

Richard Seaman Dublin Institute of Technology and BDP

Seaman graduated from Dublin Institute of Technology in 2013 with first-class honours in building services engineering.

In his final year, he was runner-up in the 2013 CIBSE President's Prize, and received a student academic excellence award for the highest average mark in all Level 8 engineering programmes. He decided to continue his studies at University College Dublin, where he completed a Master's degree in energy systems engineering. For his thesis, he evaluated and optimised the CHP unit, heat-recovery chiller and ice-bank systems included in the mechanical and electrical design of the National Gallery of Ireland.

He now works as a graduate mechanical engineer for BDP at its Dublin office.

Bryony Turtle University of Bristol and Atkins

Turtle graduated from the University of Bristol with a MEng degree in mechanical engineering. For her final-year project, she designed part of a solar-powered refrigerator to provide sustainable refrigeration without electricity or maintenance in developing countries. She was also awarded the Wertheimer Memorial Prize for her contribution to student life, and helped to promote engineering by working at departmental open days.

Turtle, who is a CIBSE member and a STEM ambassador, joined Atkins in 2013 as a graduate building services engineer, and has worked on schools, airports and UK government projects.



Richard Seaman, Bryony Turtle, Amelia Ng, Emilia Targońska, Michael Enstone, James Harker, Charlotte Mercer and Kit Stormont

It is not the advanced technologies that are pushing the boundaries of engineering design, but the people who use them

➤ Gone are the days of telegrams and the postal service – today’s cloud computing and video calls allow engineers to combine their experience and work collaboratively online.

‘Technology is also pushing the boundaries of what is expected by clients, and, thus, our work,’ said Targońska. ‘To stay ahead of the competition and to acquire a client, we need to showcase our understanding of the latest technologies.’

Smartphones and tablets have also changed the way people interact with our designs, she said. ‘Today – using mobile devices – we can adjust room temperature and lighting preferences. Soon, we will be able to do the same simply by tapping our wrist, using apps on our smart watches.’

But the challenge for the future is not letting technology overshadow our expertise, emphasised Targońska. ‘We

young engineers had the advantage of growing up in the computer world, but we need to appreciate where we have come from and what can be learned from experienced engineers, such as my father.’

She said designers should have an in-depth understanding of the programmes they are using, and their outcomes.

Quoting Sir Norman Foster, she said: ‘The pencil and computer are equally dumb, and only as good as the person driving them.’

She went on: ‘I strongly believe that investment and training of young engineers is the future of our profession, and key to successfully using these technologies.

‘We have to remember, it is not the advanced technologies that are pushing the boundaries of engineering design, but the people who use them.’ CJ



1hr in-house CPD seminars available



JS Air Curtains

The widest range of air curtains in the UK with expert advice and technical support.

- Bespoke:**
- Colours
 - Fascias
 - Mounting options



T: +44 (0)1903 858656
E: sales@jsaircurtains.com
W: www.jsaircurtains.com

Introducing Potterton Commercial's Sirius two WH condensing boiler range.

Market leading performance with a 5 year warranty.*



OUTPUTS
50kW
-110kW

9:1
MODULATION
RATIO

WEATHER
SENSOR
SUPPLIED
AS STANDARD



Combine with the Sirius two Cascade Frame kits for even more efficiency and flexibility on outputs. The perfect commercial solution.

- In-line, corner and back to back configurations
- Outputs ranging from 100kW to 660kW
- Suitable for a wide range of applications accommodating two to six boilers
- Compact, modular framework saving space and reducing installation time

Tel: 0845 070 1055

Web: pottertoncommercial.co.uk

POTTERTON
COMMERCIAL

*Subject to terms and conditions. See www.pottertoncommercial.co.uk for details.

Future features in CIBSE Journal

January 2015	Renewables IT & software	July 2015	Air conditioning Fire and smoke design/management/ ventilation
February 2015	Industrial & commercial Heating & cooling	August 2015	Heat pumps Healthcare
March 2015	Air conditioning	September 2015	Air conditioning, air movement & ventilation Heat recovery systems
April 2015	Water heating Data centres Schools & education facilities supplement	October 2015	Pipework, pumps & valves Hotel & leisure facilities supplement
May 2015	Air conditioning, air movement & ventilation CIBSE Journal products supplement	November 2015	Industrial and commercial heating & cooling CIBSE Journal products supplement
June 2015	Chillers BIM supplement	December 2015	BMS & controls BMS, smart metering & control Lighting supplement

Editorial submission: Please send editorial proposals/ideas three months before publication date, eg, 1st November for February publication.

Send to: editor@cibsejournal.com.

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

For advertising opportunities contact:

Jim Folley – 020 7324 2786
or email jim.folley@redactive.co.uk

autron

Safe heating

Autron Products would like to thank all of our customers for a record breaking summer

In the fast moving electronic age that we live in, it is very easy to forget some of the good old fashioned courtesies that form the traditional values of our culture.

We would therefore like to say a big **THANK YOU** to all of the local authorities and building services consulting engineers for recognising the benefits and quality of our Low Surface Temperature radiators and specifying their use on projects including schools, nurseries, hospitals, care homes and custodial premises.

As a UK manufacturer, we recognise that there are lower cost suppliers, but believe that the ease of installation, features and longevity of our products will make them a cost effective option for both the installer and the client.

With BSRIA tested assurance our radiators are designed to give the client many years of trouble free service. They include finger and pencil proof grilles on all products which are designed for easy installation, with all casings supplied fully assembled.

Again, may we say thank you for using our products and we hope that you will continue to use them in future.

Call 01787 274135 www.autron.co.uk

A plan for all SEASONS

The autumn heating switch-on signals the start of increased energy costs, so let's use it as an opportunity to start a more efficient heating season too, says **Matt Fulford**

TALES OF THE PLANTROOM SEASONAL HEATING



As the temperature outside begins to drop, it's more or less certain that energy bills will rocket. But that needn't be the case. Switching on the heating can be one of the best times to encourage organisations to review their efficiency.

Classic times for inefficiency are during the 'shoulder' periods of autumn and spring when heating systems are switched on, causing windows to be flung open by occupants sweltering on a warm afternoon (just take a look at the windows of the buildings when you next walk down the road on a sunny day in early October).

So now is the time to make sure that both optimal start features and optimal stop/day economy features are enabled and set up with long enough times to function well (90 minutes for both is often a good starting point). The outside air hold-off temperature may also need to be adjusted for the season – raised slightly for spring and lowered for autumn. If one does not have such sophisticated control systems, then a simple adjustment of the space thermostat and boiler flow temperature is sensible.

Other settings on the heating system should also be reviewed when it is switched on. It is a good time to fix all the thermostatic radiator valves to a mid-point setting, check that they are not stuck open or shut and that there is no air in the system. Hi/low burner and other manual boiler and hot water tank set points on the devices themselves should

This month: The autumn heating switch-on, energy networks, chilled beams in Sydney and heat from biodiesel

also be checked. Where BMS-type control systems are being used, the physical thermostat dials on any boilers and tanks need to be ranged slightly higher than the boiler set point so they do not manually hold off the temperature, resulting in the control system remaining on, because the set point has not been reached.

With hi/low burners, do not make the mistake of setting the 'hi' stat to a higher set point than the 'low' stat, typically it should be 10°C lower, with the BMS set point being somewhere in the middle.

And, while on the subject of temperature settings and sensors, do make sure thermostats are located correctly. I had a site where a hot water thermostat was poorly seated in the tank. With a little thermal paste and careful positioning of the thermostatic probe, 15% saving on the hot water gas use was achieved.

Also, watch for the 'false low' reading coming from an unlagged sensor point, especially those strapped to a pipe as an afterthought. Temperature logging at one site showed this was giving a reading of 8°C lower than the actual temperature. However, a little thermal paste and lagging over the top can quickly establish a more accurate reading and save energy.

Of course, more significant energy savings can be achieved by upgrading existing heating systems by: installing condensing boilers; replacing burners on sectional boilers; lagging plant room pipework; flushing/descaling and cleaning systems by adding a suitable inhibitor; and reducing the volumes of stored hot water and heating pipework runs.

This is also the time of year when boiler maintenance is often carried out. I have lost count of how many times I have found that the maintenance engineers (not deliberately, I'm sure) have left the

controls set to manual, either on the control panel or on the boiler service switch. And, while checking that, if you have had any repairs or other works undertaken in your boiler room then check that any lagging to the fittings has been reinstated. If only I had a pound for every time it hasn't!

As the weather starts to get colder the 'it's too cold' help desk calls are also likely to rise. Many companies fall into the trap of managing a building to avoid any complaints at all costs, rather than managing for efficiency and working a little harder to achieve the right balance. Often, the easiest action can be to put the set point up a little and hope the complaint goes away, but there are alternative approaches:

1. Go to the area and check the actual temperature – is it within the operational limits and is the 'too hot/too cold' complaint perceived rather than actual? (I wish you luck when giving clothing advice to the complainant)
2. What is the thermostat set at? It never ceases to amaze me how people seem to forget how to use a thermostat when travelling between home and work
3. How warm are the radiators or other heat

emitters? Is there air or sludge in the system – which means the whole area is not fully functional – and is the zone valve stuck open or closed? I recently visited a site where block flexi-connectors to some overhead radiant panels had resulted in half the panel not working and, instead of resolving that, the whole building's set point had been raised to a sweltering 27°C

4. Is the velocity-time slope set correctly for the type of use and heat emitter? It is rare to find slopes that do not allow enough heat to get to the radiators at a mid-point of outside air temperature of, say, 8°C, with all sorts of responses being put in place, including extended times and set points, and electric heaters.

While these investigations might take a little more effort, the result can often be a more efficient building, a more comfortable environment and a satisfied client, happy that their issue has been taken seriously. So while the great heating switch-on will signal the start of the season of increased energy costs, let's use it as an opportunity for the start of a more efficient heating season, too. **CJ**

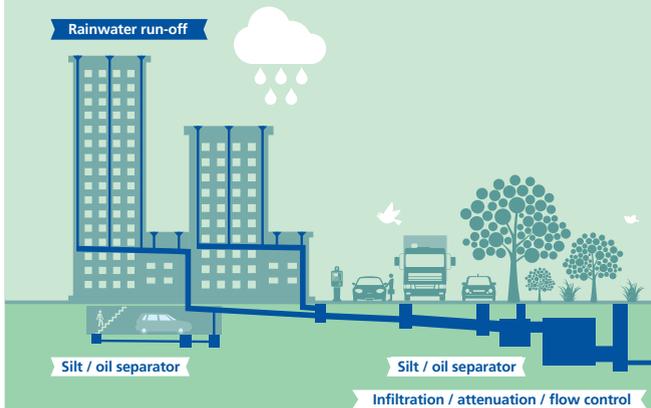
Many companies fall into the trap of managing a building to avoid any complaints at all costs, rather than managing for efficiency

MATT FULFORD is the director of Inspired Efficiency, helping organisations reduce their energy and water costs and emissions by reducing their demand

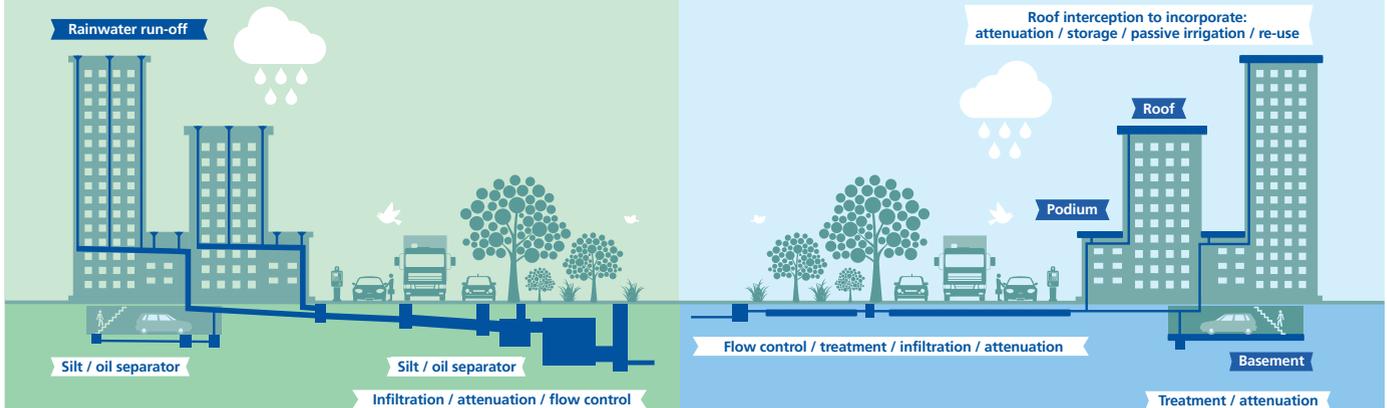
PERMAVOID GEOCELLULAR WATER MANAGEMENT SYSTEM

A shallow depth solution that's not a waste of space

Traditional drainage system



Source control drainage system



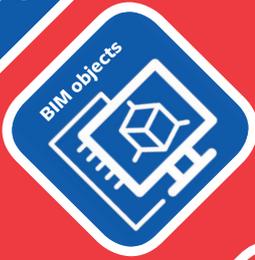
The Permavoid System provides a source control approach to the site wide SUDS requirements of a project at shallower depths



Contact Us to find out about our Technical Workshop on: 01509 615100

www.polypipe.com/permavoid





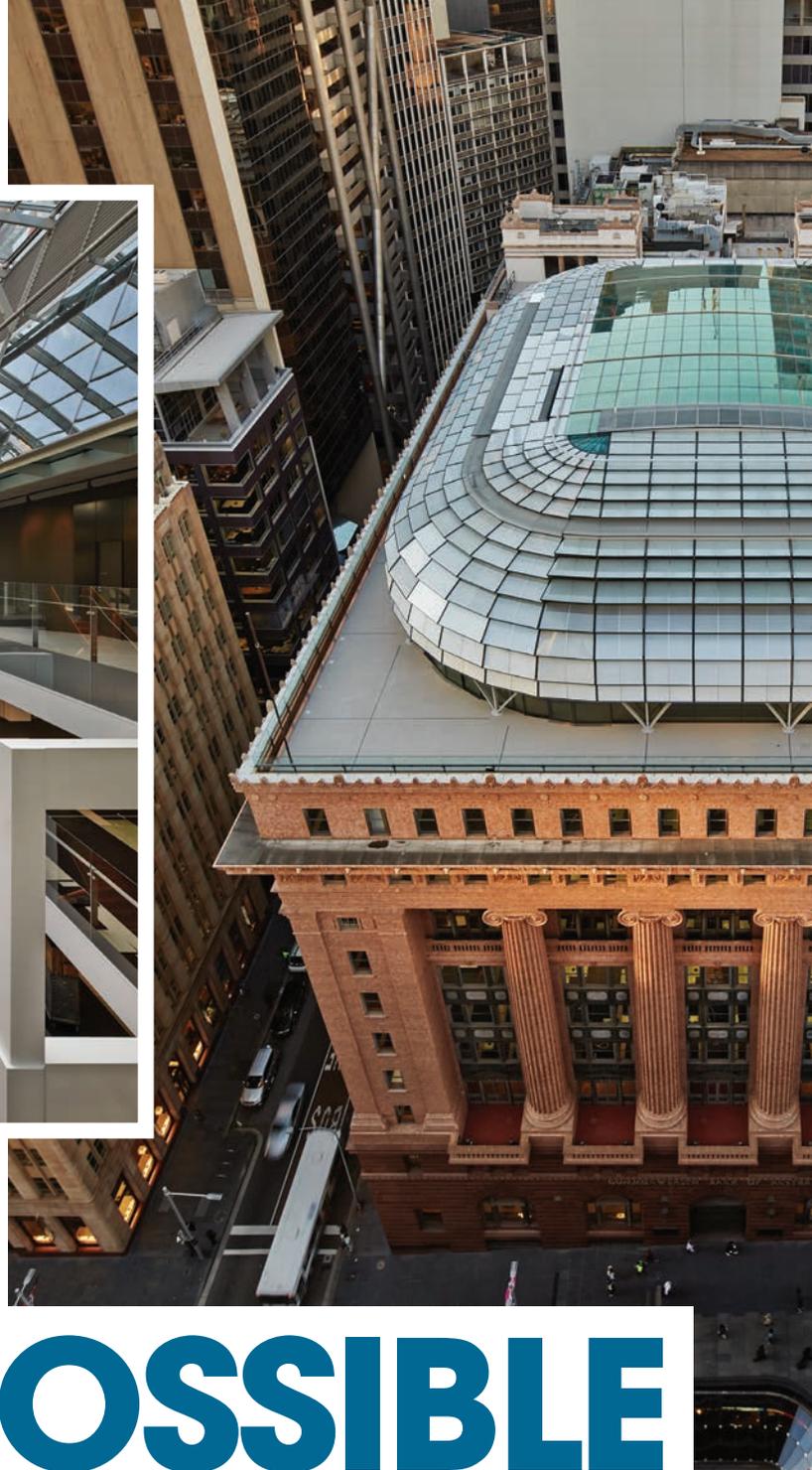
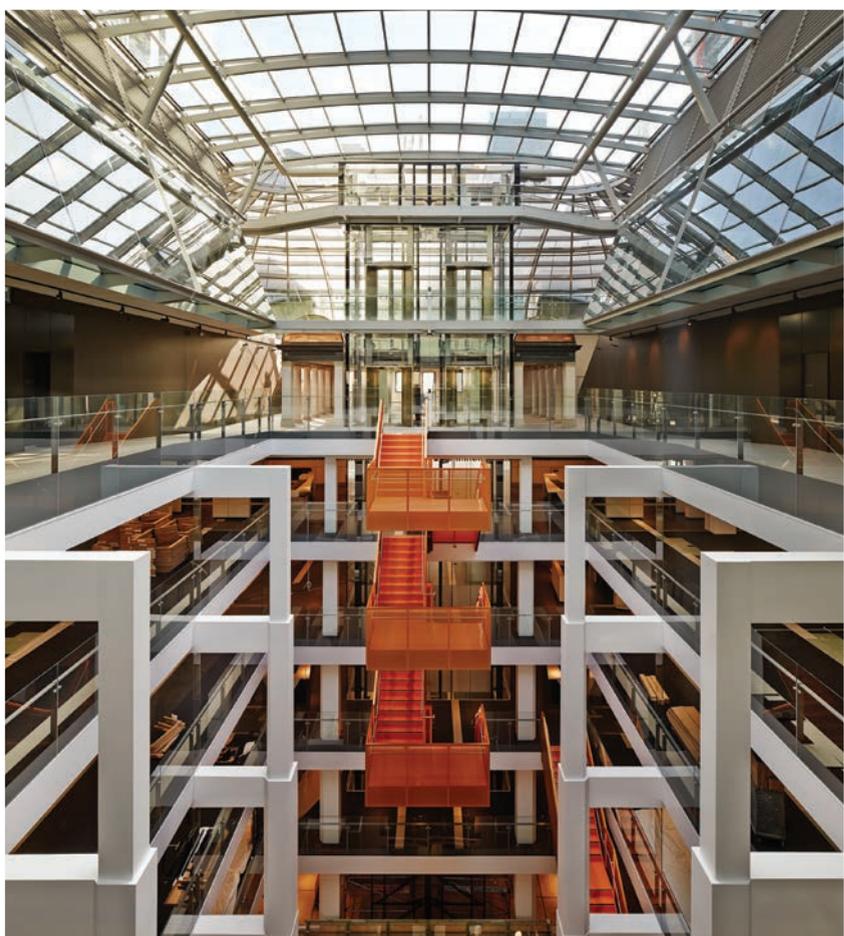
Did you know...
our dedicated
specification team
is on hand to
support your
system design



...and so much more ...Dedicated Specification Team ● Systems and technical specialists ● BIM objects ● New office in London ● CPDs available ● Quotation service ● Delivery direct to site

www.stelrad.com





THE ART OF THE POSSIBLE

Innovative engineering and careful restoration transformed an Australian Beaux Arts beauty into a global investment bank's HQ. Arup's **Andrew Pettifer FCIBSE** explains how a Sydney belle became hi-tech real estate

Fifty Martin Place is a historic building in the heart of Sydney's financial district. Constructed between 1925 and 1928 – for what was then the Government Savings Bank of New South Wales – it is a rare Australian example of the American-influenced, inter-war Beaux Arts style.

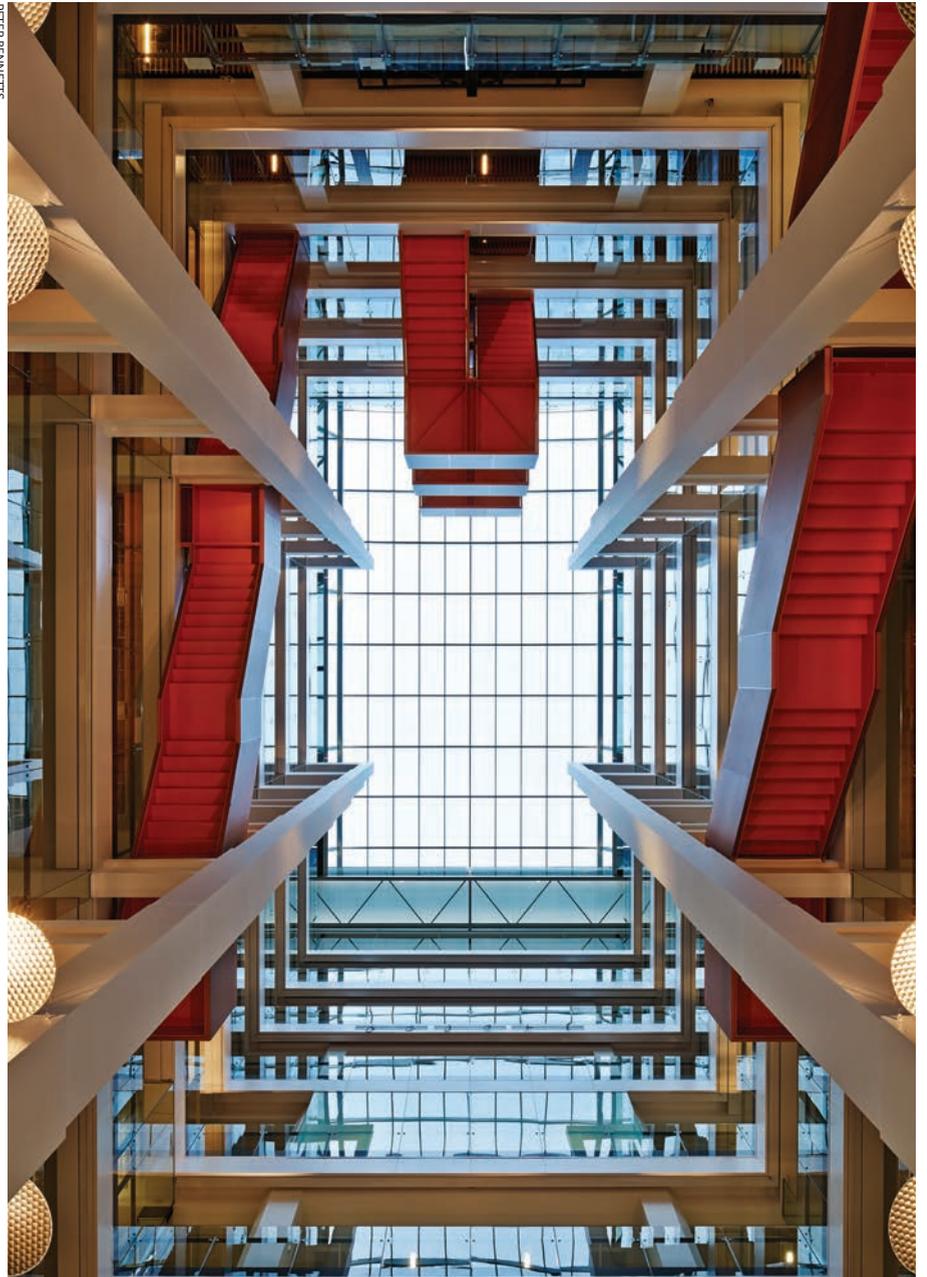
Macquarie Group, Australia's only global investment bank, acquired the building in 2012 to create its new corporate

headquarters. This was a radical step in the Australian property market where, typically, commercial property is owned and managed by real estate investment trusts. The fact that Macquarie was to be an owner-occupier opened up opportunities both to refurbish an important heritage building, and to create a world-class workspace, specifically designed to meet the bank's corporate objectives of enhanced performance through connectivity,



The addition of a glass-domed roof (centre) and enlarged, open-edged atrium (left and right) have enhanced light penetration through the Beaux Art building

PETER BENNETTS



collaboration and sustainability.

Consequently, 50 Martin Place has become the largest historic refurbishment in Australia to be awarded a Six Star Green Star rating – representing ‘world leadership’ – by the Green Building Council of Australia.

The design strategy involved the creation of a glass, domed roof – to house client facilities and meeting rooms – and an enlarged, open-edged atrium. The atrium is the centrepiece of the project, enhancing daylight penetration through the core of the building, while accommodating open stairs that provide connectivity between office floors.

The strategy presented Arup, the sustainable design and building services

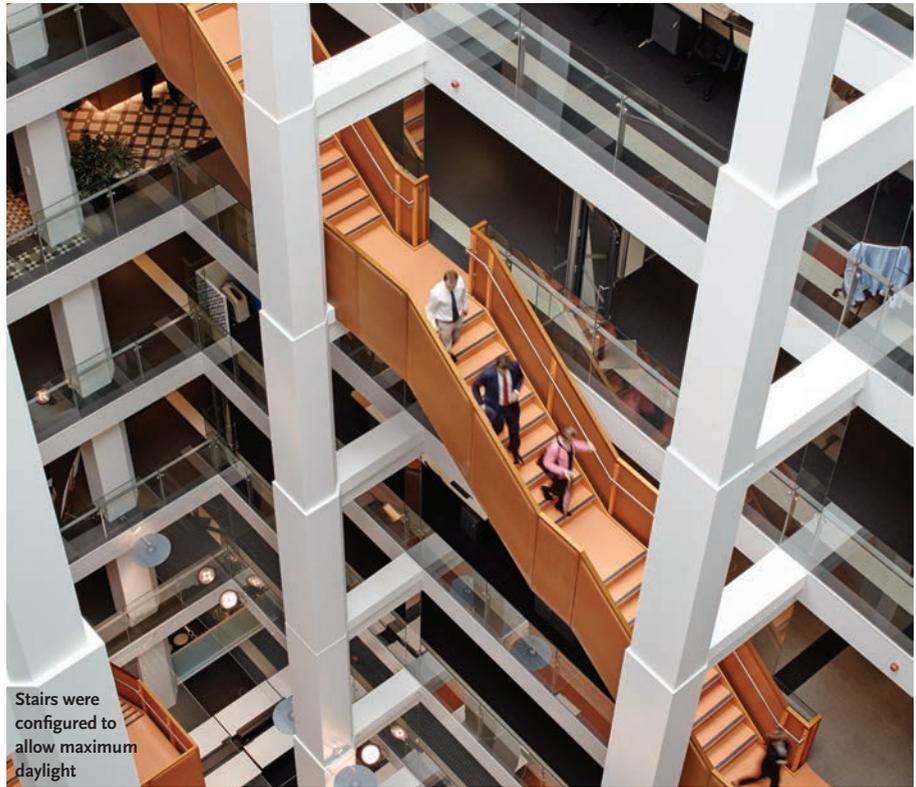


“ The atrium is the centrepiece of the project, enhancing daylight penetration through the building, while accommodating open stairs that provide connectivity between office floors

consultant for the project, with a number of challenges. The first was to remove as much plant as possible from the roof to free up space for client use. Plant that remained at roof level – including cooling towers, standby generators and smoke exhaust fans – was carefully integrated into the new glazed structure, to minimise the intrusion into the architectural form.

Other plant was sensitively relocated to reduce the impact on the historic fabric of the building. This included the conversion of original water tanks into fan- and boiler-plant rooms, and the relocation of chillers from the roof to the basement. An existing light well was used as a fresh-air intake, and worked in tandem with the atrium, which acted as the exhaust-air path.

The office air conditioning solution uses passive chilled beams, coupled with fresh air supply delivered through a 250mm-high raised-access floor. The combination is Australia's first example of such an approach (see panel, 'Air conditioning').



Stairs were configured to allow maximum daylight

Seeing the light

Given the heritage of 50 Martin Place, its façade has far less glazing than contemporary buildings, and access to daylight and views is well below modern expectations. A key design objective of the project, therefore, was to bring daylight, sky views, and interconnectivity from the top of building to its core. This was achieved through the transparent new roof structure and the enlargement of the existing narrow atrium, to increase daylight penetration into the building, while creating a visual point of connection to the outdoors.

Innovative glazing technology – comprising triple glazing with an inbuilt extruded mesh –

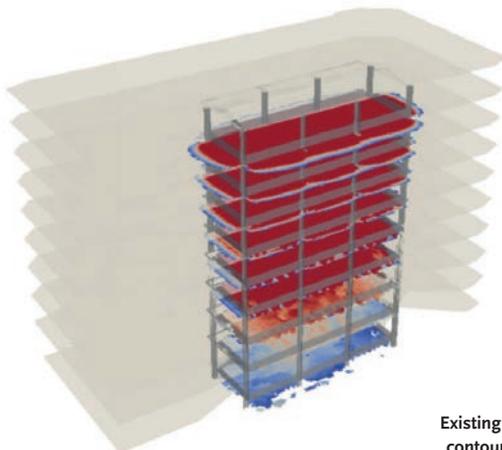
creates a high-performing fabric. The result is superior thermal comfort, ample daylight, and extensive sky views. Architecturally, the result is a transparent volume, clearly demarcating the new and the old, and respecting the history of the building.

Extensive daylight analysis was conducted, to demonstrate to the Heritage Council of NSW the environmental benefits of increasing the atrium size. The analysis quantified the benefits of increasing the atrium width for daylight penetration on the floor plates, and within the atrium. Further studies were conducted to determine the best configuration for the internal

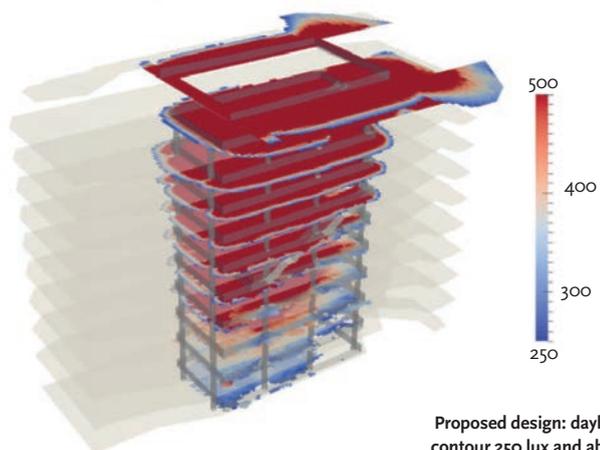
stairs interconnecting the atrium to ensure the stairs allowed as much daylight as possible to reach the bottom of the space. The results of the analysis showed daylight reach within the atrium would extend three storeys deeper, compared with the existing building. Useful daylight penetration into the office space was increased by approximately 150%.

Modelling was also undertaken to assess sunlight penetration, and an automatic blind system will shade the atrium floor during the relatively few hours in a year when the sun is sufficiently high to penetrate the office space.

The atrium – daylight penetration before and after refurbishment



Existing condition: daylight contour 250 lux and above



Proposed design: daylight contour 250 lux and above

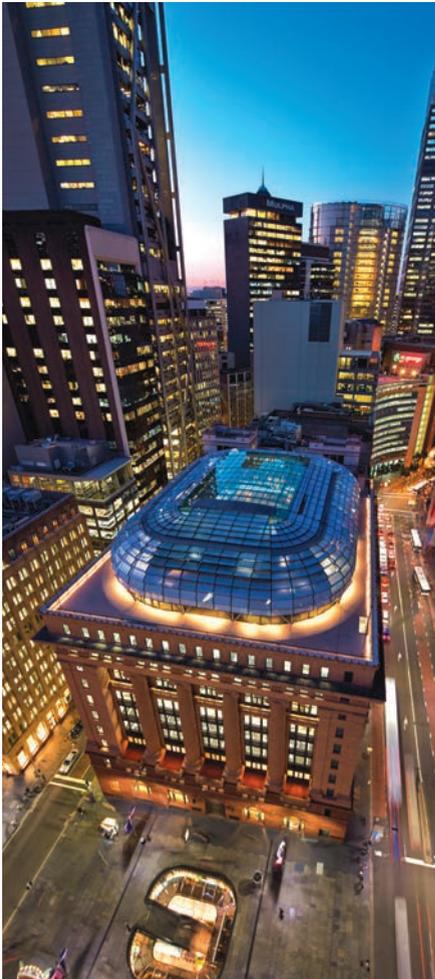


Saving the world's energy

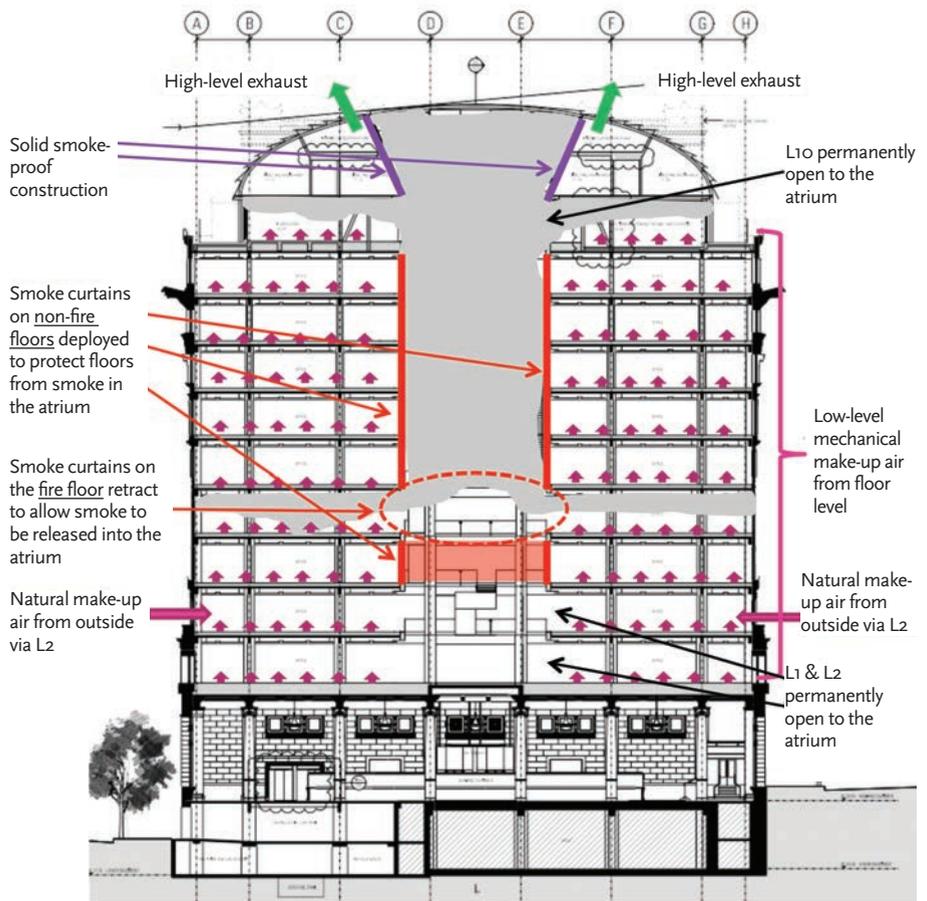
With over 40 years' experience of making water heaters for the commercial and large domestic sector, A.O. Smith invests in energy saving and efficient ways to produce hot water without compromising on comfort levels. A.O. Smith combines the natural resources of sun and air with revolutionary technology 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



Section view showing ventilation and fire strategy



► Lighting

The office lighting layout was developed to reinforce the structural and ceiling grid in the original building, and to expose the historic fabric previously hidden behind the ceiling.

The offices and atrium have perimeter, ceiling-mounted daylight sensors that dim the adjacent lighting when sufficient daylight reaches the work desks.

To maximise the effect of the widened atrium, it was decided not to add any further equipment to light the void.

Vertical circulation lighting is managed using integrated balustrade lighting in the stair. This also plays on the perforated balustrade panels, giving the stair the appearance of a glowing ribbon rising up through the generous space.

At high level, the need to mount luminaires beneath the glazing has been avoided by the design of self-illuminated glass bridges. At the base of the atrium, an indirect mirror system is used to redirect light to the traders. The luminaires and mirrors are mounted to the exposed beams at the perimeter of the void, to provide clear views up through the atrium.

► Fire safety engineering

Fire safety engineering

While the large open atrium allows daylight to penetrate deep into the building, it did provide the engineers with a tough challenge in terms of fire safety. The Building Code of Australia limits the number of floors that can be connected via openings to two above ground, although any number may be connected via a sealed atrium.

The requirements for a sealed atrium are onerous, with glazing and wall-wetting systems, smoke exhaust, emergency power, multiple exit routes for any balconies, and – importantly – no real connection to the floors. This did not meet Macquarie’s desire for the atrium to be open and therefore enhance connectivity and collaboration within the business.

To achieve an open-edged atrium – and provide the required interconnectivity – a performance-based, fire-engineering design was developed by Arup’s fire engineers.

In the event of fire, the non-fire floors are smoke-separated from the atrium by a combination of drop-down smoke curtains and glazed panels, required to resolve tricky

detailing around large heritage beams.

The fire floor remains open to the atrium, and large smoke exhaust fans extract from the top of the atrium at a rate of 40 m³/hr, while make-up air comes from automation of existing heritage balcony doors at level two, combined with the general supply air system.

The new client floors constructed within the glass-dome roof extension are open to the atrium. For these floors, exiting through a smoke-proof construction to fire-escape stairs – off an external terrace – enables occupants to move to a place of relative safety before evacuating.

This approach allows for high-occupant numbers to be accommodated within the client entertaining areas.

Sprinklers are provided throughout the building to keep fire sizes low. Smoke detection – including beam detection in the atrium – provides for early warning, while pressurised escape routes give people time to evacuate the fire floor and those adjacent to it, simultaneously. There is staged evacuation for the remaining floors.

Simply Refreshing

The only independently tested complete answer to tempered fresh air ventilation



Envirofresh 70

Air Source Renewable Energy Stand Alone Packaged Heat Pump Air Handling Unit

Air Handlers Northern Ltd.
Tel: 0161 745 8888
Web: www.airhandlers.net

BSRIA

AIR HANDLERS
CELEBRATING 25 YEARS OF SUCCESS
1989 - 2014



Looking to create the most energy-efficient, healthy and comfortable indoor climate possible? Don't worry, we can help...

Heating Cooling Fresh Air Clean Air

Zehnder has been a leading manufacturer and supplier of heating systems into the UK commercial market for the last 30 years. Our product portfolio is designed specifically to help create a comfortable healthy indoor climate, whatever the building. For energy-efficient heating and cooling solutions, Zehnder has the answer.

www.zehnder.co.uk
sales@zehnder.co.uk • 01276 605800

always around you **zehnder**



AquaTech Pressmain

Leaders in fluid pumping equipment and controls

- Water Pressure Booster Sets for increasing the pressure in wholesome and rain water systems
- Pressurisation Units for maintaining pressure in sealed heating or chilled systems
- Water Storage Solutions one-piece, two-piece & sectional GRP water storage tanks
- Tank Level & Temperature Controls monitoring the level & temperature of fluid in tanks

Other products include Hydraulic Shock Control, Pressure Vessels and a Bespoke Design Service



To discuss your project please call:
Head Office: 01206 215121 Manchester: 0161 226 4727

email: info@aquatechpressmain.co.uk
www.aquatechpressmain.co.uk

Plant that remained at roof level – including cooling towers, standby generators and smoke exhaust fans – was carefully integrated into the new glazed structure, to minimise the intrusion into the architectural form

➤ Another significant task was to upgrade the numerous styles of heritage luminaires on the original staircases and the halls, some of which were gas mantle luminaires.

To upgrade the historic fittings, a number of diffuse LED sources were developed, effectively replicating the optical distribution of older tungsten lamps, while increasing the lumen output to meet the egress requirements.

Summary

50 Martin Place demonstrates how new life can be breathed into a historic building, to create an exciting contemporary workplace. The project highlights that the unique characteristics of such a construction requires highly bespoke engineering solutions.

The result, however, is a building that is prudent in the reuse of existing resources, energy efficient in performance, and – most importantly – meets the client’s objectives of creating an inspiring and efficient place to work. **CJ**

ANDREW PETTIFER FCIBSE is principal of Arup’s New South Wales region in Australia

Air conditioning

The general office air-conditioning solution uses passive chilled beams, coupled with dehumidified fresh air supply, delivered through swirl outlets in a 250 mm-high raised-access floor, acting as a plenum. Raised-access flooring systems are not common in the Australian commercial market, and the combination of chilled beams with supply air through the floor at 50 Martin Place is the country’s first example of such an approach.

Mindful of the potential leakiness of the heritage structure, the raised floor plenums went through rigorous pressure testing on site, to ensure that performance requirements were met. The swirl outlets were specified to have an adjustable throw pattern of +/-30 degrees from the vertical, to provide occupants with the opportunity to adjust the air distribution in their vicinity.

The ceiling-level services have been carefully arranged to complement the original ceiling design, and allow the 1920s structural grid to be exposed. Passive chilled beams enabled the ceiling to be pushed up within the beam structure, resulting in a 270 mm-deep ceiling zone, bordered by a 450 mm-deep structural beam grid. Full factory testing of the beams, acting in combination with the specified floor diffusers, allowed the design to be verified before installation.

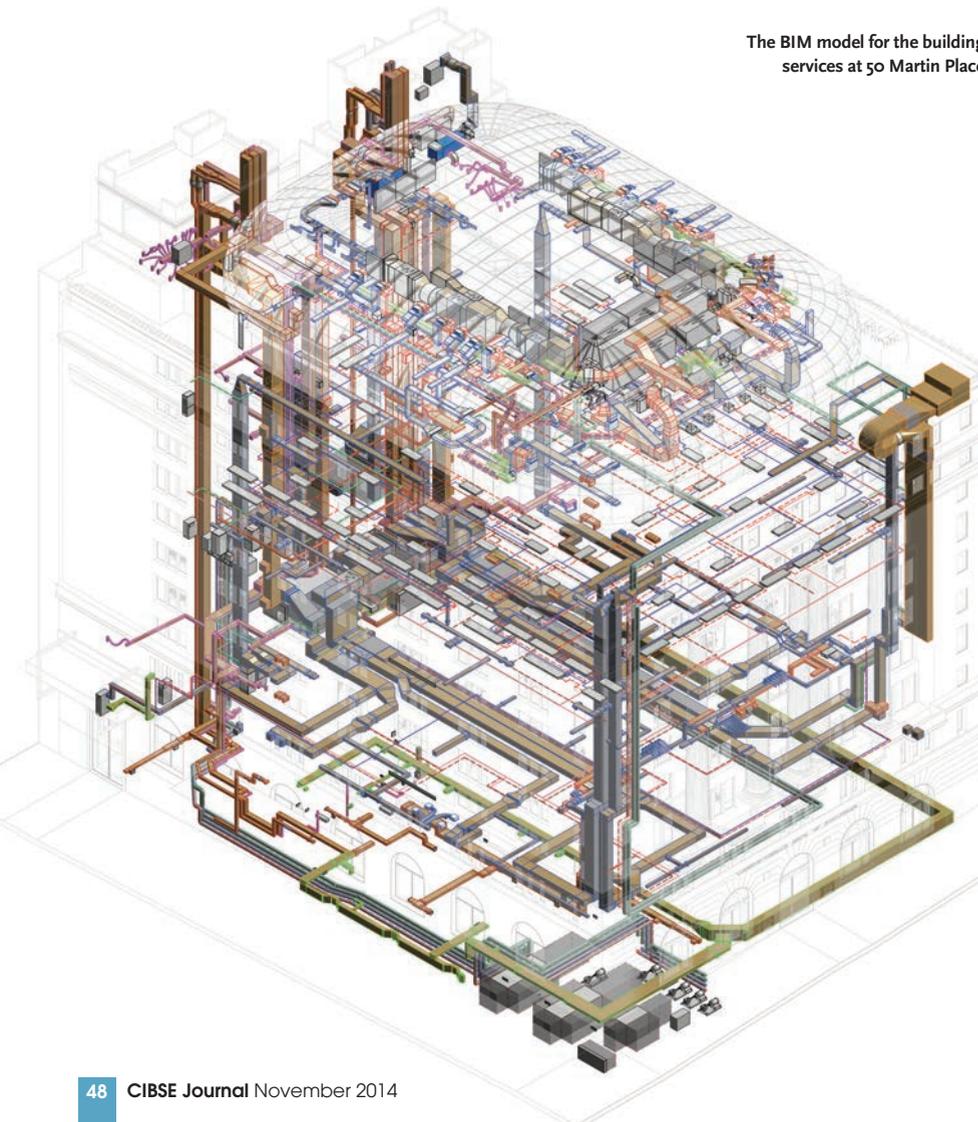
To avoid the need for long and deep ductwork runs from the side core configuration at each level, supply air is introduced into the shallow floor plenum by 12 new supply air risers. These are distributed around the perimeter and served from lateral distribution of ductwork accommodated within a 900mm-deep floor at level one.

Partway through demolition, sections of the original, ornate, pressed-metal ceiling cornices were discovered on level one, which was being converted into the main trading floor. The in-desk cooling specification allowed the ceilings and chilled beams in these areas to be omitted, and the cornices fully restored and exposed.

The trading floor also extends across the base of the atrium, which again – with no ceiling immediately above – suited an in-desk cooling solution. Cooling units are integrated into the desks and underfloor displacement delivers fresh air drawn from the raised access floor in combination with chilled beams on other levels. This is the first commercial installation of in-desk cooling in Australia.

The chilled-beam and in-desk cooling solutions require a well-sealed building, particularly in the Sydney climate, which experiences sustained periods of high temperature and humidity. The building fabric was pressure tested by Arup during the early design phase and performed surprisingly well, with only window seals needing replacement.

The BIM model for the building services at 50 Martin Place



Chilled beam cooling strategy

Passive chilled beams

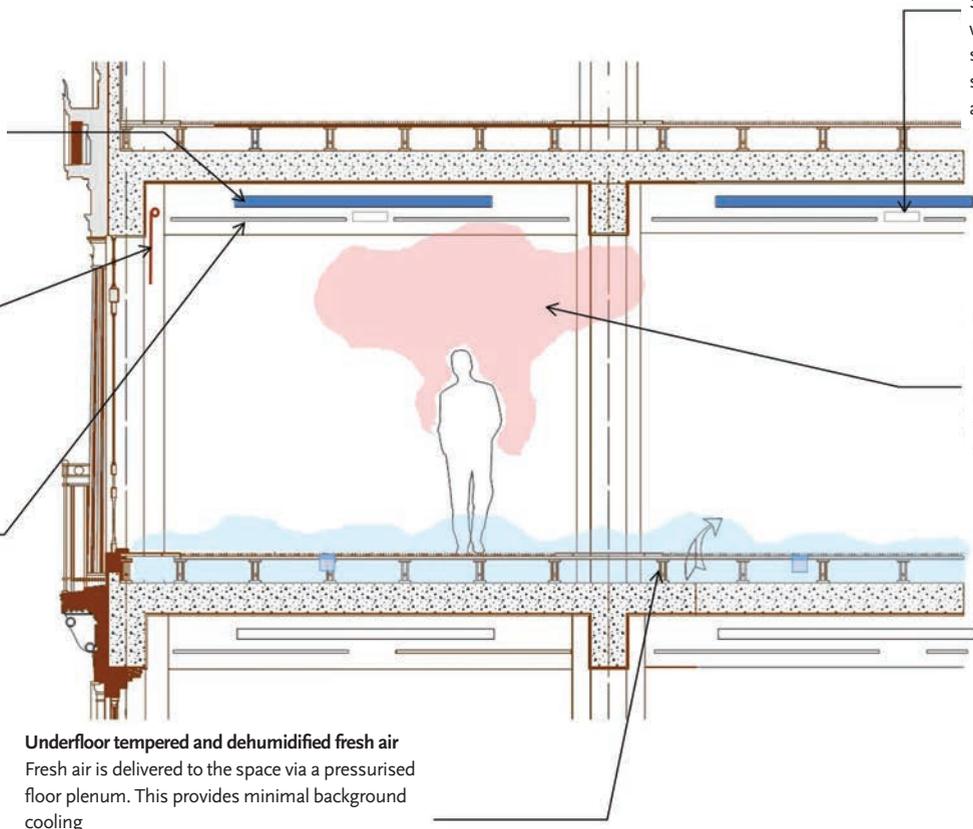
Cold water circulates within finned, chilled water pipes. The beams cool down the surrounding air, creating a cool convection current

Internal blind

High performance internal blind is needed for comfort and glare control

Perforated metal ceiling

The ceiling provides some radiant cooling effect, but allows convection air currents to pass through it



Integrated service modules

Sections within the ceiling will house high level services, such as lighting, sprinklers, emergency lights and speakers

Internal heat loads

Heat from people, equipment and lighting rises naturally to the ceiling where it is cooled down by the chilled beams

Underfloor tempered and dehumidified fresh air
Fresh air is delivered to the space via a pressurised floor plenum. This provides minimal background cooling



design efficiency

your comfort. our world.

360° efficiency

Our new VRV IV heat recovery system sets pioneering standards in all-round climate control efficiency.

Total design simplicity, rapid installation, full post-commissioning flexibility. All with Variable Refrigerant Temperature control for absolute operational efficiency. Maximum comfort can now be delivered with all-round maximum efficiency: 360° efficiency.

Efficiency redefined.

daikin.co.uk/vrviv

installation efficiency

operational efficiency

VRV IV + **HEAT** recovery

FAST design + **QUICK** installation + **MORE** free heat + **MAX** comfort

6 The challenge with most CHP systems is to find a use for the heat created by the engine. One solution is district energy

Combined heat and power (CHP) is the generation of thermal and electrical energy in a single process. A typical power station uses around 35% of its fuel to create electricity, with the remaining 65% released as heat to the environment; in other words, a typical power station is perhaps 35% efficient.

By contrast, a CHP engine uses around 40% of its fuel to create electricity but, instead of the created heat being released into the environment, the bulk of it is used for warming buildings. This makes a CHP approximately 80% efficient.

The challenge with most CHP systems, however, is to find a use for the heat created by the engine. One solution is district energy, which supplies thermal energy – through piping networks – to multiple buildings. By aggregating the thermal loads of several buildings, the district energy

system optimises the economical use of surplus heat from CHP engines.

In Birmingham, a public-private partnership is behind the integration of a new district energy scheme into an established cityscape. Meanwhile, for the redevelopment of London's King's Cross, a privately funded – and run – district energy scheme has been designed and constructed specifically for the redevelopment.

KING'S CROSS

At 67 acres, the transformation of London's King's Cross is one of the largest urban-development projects in Europe. It is being undertaken by King's Cross Central Limited Partnership (KCCLP) – a development vehicle comprising Argent King's Cross, London & Continental Railways, and DHL Supply Chain.

Planning permission for the scheme

ACCESS



was granted in 2006, with work starting on site in 2008. By 2020 – when the majority of buildings are expected to be completed and fully occupied – the development will have created a new area of London, incorporating: eight million square feet of office buildings; a university; 1,900 new homes; restaurants, leisure facilities and shops; and a series of new public spaces.

When the scheme went for planning approval, however, the draft London Plan was pushing climate change up the capital's agenda. As a result of this planners were demanding that schemes include initiatives to help reduce their environmental impact. 'There was an expectation that all major schemes would consider CHP as a way of reducing carbon emissions,' says André Gibbs, a partner at developer Argent.

For KCCLP, committing to a district heating scheme at such an early stage in

the scheme's development was a risk. 'We understood that district heating could help reduce our carbon footprint, but as we were embarking on a plan for an 8m ft² development – which had to appeal to several different markets, where we hadn't, as yet, met any of our customers – it wasn't entirely clear to us what the risks were,' says Gibbs.

There were benefits, too, in having the planners effectively force the developer's hand. 'Having a planning requirement for a district energy centre avoided the need for us to do lots of cost-benefit analysis; instead, it was: "If we're going to have to put in CHP and district heating, then how do we make these systems work best?",' Gibbs says.

One major benefit to the developers of having a low carbon source of power and heat on site, is that it is a cost-effective way to help the development achieve high levels of energy efficiency. 'We committed to build 5%

better than Part L, which means we enhance the building fabric to make it more energy efficient,' Gibbs explains. 'The district heating scheme fits in well with this because it will help us reduce carbon emissions by a further 15-20% from our already reduced emissions, so that – when we do our BREEAM assessments – it makes it more cost-effective for these buildings to achieve Excellent or Outstanding ratings.'

Unlike with the piecemeal expansion of CHP into Birmingham, King's Cross – as a new development – has had its district heating system designed with the capacity to supply heat to every building on the site. The downside of this is that, because the development is phased, the developer has had to invest capital in installing the network of heating mains before it can sell any heat.

The heat network was installed at the same time as other utilities, and before

ALL AREAS

Two significant district energy schemes are currently being rolled out, one in central Birmingham and the other in London's King's Cross. **Andy Pearson** compares strategies



The King's Cross development includes 8m ft² of office space



► access roads and buildings were constructed. In all, 2,000m of pre-insulated pipework has been installed. 'It was not a complete disaster, because the electricity substation is located next to the energy centre, and we had to put in distribution networks for other utilities along those same routes – so we laid a significant tranche of the heating mains at the outset,' says Gibbs. 'Because it is a mixed-use development, having the utilities in place gave us the flexibility to respond quickly to whatever market we needed to.'

The first major building to be completed on the site was the new home for The University of the Arts. However, with no other buildings constructed, heat demand from this building was insufficient to warrant the installation of a giant CHP engine. Instead, a containerised energy centre was built to house boilers to supply heat on a temporary basis – which also allowed the developers to defer capital investment. 'We had put in place the district heating pipework, but we couldn't yet justify installing a CHP unit – so we feed heat to the building from a temporary boiler pod, in anticipation of the first CHP unit being in place within a couple of years,' says Gibbs.

Building control was unimpressed with the temporary arrangement, however. 'The difficulty was in getting Building Regulations approval when it became apparent that the CHP would not be installed until later,'



A CHP engine at King's Cross, painted pink for breast cancer awareness...



... and the energy centre in which it will be situated

Gibbs explains. Heating was not the issue, he says, because heat could be supplied from an efficient gas-fired boiler. The planners were less happy that the heat from the boiler was to be used to drive an absorption chiller, to provide cooling to the building until the CHP engine was installed. 'Even though we could point to the future energy centre – and explain that we had a CHP engine ordered – because it was not installed, building control said the university would fail to comply with Building Regulations on the day it opened.'

As a result of the phasing, the opportunity to install absorption chillers was missed, and the university is now cooled using mechanical chillers. 'I can understand the position they [building control] took on that, because we couldn't offer them any certainty on when the building would be connected to the CHP,' says Gibbs.

Three years on, and the scheme's permanent energy centre is now open. The building has been sized to accommodate sufficient plant to supply the site's entire heat demand, based on an estimate produced by Arup from the masterplan. The systems within the energy centre have been designed, installed – and are being maintained on a day-to-day basis – by Vital Energi, after it won the maintenance contract for the next 30 years.

In keeping with the site's phased redevelopment, plant in the energy centre



HEATING & HOT WATER SOLUTIONS FUTUREPROOF



**HIGH EFFICIENCY
BOILERS**



**HIGH EFFICIENCY
WATER HEATERS**



**INTEGRATED
RENEWABLE SOLUTIONS**

Lochinvar products have been providing economical solutions for hot water and heating systems in the UK since 1976. Knight and Charger Water Heater ranges were among the first of their type to be available.

Based in Banbury, Oxfordshire, the company has continued to provide energy efficient products for a wide range of Commercial, Industrial and large Domestic applications. We offer a flexible range of gas-fired Condensing Boilers and Water Heaters which are suitable for new build, refurbishment or replacement requirements. We also offer a range of integrated renewable solutions, including technologies such as Solar Thermal and Air Source Heat Pumps.

is being installed in stages. ‘We do have a mixed-use development with a large number of offices, retail and residential developments – along with the university – that allow us to take advantage of diverse demand-profiles in the sizing of the plant,’ says Gibbs. Currently, two gas-powered 2MW Jenbacher CHP engines are installed. Heat from these is captured and used to provide heat and hot water for the development, via two 75,000-litre thermal stores

At the moment, the two engines produce too much heat for the development. ‘We’re not yet at the stage where we can run both engines flat out but, this winter, we’ll be able to run one at full power, with the boilers used to deal with the peaks and troughs,’ says Gibbs.

When the scheme is fully developed, it should have three 2MW CHP engines running. These are predicted to provide 62% of the scheme’s total thermal demand and 79% of the power requirements. Backup will be provided by three giant, 10MW gas-fired Viessmann boilers, sized on an N+1 basis to allow plant to be taken out of commission. Electricity generated by the CHP is sold to the National Grid.

The plan to install absorption cooling – to use surplus heat from the engines – is currently on hold. ‘Initially, the plan was to have a cooling network distributed around the site, but the technical challenges made it difficult to get absorption cooling to work in a way that would reduce carbon emissions,’ says Gibbs. In the future, the energy centre may provide cooling to a small local network via an absorption chiller.

The district energy system has been designed so that, as time goes on, it can be linked to surrounding developments that require heat. ‘We did a lot of our plant sizing five years ago, and Part L continues to push down the heat the buildings actually need – so it could be that the pipework and plant become oversized, and we can supply surplus heat to the surrounding area,’ Gibbs says. ‘We set the structure of the Energy Services Company (ESCO) so that – if we wanted to – we could extend the pipework beyond our site, so that energy centres elsewhere could feed into it.’

The district heating and energy centre was funded privately under the development. It is 90% owned by KCCLP, with the other 10% belonging to Metropolitan Infrastructure, which manages it.

‘The energy centre does generate revenue,’ says Gibbs. ‘It’s not the main event in the business plan, but – if we’re paying for



Birmingham New Street will be the first Network Rail station to have a CHP



everything – then we do need to retain the revenue. Independent Community Heating Limited (ICHL) owns the pipework and, effectively, the ESCo pays ICHL to use its hot water to convey heat from A to B, in the same way that E.ON would pay UK Power Networks to convey its electricity from A to B.’ Metropolitan King’s Cross is the ESCo established by KCCLP to act as the interface between customers, the National Grid, and the Energy Centre at King’s Cross.

Initially, there were issues around pricing, with tenants concerned about signing up to a single-source supply from a monopoly. However, according to Gibbs, this has become less of an issue as the scheme has grown, and the developers have become better at explaining the system to the tenants. ‘The physics is relatively straightforward; the business case is much more complicated to get to work effectively,’ he says.

BIRMINGHAM

Birmingham’s district energy network is undergoing a significant expansion. The city’s inaugural district energy scheme opened in 2007, when the first phase of Broad Street opened in response to the city council’s action plan to cut carbon emissions by 60% – from 1990 levels – by 2025. This was followed a few years later by the East Side scheme. Over time, both have grown, with the addition



of new energy centres and extra customers for heat. Now, as part of the construction of the £650m Birmingham Gateway scheme, the two independent schemes are being interconnected – and expanded further – to form a single, giant, resilient district energy system for the city.

Initially, the Broad Street scheme was developed to serve the International Convention Centre (ICC) and a range of – mainly council – buildings in the central business district. This tri-generation scheme comprises a 1.6MWe gas engine CHP unit, and 7.3MWth of additional heating from gas-fired boilers, also housed in the ICC.

High-efficiency chillers provide a central source of chilled water for air conditioning. Hot and chilled water from the energy centre is delivered to the various buildings in the Broad Street area through a network of underground pipes, while the electricity generated is used by these buildings directly, via private wire connections.

A year after the scheme opened, it was extended when an additional 600kWe CHP unit was added at the National Indoor Arena. More recently, a connection to the city's new library has resulted in the network expanding still further, with the addition of a 725kWe CHP engine, a 400kW absorption chiller, and two 2.25MW gas boilers.

Phase two of the scheme involved the



John Lewis will use heat from Birmingham New Street station's CHP



development of district heating in the Eastside regeneration area, starting with the refurbishment of Aston University's energy centre to incorporate 3MWe CHP. In August 2010, a new energy centre, with an additional 1.6MWe of CHP, opened at the Birmingham Children's Hospital, and a heat network connection was installed to the city council's Lancaster Circus offices. More recently, this scheme has been extended to heat 656 rooms of the Bagot Street student accommodation complex.

Both the Broad Street and Eastside schemes are owned and operated by Cofely through a special-purpose energy services company (ESCO) – the Birmingham District Energy Company (BDEC). It has a long-term energy-supply contract with the main partners, Birmingham City Council, Aston University, and Birmingham Children's Hospital. Cofely was selected as the preferred partner to deliver energy services under a 25-year agreement, after its successful bid when the tender was published in the *Official Journal of the European Community*.

'What is interesting about the scheme in Birmingham is that it involves retrofitting district energy into a city-centre environment, which is particularly challenging,' says Ben Watts, technical development director at Cofely – Energy Services. In taking a supply from Cofely, the price users pay for heat is



Pipework installed in Birmingham's congested city centre

▶ linked to national fuel prices, electricity is sold directly to the buildings where it is generated, and profits are shared within the partnership as the network expands.

These two schemes are now set to undergo further expansion under the Birmingham Gateway development. This £650m scheme will transform the city's New Street railway station into a light and modern, 21st-century transport hub. At the same time, the 1960s shopping centre above the station is being redeveloped, and a new department store – which will be home to a branch of John Lewis – is being constructed south of the station. The Gateway will also include a 1.6MWe CHP unit – the first to be installed at a Network Rail station.

The requirement for CHP at the station came about as a result of the way the Gateway scheme is funded. In addition to finance from Network Rail, the project is being bankrolled by other regeneration bodies and the city council. Funding is allocated on the proviso that the scheme meets specified sustainability targets, including one of BREEAM Very Good for the station.

'Having to achieve BREEAM for the station kicked off a lot of the sustainability initiatives, including consideration of the CHP to provide additional credits,' says Azhar Quaiyoom, engineering and sustainability manager, project engineering, for Network Rail, whose job it is to ensure the scheme meets all of the funders' sustainability criteria.

Quaiyoom says CHP was initially ruled out because 'the station's energy profile was too electric-intensive compared to heat'. However, the economics changed when John Lewis announced it was to open a store next to the station, and agreed to use some surplus heat for its hot water and heating requirements.

'With the addition of John Lewis as a heat customer – and with the station utilising the CHP's electricity – Network Rail quickly established a valid business case, with the assistance of Arup and consultants Second Nature,' Quaiyoom explains.

BDEC successfully won the tender to build and operate the scheme, and to interconnect it to the Broad Street and Eastside schemes. 'The project will increase resilience and efficiency through operational optimisation, enabling us to operate CHP assets across the city with greater flexibility, and against a more consistent load,' says Cofely's Watts. The operator will also use the opportunity to introduce further value by expanding the current district energy scheme through the



How do Birmingham and King's Cross compare?

	B'ham total	New Street	King's Cross
Total heat output	56MW _{th}	1.8MW _{th}	45MW
Total electrical output	7.6MW _e	1.6MW _e	4MW _e + 1 future 2MW _e (due end 2014)
Total cooling output	12MW _{th}	N/A	0
Number of energy centres	6	1	1
Heat from boilers	48MW _{th}	N/A	2 x 10MW _t boilers supplied + 1 x 10MW _t boiler (due end 2014)
Length of district heating mains	4,000 m	4,000 m	2,000 m
System designer, operator and installer	Cofely District Energy	Cofely District Energy	Vital Energy

station development, to reach the parts of the city previously constrained by the station's footprint. 'The great thing about the CHP option is that there was already a district heating network to the north west [Broad Street] and to the north east [Eastside] of the station,' says Quaiyoom.

The CHP will be housed in a new plantroom built on the station's roof. A connection will be included in the scheme to enable the system to be extended to the south of the station, as the area is redeveloped after completion of the new John Lewis store. Pipework is currently being installed in the station and the streets leading to it, to link with the existing district energy networks. Birmingham's new, expanded and interconnected district energy network is due to be fully operational by the end of 2015. CJ

To find out more
come to our
**Technical
Symposium**
@ The Building Centre
on the 11/12/14
(see below for details)



A BREAKTHROUGH IN COMFORT AND
ENERGY SAVINGS - ALL YEAR ROUND

**No Chiller, No Condenser,
No Boiler, No Pipework**
just

ReCOOLER HP

With an **EER up to 10.9**, the ReCOOLER HP provides **BREEAM** credit for a low environmental impact. Plus, with **COPs of 6.5**, all year round energy recovery, as well as quick and simple installation, it's time to discover the next generation of heating and cooling unit.

To find out more, why not come to our **technical symposium** on the **11th December** at the **Building Centre** in London (CPD hours available). See below to register and be part of it.

>> *Learn more at www.flaktwoods.co.uk*



ENVIRONMENT
ECONOMICAL
EXPERTISE



To register for our Technical Symposium, either click on the QR code or contact us direct:

e: marketing.uk@flaktwoods.com
t: 01206 222 699



FAT LOTS OF GOOD

The UK is missing an opportunity to heat its buildings using waste cooking oil. Harry Howard, of Atlantic Boilers, explains why biodiesel could rival biomass as an alternative fuel source

6 An environmentally friendly alternative to fossil fuels, biodiesel supports an economic cycle that creates a secondary use for a waste material

Worldwide consumption of biodiesel has been rising rapidly since the start of the new millennium, with global production increasing from 16bn litres in 2000 to more than 100bn litres in 2012¹. However, the industry is still in its infancy in the UK.

Based on gross national product, the UK market ought to total three billion litres of biodiesel per year; however, the country consumed just 1.6m litres during 2010-2011². The majority of this output went to road transport – because of a fuel-tax allowance – but biodiesel can also be used in well-designed boilers and burners.

An environmentally friendly alternative to fossil fuels, biodiesel is a transformed variety of used vegetable and raw oils that supports an economic cycle that creates a secondary use for a waste material. In 2011, around 89% of the biodiesel manufactured

in the UK was produced from used cooking oil³.

The UK Sustainable Biodiesel Alliance has calculated that 90,000 tonnes of used cooking oil were collected throughout the country during 2011, leaving an estimated 160,000 tonnes uncollected⁴. Together, the four main biodiesel production centres – in Teesside, North Lincolnshire, Liverpool and Bellshill – made 218,000 tonnes of fuel during 2011, against a full-production capacity of 574,000 tonnes⁵. This is a significant over-capacity, ensuring future output for new developments.

Raw oilseed rape is also a source of biodiesel in the UK. It is planted in around 0.6m hectares and, annually, yields 1.8m tonnes of seed – plus, 7.2m tonnes of cattle feed. Generally, there is a 5% to 10% surplus of this oilseed rape, which is exported. This yield rose by 60% between 2000 and 2010⁶.

In a comparison of calorific value with biomass, 100% biodiesel (B100) – produced to the European standard EN 14214⁷ – gives 37 megajoules/kg (MJ/kg), as against 17MJ/kg for good-standard wood with moisture content of less than 1% (moisture content can reach 30% and reduce the heat capacity). In addition, one cubic metre of B100 contains 39,600MJ, as against 9,770MJ for one cubic metre of timber – which means it has up to four times more heat per unit volume.

In the past seven years, approximately 100 commercial biodiesel boilers have been installed in the UK⁸. The cultivation and processing of biodiesel emits less climate-relevant carbon dioxide than that of fuels from fossil sources. When looking at energy sources overall – as well as the individually polluting dangers to water, the climate, and human health – biodiesels compare very favourably with fossil fuels.^{9,10}

Storage, pipes and pumps

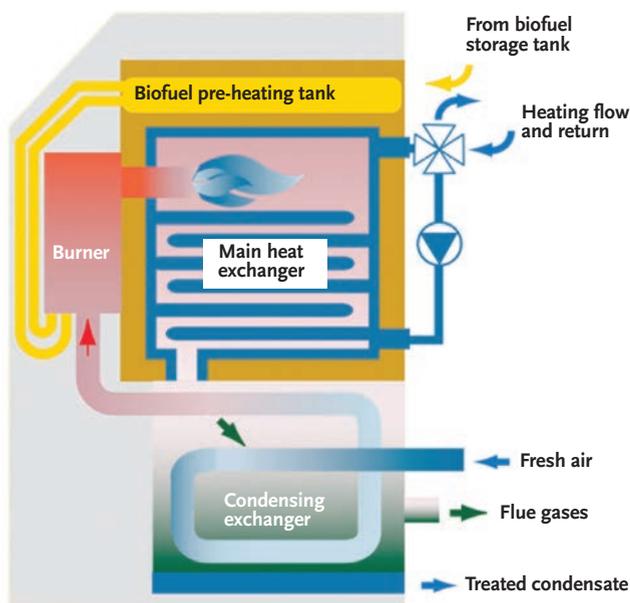
Provision must be made on site for B100 storage. General guidance for this is given by the Oftec OFST200 oil-firing equipment standard, and the Oftec SP697.432 oil-fired heating system design. It is usual to provide storage to enable the boiler plant to run at full load for a period of three weeks, plus a minimum of 10% extra to allow for a flooded sump, which covers against deposits in the bottom of the tank and against the total immersion of an electrical heater. This should allow for any disruption of supplies. For calculations, one litre of B100 is equivalent to 8kWhr.

Pipe sizing must be large enough to maintain a low pump suction head, and to avoid suction greater than minus 2kPa in the pipeline. B100 has a kinematic viscosity of 4.5 centistokes at 40°C, compared with 3.0 for diesel oil.¹¹

Pipe materials must also be compatible with the B100 fuel – only carbon steel and, preferably, austenitic stainless steel materials are suitable. Pipe jointings and compounds must be carefully chosen; where valves, strainers and so on are fitted, they must not be brass, bronze or copper.

For smaller installations, an economic submersible pump will lift the B100 from the tank into the vicinity of the boiler and a pressure-balancing overflow valve. From there, the B100 is fed – at controlled pressure – to the boiler-burner assembly. For larger installations, of two boilers or more, a duplex in-line pumping system transfers the B100 to each boiler. Pressure

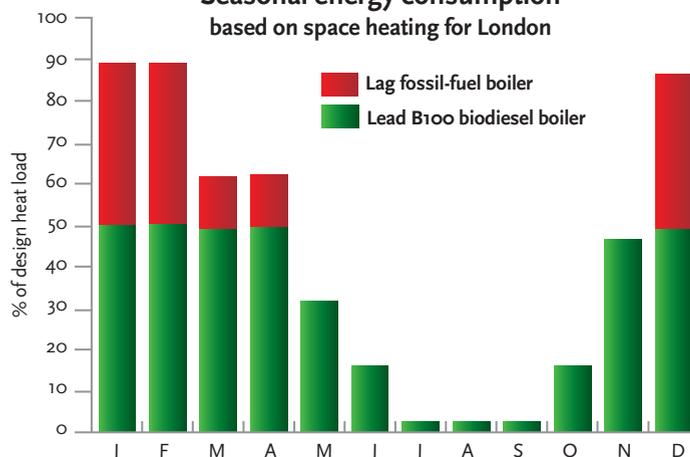
B100 biofuel condensing boiler



Biodiesel condensing² boilers recover most of the heat in the flue gases and, consequently, operate at much higher efficiencies. If the flue gases are cooled below their dew point, latent heat – as well as sensible heat – can be recovered.

- Maximum flow temperature 95°C; minimum return temperature 20°C
- Efficiency 92%GCV to 98%GCV

Seasonal energy consumption based on space heating for London



In typical London weather, biodiesel boilers may meet the base load throughout the year



Turning chip fat into fuel

To turn vegetable oil into biodiesel fuel, a chemical reaction process called esterification (or transformation) takes place. With used cooking oil, this is preceded by fine filtering.

The whole process causes the physical properties of the vegetable oil – in particular, viscosity – to correspond to those of conventional diesel fuels. As a benefit, glycerine emerges as an additional product used in the food, pharmaceutical and personal care industries.

The development of the transformation process has resulted in a precision industry that converts used cooking oil into blended biodiesel, approved to EN 14214. This is a European standard that determines fatty acid methyl esters – the most common type of biodiesel. EN 14214 embodies strict quality controls, which are vital to maintain standards.

by a number indicating the percentage of biodiesel. For example, B99 is 99% biodiesel, 1% fossil diesel.

The method can transform a wide range of products, including animal fats and other raw vegetable oils.



RADU BERCAN / SHUTTERSTOCK

➤ Biodiesel blends are designated as 'B', followed

Biomass versus biodiesel

Biomass	B100 biodiesel
Risk of burn-back between fire zone and fuel store	Attacks rubber-based joints and seals
Unburned fuel clogging the ash zone	Attacks brass and copper materials
Difficulty of establishing fire rate	Low-temperature congealing (needs to be kept within the temperature range of 5°C to 15°C at all times)
Burden of handling the ash	Uncertainty over supply point
Fuel blockage in the wood screw	
Damp fuel in the store	
Particulate matter in the flue gases	
Incomplete combustion and excess CO	
Extended manual attendance	

Technical disadvantages of biomass and B100 biodiesel boilers

Initial and running costs (estimates) – typical 300kW boiler

Biomass	B100 biodiesel
<p>Boiler + hopper space + undercover store £130,000</p> <p>Annual fuel costs for winter space heating: Wood pellets – 1000 kgs for £250 or 17,000 MJ for £250 = 68MJ per £1 30 weeks x 60 hours x 300kW x 0.7 weather factor + 30 weeks x 48hours x 300kW x 0.1 Boiler base load = 378,000 + 54,000 divided by 80% Efficiency = 540,000 kWhr or 1,944,000MJ or £28,588</p>	<p>Biodiesel boiler + oil tank £35,000</p> <p>Fuel – B100 – 75 pence per litre or 44MJ per £1 30 x 60 x 300 x 0.7 divided by 94%GCV = 402,128 kWhr or 1,447,660MJ or £32,901</p>
<p>Electric load – 5kW (burner + fuel handling)</p> <p>30 x 60 x 0.7 x 3 + 30 x 48 x 0.1 x 3 = 3,780 + 432 = 4,212kWh 12.5kW per £1 = £337</p>	<p>Electric load – 2kW (burner + oil pump)</p> <p>30 x 60 x 0.7 x 1 = 1,260 kWh or £101</p>
<p>Manual 30 wks x 4hrs = 30 x £120 = £3,600</p> <p>Service boiler £900</p>	<p>Attendance 30 wks x 1 hour £900</p> <p>Service boiler £900</p>
<p>Total first year – £163,465</p> <p>Total 20 years – £799,300</p>	<p>Total first year – £69,802</p> <p>Total 20 years – £731,040</p>

Costs are based on market prices



Pure biodiesel combustion process

Two chemical reactions take place

A. Carbon + Air > Carbon dioxide + Nitrogen + Heat & Light:

Carbon in the B100 combines with oxygen in the air. If carbon/air mix is incorrect, carbon monoxide (CO) is formed

B. Hydrogen + Air > Water + Nitrogen + Heat and Light:

Hydrogen in the B100 combines with the oxygen in air. If the nitrogen gets too hot, NOx is formed. Sulphur is almost negligible (0.002%) as against 0.29% in diesel fuel.

B100 biodiesel combustion – typical conditions

- CO lower than 20ppm
- Presently, NOx from 2 mg/kWhr to 40 mg/kWhr
- No lead, no sulphur, no benzene, no tuolene, no xylene, no particulate matter (soot)
- Pleasant odour
- Efficiency greater than 80% GCV and up to 98% GCV
- Boiler temperature range more than 20°C less than 95°C

in the feed circuit is regulated by the in-line pumps, and an overflow valve placed in the return.

Biodiesel boilers will operate efficiently down to 10% of output, and are capable of close control throughout the year. For example, in typical London weather, the biodiesel boilers may meet the base load throughout the year. Other fuels or forms of energy may be used to meet the extra demand of the peak winter months (see graph on page 59).

The B100 biodiesel boilers can have conventional or balanced flues. These are graded to the boilers to allow the condensate to drain to the rear of the boilers. The flues are precision-made from polyvinylidene fluoride (PVDF), which is extremely corrosion-resistant, hard-wearing, and not affected by ultra-violet radiation.

Hours of operations

Biodiesel boilers are particularly relevant for use in buildings that require long hours of boiler operation. The longer a biodiesel boiler runs, the larger the energy load it takes, and the greater the environmental advantage.

The Annual Hours table (see page 62) identifies different types of building and, in each case, gives an indication of the annual equivalent, full-load hours of boiler operation. Buildings of a similar heat load will probably require similar-size boilers, but these may run for vastly different lengths of time depending upon the use of each building. In each case, the biodiesel boiler must always be the lead boiler; two or three biodiesel lead boilers may be justified in the case of four- or five-boiler installations.

Biodiesel boilers can, therefore, be used to provide environmentally friendly space heating in the majority of buildings. They can be even more effective when space heating and centralised domestic hot water are considered together.

In a two-boiler installation, the lag boiler will be needed in the winter months. The lead boiler will also do 70% of its work in the five months from November to March, so both need to be at maximum efficiency in winter months.

Conclusion

Biodiesel boilers are cleaner and more efficient than biomass ones, and more environmentally friendly than traditional fuels. In addition, the material needed to produce it – waste oils – are readily



COND AIR - the new name for JS Humidifiers

“ Having been a member of the Condair Group for three years, JS Humidifiers is changing its name to Condair plc.

As well as manufacturing Condair products at our production facility in West Sussex and offering the full Condair humidifier range to our UK customers, we act as a central sales office for many Condair distributors around the world.

Rebranding to Condair allows us to streamline our UK operations and communicate our role within the world's leading humidification and evaporative cooling company.

For over 30 years, as JS Humidifiers, we have delivered the very best solutions for our customers' humidification requirements. Now under the name of Condair our mission is and always will be to continue to provide the very highest level of technical expertise and customer satisfaction. ”

See www.condair.co.uk for more info



Tim Scott,
Head of Sales, Condair plc

➤ available in the UK, whereas biomass relies heavily on shipping wood from Europe. What is required for the market in Britain to grow further, is for biodiesel to be fairly priced – unlike biomass it is not

supported by the Renewable Heat Incentive scheme – to reflect its potential as a reliable energy source. **CJ**

Annual hours table

Annual operation
1,800hrs

Hospitals, old people's homes, residential nursing homes

Annual operation
1,400hrs

Boarding schools, children's homes, greenhouses, botanical gardens, halls of residence, hotels, leisure and sports centres, motorway services, prisons, swimming pools, colleges and universities, fire stations

Annual operation
1,000hrs

Airport terminals, clinics and health centres, day nurseries and schools, factories and warehouses, libraries and museums, retail units, shopping centres, department stores, theatres and cinemas, bingo halls

Annual operation
700hrs

Cafés, coffee bars, pubs, restaurants, banks, churches, small shops, supermarkets, surgeries

Annual equivalent, full-load hours of boiler operation for buildings with varying uses

Bibliography

- 1 *Technology Roadmap; Biofuels for Transport*, International Energy Agency, 2011
- 2 *The market for biodiesel production from used cooking oils and fats, oils and greases in London*, Hugh Smith, Jonathan Winfield, Laura Thompson, LRS Consultancy <http://bit.ly/ZME1ka>
- 3 Renewable Transport Fuels Obligation (RTFO) data, 15 April 2011 to 14 December 2011
- 4 Written evidence submitted by UK Sustainable Bio-Diesel Alliance (UKSBA) <http://bit.ly/ZMFtms>
- 5 2011 production by country, EU biodiesel industry www.ebb-eu.org/stats.php
- 6 Department of Environment, Food & Rural Affairs – Farming Statistics, 1 June 2012
- 7 European Standard EN 14214:2008, published in English, French & German
- 8 *Key facts: Combustion, biofuels and and zero net carbon*, Dunphy <http://bit.ly/1pABRe7>
- 9 *Biodiesel – growing a new energy economy*, Greg Pahl 2005 p.7 et alia
- 10 *Planning & Installing Bioenergy Systems*, German Energy Society 2005 p.2 et alia
- 11 Atlantic Boiler data sheet: TDS 102.B100 www.atlanticboilers.com/manual/ATLANTIC_BIOFUEL.pdf
- 12 <http://www.atlanticboilers.com/bio-diesel-boilers.html>

A Worldwide Standard Meets World Class Energy Saving Controls



KNX Detectors
PIR & microwave detection

Complete KNX Functionality

It's the perfect joining of energy saving technologies! KNX, the established protocol for intelligent building control - and CP Electronics' energy saving microwave and PIR detectors specifically designed for KNX applications.

Our presence detectors work seamlessly with the KNX system to control lighting and heating.

Add to this the ease of configuration, our presence detectors give the installer total flexibility while also cutting installation time.

Lighting control for the most demanding areas

- Movement sensor, either PIR or microwave
- Walk test LED
- Light level sensor
- Two volt-free switch inputs
- Infrared remote control sensor
- User-configurable logic functions and timers
- Manufactured in the UK

connect with us

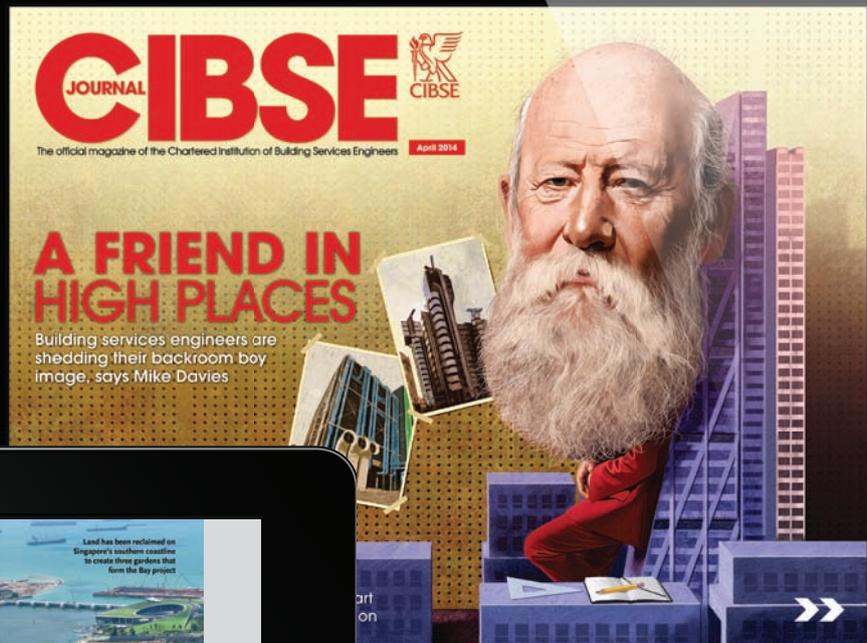
Call us today on +44 (0)333 900 0671 or visit our website www.cpelectronics.co.uk



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 or
search CIBSE in the store below



➔ See it online via www.cibsejournal.com

FRENGER[®] Accredited CPD Provider by CIBSE for Radiant Heating Technology

Did you know **FRENGER** have all the necessary testing laboratories under one roof at their UK Technical Facility to underpin their product solutions, be it **Radiant Heating**, **Multiservice Chilled Beams** and lighting (3 x Climatic Test Labs, 2 x Photometric Labs, 1 x Acoustic Sound Lab and Thermal Imaging).

Radiant Heating Panels



Modula™ - Water Driven Radiant Heating Panel

Chilled Beams



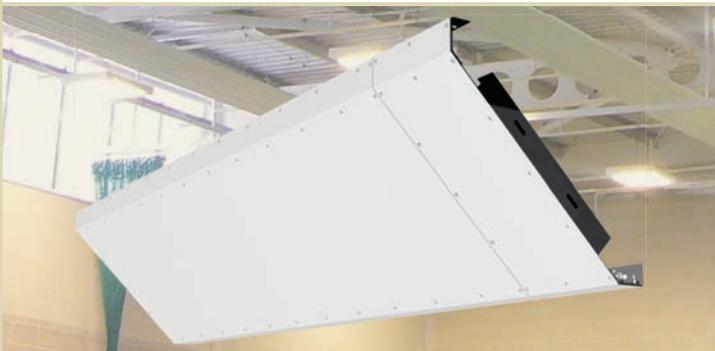
X-Wing® - 'Radiant' Passive Chilled Beam



Energostrip™ - Electric Radiant Heating Panel



Compact® - Active Chilled Beam



PNP™ - Water Driven Radiant Prison Panel



Eco® - Active Chilled Beam

FRENGER[®]

systems



www.frenger.co.uk sales@frenger.co.uk



Frenger[®] Systems is an FTF Group[®] Company

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 while the information they contain remains current.

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

Radiant heating with low temperature hot water

This module explores the underlying processes that drive radiant heating, and the application of simple and integrated service radiant heating panels

The application of low temperature hot water radiant heating in buildings can provide energy-efficient solutions that do not take up valuable floor or low-level wall area and, increasingly, can also offer quality assured integrated building services.

This CPD considers the underlying process that drives radiant heating, and discusses the application of simple and integrated service panels.

Thermal radiation

All real materials will radiate 'heat'. Radiant thermal energy may be thought of as consisting of electromagnetic waves or tiny, massless particles of energy, known as

photons. The molecular movements within a material are associated with electric and magnetic fields, resulting in the emission of photons, radiating energy through its surface boundary – as the temperature rises, the molecular movement increases and more radiation is transmitted. Science is still discovering phenomena associated with radiative heat flow that cannot be completely described by this depiction. However, it is perfectly adequate and, in practice far beyond the knowledge required for applications in building services engineering. Whether the energy is passing through a vacuum or the air in a room, it will move at the speed of light, so providing an instantaneous source

of heat that is available as soon as the emitter temperature is at a temperature higher than that of the receiving surface.

The temperature of a surface will affect the emitted electromagnetic frequency. At high temperatures – such as that of a 'red hot' coal fire or an electric bar fire – incandescence will make the flow of energy visible. At temperatures typically found in a building's HVAC system, the frequency will be lower and the wavelength will be such that it is no longer visible to human eyesight – known as the infrared ('below red') region, as shown in Figure 1. All objects will emit a spectrum of radiation, and even extremely hot surfaces that have the peak of their emissions at a high

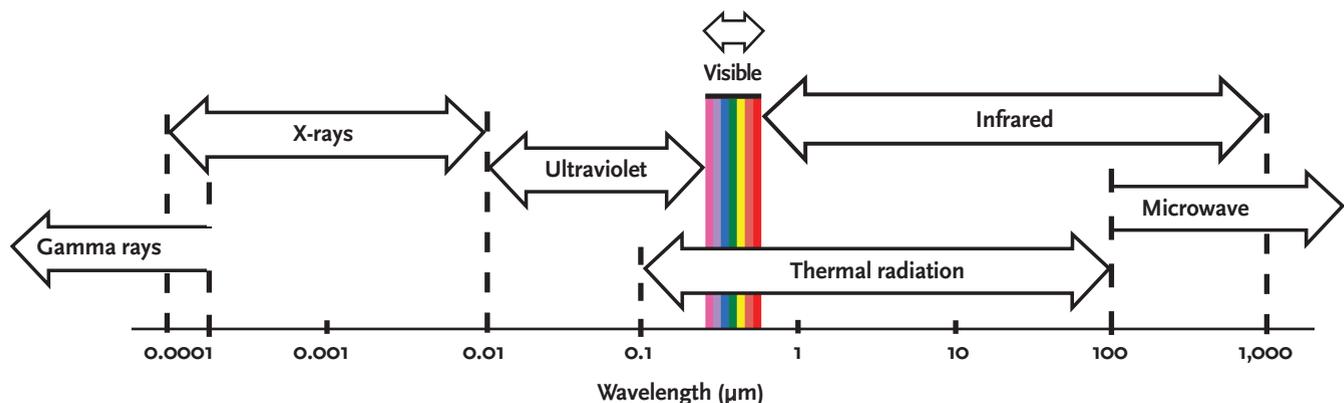


Figure 1: Electromagnetic spectrum

frequency, short wavelength (such as the sun, at a temperature of above 5,500K) will still emit most energy in the infrared region.

The surface temperature of low temperature hot water (LTHW) radiant heating panels is typically between 30°C and 70°C, so emissions are predominantly within the infrared region. These cannot be seen with the naked eye but, using an infrared-sensitive camera, the profile of the temperatures may be visualised. Figure 2 shows a free-hanging LTHW radiant heating panel under test, with its corresponding infrared thermal image.

The amount of available heat energy will be related to the absolute temperature difference of two objects to the power of four (that is, ΔT^4). This compares with convective and conductive heat flow, where the driving force is related approximately proportionally to the temperature (that is, ΔT). So, particularly at higher temperatures, the radiant heat transfer component will dominate the heat flow.

At lower temperatures – as typically encountered in buildings – small changes in temperature difference can more significantly alter the magnitude of the radiant, compared with convective, heat output.

The actual amount of energy received is dependent upon the temperatures, emissivities, absorptivities and mutually viewable surface areas of two objects – such as a ceiling mounted LTHW radiant panel and a floor. The ability to emit and receive radiant energy ('emissivity' and 'absorptivity') will depend on the materials, their shape and surface finish. The values will vary with frequency and are compared to the values for a theoretical 'black body' that has an emissivity and absorptivity of 1 (a perfect absorber). A polished silver surface has an emissivity of about 0.02 at room temperature, whereas black soot has an emissivity approaching 1, so soot may be used as approximating an ideal 'black body'. Apart from those extremes, the human eye is not good at judging specific values of emissivity. To analyse the radiation performance of systems requires detailed knowledge of the spectral (frequency-related) and directional radiation characteristics.

Electromagnetic radiation only delivers thermal energy when absorbed by another material; no energy is lost when passing through a vacuum and very little through air. When striking a material, the energy will be absorbed, reflected or transmitted (that is, passed through). If, for example, the photons strike a perfectly reflecting mirror, then no energy would be released. However, building materials (and building occupants) will perform somewhere between the theoretical

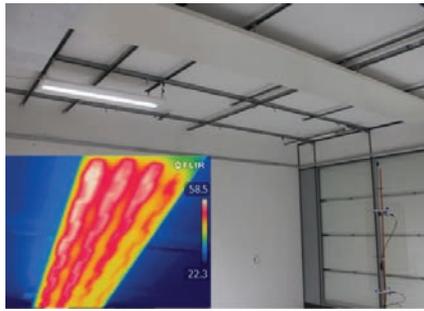


Figure 2: A ceiling-mounted radiant panel under thermal test, with associated infrared image (Source: Frenger)



Figure 3: A free-hanging ceiling radiant panel in a teaching space (Source: Frenger)

'black body' and a reflector. In practice, most non-metallised finishes in buildings (and people) have an emissivity of around 0.9. For example, a white enamelled radiant heater would typically have an emissivity of 0.95.

It is the exchange of energy between two bodies – rather than the absolute value of an object's heat radiation – that is of interest in building heating systems. An advantage of radiant transfer is that more energy is delivered if the temperature difference between the bodies is greater – hence, radiant heating could be thought of as self-balancing the heat flow to where it is required. For example, an external wall might have a lower surface temperature than an internal wall, so more energy would be exchanged to that than to warmer surfaces (the amount will depend on the position and surface characteristics of the materials).

Operational radiant heating

A greater contribution from radiant heat to an occupied space means that a lower air temperature is acceptable, while providing the same comfort levels. If properly controlled, this can result in energy – and cost – savings.

This may be readily illustrated using the CIBSE simple model¹ for sizing heat emitters, where a radiant component for a ceiling mounted panel can be in excess of 0.6, compared with a convector radiator with a radiant component of 0.1. Effectively, by increasing the average temperature of a room's surfaces – the 'mean radiant temperature' – the required air temperature

is reduced while maintaining the same 'mean operative temperature' (a function of air temperature, mean radiant temperature and air velocity). The value of mean radiant temperature varies in a room, depending on the surrounding temperature, emissivity and 'shape factor' – the fraction of radiant energy leaving one surface that is intercepted by another surface. Practically, for forensic purposes, the mean radiant temperature felt by an occupant at any particular point in a room may be measured with a globe thermometer mounted 1,140 mm off the floor.² For operational control, it is important that the room sensors are able to take account of both radiant and air temperatures, and that they are positioned appropriately – as discussed in the CLIMA 2007 paper by Simone *et al.*³ The term 'black bulb sensor' is often used for such a device.

For 'normal' room conditions (with an air velocity less than $0.2 \text{ m} \cdot \text{s}^{-1}$), the operative temperature, θ_e (°C), is simply the average of the mean radiant temperature, θ_r (°C), and the room air temperature, θ_{ai} (°C). However, if it is expected that air velocity is likely to be higher, then $\theta_e = A \theta_{ai} + (1-A) \theta_r$, where A is determined depending upon local air velocity, v_a ($\text{m} \cdot \text{s}^{-1}$), where $A = 0.5$ if $v_a < 0.2 \text{ m} \cdot \text{s}^{-1}$, $A = 0.6$ if $0.2 \text{ m} \cdot \text{s}^{-1} < v_a < 0.6 \text{ m} \cdot \text{s}^{-1}$, $A = 0.7$ if $0.6 \text{ m} \cdot \text{s}^{-1} < v_a < 1.0 \text{ m} \cdot \text{s}^{-1}$. So as v_a increases, the relative influence of the radiant temperature on comfort will reduce.

However, increased air changes will have less impact on the performance of radiant panels compared with convective systems, since the radiant component is unaffected by the air change rate, whereas convective systems must primarily raise the air temperature to maintain comfort conditions. This can provide an advantage for areas such as classrooms and lecture theatres (Figure 3), where doors may remain open between occupied periods, allowing significant volumes of air to pass through the space.

Shorter pre-heat times are often associated with radiant systems, due to the radiant heat transfer exchanging heat directly with the building's thermal mass. As soon as the radiant heating panel temperature is above that of the room's surfaces the building fabric will begin to absorb heat. Radiant heating panels have a lower water content than traditional radiator systems, so heat-up time is reduced, allowing more effective intermittent use. Low temperature hot water radiant ceiling-mounted heating panels will have a downward radiation component of approximately 60%. The remaining 40% is convected, maintaining the soffit temperature, and can prevent cold downdraughts. Unlike

shorter wavelength solar radiation that can pass through the glazing of a building, lower temperature, longer wavelength radiation from a radiant panel does not pass through glass, so can be used effectively in rooms with glazed façades.

Thermal comfort and air quality

Thermal comfort is realised with appropriate air and mean radiant temperatures, and no excessive vertical air temperature differences, extreme temperature asymmetry, or excessive air movement. A properly designed and installed radiant heating system will directly transfer heat to surfaces and objects (such as walls and floors) and then heat the air in the occupied space through secondary convection. Since the floor provides secondary heating, the thermal gradient within the occupied zone (0.1m to 1.8m from the floor) is typically 0.5 K – CIBSE⁴ recommends a maximum of 3 K for general applications. The vertical temperature gradient for various heating types is illustrated in Figure 4.

A room with high ventilation rates or significant infiltration can still maintain reasonable operative temperatures with radiant heating, since the radiant input is unaffected by the volume of airflow. It is important, however, to ensure that any asymmetric temperature felt by the occupant does not cause discomfort – as a matter of appropriate design and installation.

Heating a room with radiant (rather than convective) exchange results in less air movement, so reducing entrained airborne particulates. Since the radiant panels are typically simple flat surfaces with no extended ‘finned’ sections, cleaning is more readily undertaken. These combine to provide conditions where the indoor air quality is potentially improved, compared with a convective-dominated heating system

– making them particularly suitable for hospital and healthcare environments.

Building coordination and installation

As LTHW radiant panels are ceiling-mounted or free-hanging, they do not occupy valuable floor and wall space. And since radiant energy is not significantly affected by distance within a building, LTHW radiant panels can be used in areas with high-level ceilings – for example, atriums, lecture theatres and sports halls – without special consideration for the additional height.

Having the radiant panels mounted at high level also reduces the risk of occupants being accidentally burned, so installations require no special consideration for young children or vulnerable occupants. This also provides advantages in potentially hostile environments, such as prisons.

Radiant heating typically costs less to install than conventional systems, because the radiant heating panels are usually installed at ceiling level, making pipe routing and installation less restricted. The reduced water content in the radiant panel system also requires less inhibitor chemicals, saving on installation and operational costs.

It is becoming increasingly common to use ‘free-hanging’ radiant panels, so removing the cost of separate ceiling systems. These

have evolved into multi-service radiant panels (MSRPs) that integrate other building services – such as lighting, lighting control, and specific surfaces to reduce room reverberation time. Such systems are used to help meet the acoustic (described in Building Bulletin 93⁵) and lighting (as per *Lighting Guide 5*⁶) requirements for schools, while also delivering heating (as in Figure 5). MSRPs will be factory prefabricated, providing accelerated installation and improved quality control. They are well suited to restricted height projects, where finished soffit heights are relatively low – for example, 2.7m above floor level. The off-site prefabrication of MSRPs provides the quality assurance and manufacturing/procurement advantages of construction in a controlled factory environment. Factory assembly can reduce the project construction period, as MSRPs can be simultaneously assembled and tested while the building is constructed – so meeting ‘just in time’ programmes and reducing the need for skilled site workers.

© Tim Dwyer, 2014.

Further reading:

A comprehensive text is *Radiant Heating and Cooling Handbook* by Richard Watson, McGraw-Hill Professional, 2008, covering a range of areas, from fundamental radiation principles to application case studies.

References:

- 1 CIBSE Guide A, Section 5.6.2, 2006.
- 2 Tredre, B., Assessment of mean radiant temperature in indoor environments, *British Journal of Industrial Medicine*, 1965.
- 3 Simone, A., et al, *Operative temperature control of radiant surface heating and cooling systems*, Clima, 2007.
- 4 CIBSE Guide A, Section 1.5.6, 2006.
- 5 Building Bulletin 93, *Acoustic design of schools*, Department for Education and Skills.
- 6 *Lighting guide 05, lighting for education* (SLL LG5), CIBSE, 2011.



Figure 5: An application of multi-service radiant panels in a health centre (Source: Frenger)

Turn over page to complete module ➤

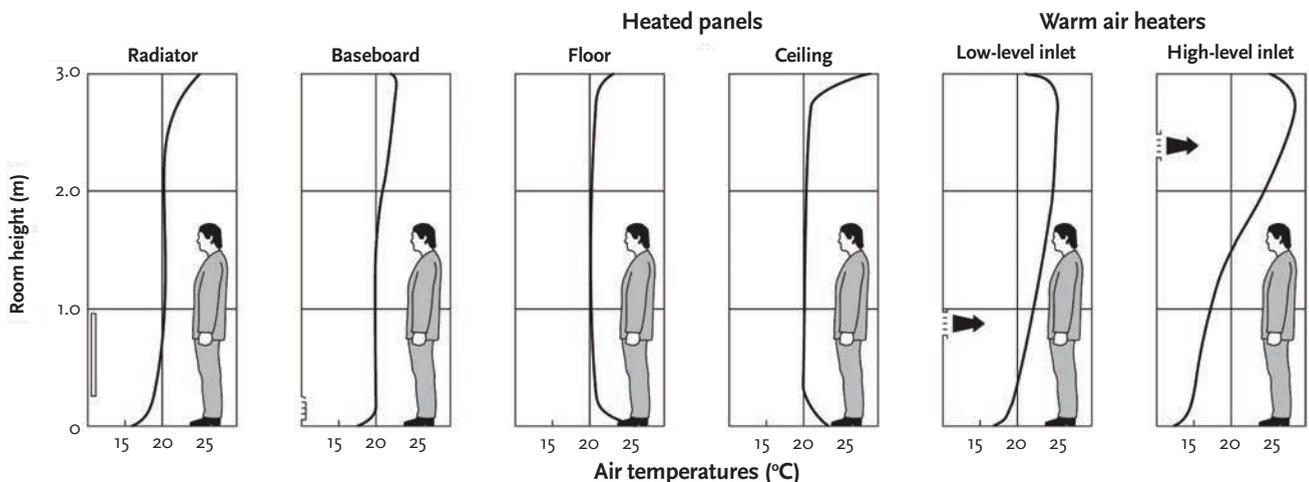


Figure 4: Vertical air temperature gradients for different heating types (Source: CIBSE Guide A 2006)

Module 70

November 2014

1. Which of these electromagnetic wavelengths is most likely to fall into the infrared range?

- A 0.0001 μm
- B 0.001 μm
- C 0.01 μm
- D 0.1 μm
- E 1.0 μm

2. Which of these surfaces is likely to have the highest surface emissivity?

- A Polished silver surface
- B Soot-covered surface
- C Plastered wall
- D White-enamelled radiant heater
- E Mirror

3. What is the radiant heat output component of a convector radiator likely to be?

- A Approximately 0.1
- B Approximately 0.3
- C Approximately 0.5
- D Approximately 0.7
- E Approximately 0.9

4. What is the typical temperature difference between 0.1 m and 1.8 m (off floor level) when using a ceiling-mounted LTHW radiant panel?

- A 0.1 K
- B 0.5 K
- C 1 K
- D 2 K
- E 3 K

5. Which of these is unlikely to be an attribute of MSRPs?

- A Able to be suspended at 2.7 m above floor level
- B Possible to integrate lighting
- C Potential to modify room reverberation time
- D Provides slow response due to high water content
- E Off-site manufacture

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 Frenger Systems, 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 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

Aspire to complete hydronic control and system efficiency.

Aspire to Spirotech.



Our comprehensive range of services includes:

- **Pressurisation systems** – controlling system pressures and conditioning water refill
- **Deaeration equipment** – removing air, inhibiting corrosion and contaminates build-up and reducing energy costs
- **Dirt separators** – removing circulating particulates, providing long-term protection and reducing maintenance costs
- **System analysis** – diagnosing problem systems and planning the best long-term solutions
- **Chemical treatment** – cleaning and protecting your investment

Only one company offers you a total solution to make sure your system is operating at optimum efficiency.

Calling upon over 40 years' experience and expertise, Spirotech seamlessly integrates all relevant disciplines to look at the complete picture, rather than focusing solely on expensive chemical regimes to achieve hydronic stability.

Whether it's designing new installations or providing solutions for problem sites, rest assured Spirotech has the full system knowledge to meet even your most specific requirements.

Now represented in over 60 countries worldwide, Spirotech's total solution approach is matched by a complete confidence in our services and products.

So if you'd like to aspire to higher efficiency and lower overall project costs, visit www.spirotech.co.uk, call one of our sales engineers on **0208 451 3344** or email info@spirotech.co.uk

SPIRO  **TECH**
FOR BETTER PERFORMANCE

 **CIBSE BUILDING PERFORMANCE AWARDS 2015**

Proud to sponsor the Energy Saving Product of the Year Award





Titan Products' TPZ-NET wireless CO₂ range expands further

The wireless CO₂ sensors launched by Titan Products include the TPZCO₂T/L, which adds LED indication for CO₂ to a battery life of up to three years. The CO₂ sensor is wireless and battery-driven, so requires no wiring for power, or for the signal to controllers. The TPZCO₂T/L will monitor CO₂ and temperature, and transmit values to the Titan TPZ-COORD coordinator via Zigbee communications.

● Call 0161 406 6480, email admin@titanproducts.com or visit www.titanproducts.com

Adiabatic air-inlet cooling

EcoMESH is a unique, mesh and water-spray system that improves the performance of air-cooled chillers, dry coolers and refrigeration plants, while reducing the energy consumption by up to 44%. EcoMESH has been fitted to troublesome units worldwide, where its patented water-spray technology eliminates problems and, once fitted, is virtually maintenance-free. It can be retrofitted to any model, make or size of air conditioning and refrigeration unit.

● Call 01733 244224 or visit www.ecomesh.eu



Mikrofill at Langley Park School

Langley Park School for Boys has undergone a major refurbishment, with the secondary school having been demolished and rebuilt, with a new performance space. A Sport England sports hall was built adjacent to the Phythian Building, which was retained and refurbished to bring it in line with the new builds. Design and build experts

LJJ Limited, of High Wycombe, specified Mikrofill's Ethos floor-standing condensing boilers and Extreme loading cylinders for both the new school and the refurbished Phythian building.

● Call 03452 606020 or visit www.mikrofill.com

Logic HIUs from Ideal Commercial make good sense

Ideal Commercial Boilers has launched its new range of Logic heat interface units (HIUs), the latest heating-system solution designed to maximise efficiency in multi-residential buildings when integrated with

centralised commercial condensing boiler plant. Providing localised heating control for individual dwellings in multi-residential buildings, the Logic HIU operates as a control interface between the centralised heating plant and the heating and hot-water system within each flat. Logic HIUs offer advanced anti-clog technology for optimum reliability, and a fully insulated cover minimises heat loss.

● Call 01482 492251, email commercial@idealheating.com or visit www.idealcommercialheating.com

PEL Services completes sound system for flagship Debenhams store

PEL Services has completed the design, supply and installation of a music and public address system at Debenhams in Oxford Street, London, as part of the store's £25m refurbishment. The digital sound system features 650 ceiling speakers, making it one of the largest Bose ceiling-speaker installations in the UK. The system has been zoned by PEL – two per floor, plus a dedicated zone for the atrium escalator – so each area can play different announcements.

● Call 0333 123 2100 or visit www.pel.co.uk or www.pelav.co.uk



Remeha boilers provide top-class heating at college

Two energy-efficient Remeha Gas 310 Eco Pro gas condensing boilers have been specified at Sunderland College, to assist in meeting the Very Good BREEAM rating target of its newly opened £22 m sports and visual and performing arts facilities.

David Wright, director at Desco and M&E consulting engineer on the project, said: 'This is one of the best installations we have ever seen. Sunderland College has long-term quality and efficiency expectations that these Remeha boilers help achieve.' The main contractor was BAM Construction; the M&E contractor was Castle Building Services, led by Matty Mitchell; and the architect was Redbox Design.

● Call 0118 978 3434, email boilers@remeha.co.uk or visit www.remeha.co.uk



NO_x class 5 condensing boilers for care home

The Avondale mental healthcare centre, in Liverpool, is a 50-bed unit, established in 1991 by charity Delphside. When first built, the centre was fitted with Atlantic Boiler's world-leading Optimagaz and Condensagaz E Series gas condensing boilers. The centre has just undergone a complete refurbishment, and two of these long-life boilers have been replaced by the latest technology. Two VF 100kW, pre-mix, low-NO_x gas condensing boilers – computer-controlled and programmed for continuous comfort and maximum economy – have been installed.

● Call 0161 621 5960, visit www.atlanticboilers.com or email nabeela@atlanticboilers.com



Taking control of lighting at Sunderland College's new buildings

Two new buildings on the Bede Campus at Sunderland College have been fitted with a networked lighting-management system from CP Northern, to ensure optimum use of lighting, with minimum energy consumption and carbon emissions. The £22m expansion of the campus includes a new sports hall with fitness suite, sports laboratories and teaching rooms, while the second building provides a new performance hall, dance and drama studios, music recording studios, and a digital film lounge.

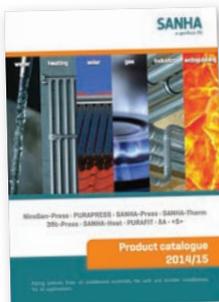
● Call 0845 0755884, fax 01785 330788, email sales@cpnorthern.co.uk or visit www.cpnorthern.co.uk



PCM offers thermal solution

Phase Change Materials (PCMs) are ideal products for thermal-management solutions. This is because they store and release thermal energy during the process of melting and freezing – in the same way an ice cube maintains a prolonged cooling effect in a glass of water. This very simple concept enables a bridging of the gap between energy requirement and energy use. When applied correctly, PCMs can offer free cooling, increased efficiency, and lower system-running costs. PCMs between 8°C and 20°C can be simply charged using a free cooler overnight – without the use of a chiller – and, later, the stored free energy can be used to handle the daytime sensible building loads.

● Call 01733 245511, email info@pcmproducts.net or visit www.pcmproducts.net



Sanha releases extensive range in new 2014/15 catalogue

Sanha, the German manufacturer of pipes and fittings, has announced the release of its latest product catalogue for 2014/15.

The extensive range of conventional soldered, threaded and welded fittings – alongside the

fully developed push-and-press fittings – can now be viewed in one location via the Sanha catalogue. With its reputation built on the high-quality materials used in all fittings and pipes, Sanha provides 252 pages of detailed product information and applications for use, available in electronic and printed format.

● Call 01628 819245 or email uk@sanha.com

Timoleon and Alpha-Innotec link up for RHI

The UK's carbon-reduction targets – and the recent extension of the Renewable Heating Incentive (RHI) to include domestic properties – have underlined the benefits of heat pumps. They have also prompted a new collaboration between Timoleon and one of Europe's best-known ground- and air-source specialists. The manufacturer of the Hydronik range of underfloor systems has become the sole UK distributor for Alpha-InnoTec, referred to as *Die Wärmepumpen-Spezialisten* – the heat-pump specialist.

● Call 01392 363605, fax 01392 364871, email emily.withers@Timoleon.co.uk or visit www.hydronik.co.uk



Torin-Sifan launches energy-efficient centrifugal fan range

Torin-Sifan has launched an innovative range of forward-curved centrifugal fans, powered by its latest generation EC motor platform. A leading manufacturer and supplier of direct-drive centrifugal fans to the UK and European HVAC industry, Torin Sifan's new energy-efficient EC direct-drive centrifugal fans are not only compliant with the European Energy Related Products (ErP) Directive for 2015, but they also exceed the directive's required fan motor efficiency grades by nearly 50%.

● Call 01793 524291 or visit www.torin-sifan.com



Remeha Commercial celebrates move to new headquarters

Remeha Commercial's new headquarters, Innovation House, in Wokingham, was officially opened on 25 September by David Fitzpatrick – chairman of CIBSE Patrons – and the Mayor of Wokingham Borough, Cllr Ulla Karin Clark. 'The move has come at just the right time,' said Remeha MD, Mark Northcott. 'With increased office and meeting space, and a dedicated hub for our growing training centre, Innovation House is the perfect foundation for further growth and success.' Northcott praised the hard work of his 70-strong staff, who presented a cheque for £4,700 to Marie Curie Cancer Care, Remeha Commercial's charity partner.

● Call 0118 978 3434, email boilers@remeha.co.uk or visit www.remeha.co.uk

B&Q goes natural

A major new 56,800ft² B&Q store in Bedford boasts an innovative, combined, smoke and natural-ventilation strategy, provided by Adexsi UK. The system delivers a high level of thermal control and improved indoor air quality, as well as helping to safeguard life and property. Adexsi's CE-certified Certilight dual-casement smoke ventilators are well insulated to help regulate the internal temperature by reducing heat losses during winter months. During the summer, the Adexsi ventilators will automatically power open to introduce cooler air.

● Visit www.adexsiuk.com



Myson radiators provide gold-standard heating for the Glasgow Commonwealth Games

As part of the transformation of an 88-acre site in Dalmarnock, Glasgow, Myson Premier and Select Compact radiators have been installed in 700 houses and flats that helped to accommodate more than 6,500 athletes and support staff during the Commonwealth Games in July. Built by the City Legacy Consortium – which includes Mactaggart & Mickel, CCG, Cruden Homes and W H Malcolm – the houses are part of the regeneration of the area, and are available to rent or buy.

● Visit www.myson.co.uk



Grundfos Facebooks the future

During Facebook's 10th birthday celebrations recently, it was announced that the social networking site had 1.23 billion users worldwide. It is estimated that 24 million people in the UK alone log in to Facebook every day.

Originally a medium for keeping in touch with friends and family, it has evolved into a multi-communications forum, for the sharing of information and views.

With the lines between work and leisure getting increasingly blurred, Grundfos Pumps, in the UK, has set up a Facebook page – in support of its iSolutions platform – that will help customers to get the most out of complex integrated pump systems.

Initially targeting professionals involved in the design of commercial buildings services and working with pumps in the industrial sectors, it is expected that this Facebook page will become a key area for sharing information, and an important driver in the world of pump engineering in the future.

● Call 01525 850000, email grundfosuk@grundfos.com, or visit www.grundfos.co.uk or www.facebook.com/grundfosengineering.uk



Key Unilever research and development site made secure by Castel

Unilever's main UK-based laboratory and research centre – at Port Sunlight, on the Wirral, Merseyside – has upgraded its security system using the latest CAP IP intercom stations from Castel. Installation company Grange Fire and Security was tasked with updating the access control, CCTV, and intercom system throughout the complex. Part of the project required 22 of Castel's specialist IP intercom units to be installed at the gates, barriers and turnstiles, as well as at staff and visitor entrances, and goods in/out.

● Call 0844 870 6729 or email sue.kenneally@msecmarketing.com



New Fluke 1000FLT fluorescent light tester performs all essential lamp tests in less than 30 seconds

Fluke, the world leader in compact professional test tools, has introduced a fluorescent-light tester that eliminates the guesswork in maintaining fluorescent lamps. It performs all the essential tests – lamp, ballast, non-contact voltage, pin continuity, and ballast discriminator – in less than 30 seconds. The new Fluke 1000FLT fluorescent light tester eliminates trial, error and rework, and reduces the time that maintenance teams spend fixing lights.

● Call 0207 942 0700, email terry.hilder@gmail.com or visit www.fluke.co.uk



Sontay partners with Synapsys Solution

Sontay, the field controls and peripheral suppliers, and Synapsys Solutions – developer and supplier of

communication interfaces for the built environment – have joined forces to create Trend and BACnet interfaces for the SonNet wireless system. Suitable for a range of applications and protocols, SonNet – powered by SIP – gives system integrators, contractors and consultants more flexibility. It is ideal for applications where air temperature and ventilation control is crucial.

● Email sales@sontay.com or enquiries@synapsys-solution.com, or visit www.sontay.com or www.synapsys-solutions.com



Sustainable heating for ethical hotel

Elco UK, formerly MHS Boilers, has supplied two gas-fired GB6-12 Energator CHP units, two 145kW Thision L wall-mounted boilers, and three Inox-Maxi single-coil cylinders to the new Qbic Hotel, in Whitechapel, London. Consisting of 171 bedrooms, the hotel's unique concept is centred on the Cubi – a prefabricated room that arrives flat-packed from China, and that can be assembled in a day. All Cubis are connected to the building's main M&E services, with heating and hot water provided by the Energator CHP and Thision L boilers.

● Visit www.elco.co.uk



PRODUCTS & SERVICES

Telephone: 0207 324 7633 Email: greg.lee@redactive.co.uk

Metsec is first PAS 99:2012, integrated management-certified, cold-roll forming specialist

Oldbury-based lightweight structural steel and cold-roll forming specialist, Metsec, has been recognised by BSI – the business standards company – as one of the first manufacturers of its kind to operate an integrated management system (IMS) that complies with the requirements of PAS 99:2012. The standard for integrated management systems, PAS 99, was developed to help organisations adopt a systematic and streamlined approach to business processes, by reducing the time spent on internal auditing, eliminating multiple audits, and simplifying management control.

● Visit www.metsec.com or follow @Metsecplc on Twitter



Warming, cooling and clever – the all new Vido from Purmo

By combining high heat outputs from an internal heat exchanger, with intelligent technology, the stylish wall-mounted Vido will not only keep you warm in winter, it can also keep you cool during the summer months.

Cleverly designed using Purmo's much-favoured Kos casing, the Vido – used in conjunction with the Kos radiator – can create a unified elegant look throughout a property, blending both cutting edge convector and more traditional radiator technology.

● Visit www.purmo.co.uk

Have greater control of your building's performance

Heating and hot-water system efficiency is paramount to the energy compliance of a building, so specifiers, contractors and local authorities are turning to the latest technology to address this. Pegler Yorkshire has developed an energy-management solution that simplifies this emerging technology. The company's energy-efficient solutions for centralised boiler plants include heat interface units (HIUs) from the Meibes range. A HIU offers improved energy efficiency and SAP ratings, no gas installation throughout the building, ease of access to heating plant for maintenance, and a simple integrated solution of low-carbon and renewable heat sources, making it easier for planning consent.

● Call 0844 243 4400, email brochures@pegler.yorkshire.co.uk or visit www.pegler.yorkshire.co.uk



DIRECTORY Your guide to building services suppliers

Telephone: 020 7880 6200 Email: cibse@redactive.co.uk

Air Conditioning

For total solutions in air-conditioning

E: info@clivet-uk.co.uk
 W: www.clivet.com
 T: 01489 572238
 W: www.versatemp.co.uk

Air Conditioning

EUROPE'S LARGEST INDEPENDENT DAIKIN DISTRIBUTOR

Nobody knows Daikin better

Space Air has been supplying Daikin finished goods and spare parts since 1980.

Call now for the best prices and availability!

01483 504 883

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 Web: 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
 W: www.birlingconsulting.co.uk

Freelance Services

EPSILON CONSULTANTS
 THE ENERGY SPECIALISTS

.....

Mike Glanfield 07624 346826
 CV & portfolio: <http://tinyurl.com/kd4uvtr>
info@epsiloniom.com
www.epsiloniom.com

LST Radiators

Range of Low Surface Temperature radiator models to suit all budgets & applications

- Easy installation – ready assembled
- Attractive functional design
- BSRIA tested outputs and surface temperatures
- SteriTouch® antimicrobial surfaces as standard
- Energy efficient copper aluminium emitters

BSRIA

Call 01787 274135
www.autron.co.uk

Pump Packages

LEADERS IN FLUID PUMPING EQUIPMENT AND CONTROLS

- Water Pressure Booster Sets
- Tank Level & Temperature Controls
- Sealed System Pressurisation Units
- Bespoke Design Service
- Water Storage
- Energy Efficient
- Hydraulic Shock Control

Head Office: 01206 215121
 Manchester: 0161 226 4727
www.aquatechpressmain.co.uk

DEVELOP THE M&E DESIGN FOR A TUDOR WARSHIP (AND THE WORLD'S ONLY FERRARI THEME PARK)

More info and details of M&E vacancies at ramboll.co.uk/buildings



WITH 10,000 ENGINEERS, DESIGNERS AND CONSULTANTS, WE CREATE SUSTAINABLE SOLUTIONS WITHIN BUILDINGS, TRANSPORT, ENVIRONMENT, ENERGY, OIL & GAS AND MANAGEMENT CONSULTING.

CIBSE JOBS
JOURNAL
The official magazine of the Chartered Institution of Building Services Engineers

Are you looking for experienced staff?

Then advertise to the professionals.

To reach CIBSE members contact the recruitment team now at paul.wade@redactive.co.uk or call on 020 7880 6212

With over **20,000** CIBSE members receiving the **magazine**, **15,000** receiving the **e-newsletter** and over **6,000** 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**.



Mechanical Design Engineer | London | Perm or Contract | ref: 6270SW

An opportunity has arisen to join a global consulting firm who design thousands of critical infrastructure projects worldwide. Working within the heart of the design team you will work on projects including; signature high rise buildings, hospitals, airports and large international developments. Excellent opportunity for career development.

Sustainability Consultant | London | to £45K + Bens | ref: 6542SW

Our client is a leading multi-disciplinary engineering consultancy seeking a Sustainability Consultant to join their energy team. The ideal candidate will hold BREEAM AP Accreditation and have knowledge of Codes for Sustainable Homes.

Principal Mechanical Engineer | Surrey | to £60K + Bens | ref: 6267SW

An opportunity to join one of the leading design, engineering and project management consultancies in Surrey. Through securing a number of prestigious rail projects they are seeking a Principal Mechanical Engineer to join their thriving team. Ideally Chartered or working towards.

Public Health Engineer | Surrey | to £40LTD | ref: 6533SH

Due to significant project wins, our client seeks a Public Health Engineer to join their established team working on a large scale residential project. Long term contract!

Principal Electrical Engineer | London | to £40LTD | ref: 6108RM

One of the largest multi-disciplinary building consultancies are looking for a Principal Electrical Engineer to join their successful team working in a client facing role. You will manage numerous projects from detailed design to client handover on a 12 month+ contract.

For further information or to find out about other positions Blueprint are recruiting for, please call one of our specialist M&E recruiters.

t: 02392 603030

e: cv@blueprintrecruit.com

www.blueprintrecruit.com



*To Lead, Support and Deliver
Exceptional Property Solutions*

Concertus is a multi-disciplinary property and design practice based in Ipswich.

Senior Electrical Engineer

Competitive salary with rewarding package

You will be an experienced, qualified electrical engineer, who has held similar roles in a design capacity, who has significant experience in the building services sector.

Senior Sustainability Engineer

Competitive salary with rewarding package

You will ideally hold a Master's degree in Sustainable Energy, Environmental Engineering or a similar discipline and have extensive knowledge of thermal modelling.

Mechanical Engineer

£25,000 to £35,000 per annum

You will be an experienced, qualified Mechanical Design Engineer, ideally proficient in the use of industry design software and knowledge of HVAC technologies.

Closing date: 29 November 2014.

To apply for any of these opportunities, please forward a covering letter and copy of your CV to debra@bluestarhr.co.uk or call 01473 281650 for further information.



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

Mechanical Associate

London, £60 - 65k + Car + Benefits

A top 10 international multi-disciplinary consultancy have an opening for a Mechanical Associate to head up an established team of MEP Engineers that specialise in high-end major projects. You will be chartered with solid career history of delivering projects from inception to completion within a large design consultancy. The role would suit a highly motivated, personable and positive individual who is keen to create their stamp and drive the company forward in this busy market. BAR2246/CB

Senior Electrical Design Engineer

Central London, £33 - £38p/h

We are working in partnership with one of the UK's largest consultancies in their search for a Senior Electrical Engineer for a minimum 12 month contract. To be considered for this role applicants must come from a building services background and have experience working on commercial and residential projects. BAR1925/WS

Associate Director

Dubai - UAE, To 46000 Dirhams PCM

This position represents an amazing opportunity to join a world leading MEP design team in the UAE. You will be responsible leading and managing design teams, contributing towards and preparing bids, business development, and overseeing the co-ordination of design projects. Successful candidates should be able to demonstrate a commitment to low energy design, be degree qualified, and possess substantial post graduate experience having worked at a similar level. Ideally you will be a chartered engineer with experience of designing high rise services greater than G+40. BAR677/PA

Public Health Engineer

London Circa £40p/h

A leading multidisciplinary consultancy seeks a Building Services Public Health Engineer to join their busy, growing team. If you have a minimum of 6 years of industry experience and would like to be involved in some of UK's most iconic projects on minimum 1 year contract; you need to contact us! BAR2243/MA

Senior Mechanical Design Engineer

**Senior Mechanical Design Engineer
London, £30 - £40p/h**

A brilliant opportunity has arisen with one of the top M&E consultancies in London, with a diverse range of projects including mission critical, commercial, education, and healthcare spread across the UK, Europe, and the Middle East. This is a great opportunity to work on some of the most innovative projects being undertaken by UK consultants at this time. BAR2220/KB

Intermediate Mechanical Engineer

£30 - 35k + benefits, London

I am working alongside a world class multi-disciplinary engineering consultancy at the forefront of Building Services engineering that are currently looking to recruit an Intermediate Mechanical Engineer. Their London office has an outstanding award winning Building Services group who are currently involved in aviation, major commercial, infrastructure, and heritage projects in the UK and across the globe. BAR2190/JA

Thinking of your future

www.b-a-r.com



conrad consulting
technical recruitment specialists

further your career

Senior Electrical Design Engineer Birmingham

£34-£38 per hour (Ltd)

Do you enjoy the challenge of large scale international projects and leading a team throughout the process? If so, then we are looking for you! Our client is one of the top 10 leading UK consultancies who have secured 24 months' worth of work for the successful candidate. Projects range from healthcare through to luxury hotels.

Senior Design Engineer (Mechanical) Glasgow

£28-£34 per hour (Ltd)

Our client is almost one of the biggest and most well-known multidisciplinary building services consultancies in the world. Leading the market in their recent project win we are looking for a senior level mechanical design engineer to lead one of the largest aviation projects in South East Asia. This is an ongoing contract role.

Senior Mechanical Design Engineer - 18 Month Contract Central London

£40-£43 per hour (Ltd)

As one of the leading consultancies in London, with projects to support this, our client has just successfully secured project wins of a range of Luxury Hotels based in Asia. With the advantage of the media behind these new projects, you will be able to put your mark on ground breaking landmarks adding a whole new level to your already illustrious portfolio of achievements.

Principal Mechanical Design Engineer Warwickshire

£50,000 Plus Benefits

Our client, a leading UK construction group, now have a fantastic opportunity for a principal mechanical design engineer to join their operations in Stratford-Upon-Avon. Due to an increase in project wins, you will have the chance to lead large teams to provide innovative, imaginative, cost effect design within the built environment in a range of varying sectors. A great opportunity for the right candidate to progress towards associate level.

Principal Electrical Design Engineer Harrogate

£50,000 Plus Benefits

An ambitious and self-motivated principal electrical design engineer is required by our client to work on a broad range of building services projects. You will need to have a strong technical design background, excellent project and team leading ability as well as good client liaison skills. This is a superb opportunity for a principal engineer looking to progress their career within a well-rounded consultancy.

Senior Mechanical Design Engineer Cambridge

£45,000 Plus Benefits

A well-rounded building services consultancy, who hold a famous project portfolio working within sectors such as residential, leisure and retail developments are looking for a senior mechanical engineer.

This office is rapidly expanding, and is therefore looking for an engineer to join them as soon as possible to get involved with the planning of their next expansion phase. This is a great opportunity to climb the promotional ladder quickly!

Associate Electrical Design Engineer South London

£60,000 Plus Benefits

A small – medium sized building services practice, who have an incredible reputation for pioneering services design, are looking for an Associate Electrical Engineer. Within this role you will lead the Electrical team, whilst coordinating MEP services from different departments. This is a client facing role where you will be liaising with a number of the Top 20 AJ100 Architectural practices in Central London on international projects.

Associate Public Health Engineer Central London

£60,000 Plus Benefits

An international multi-disciplined engineering practice are currently looking for an Associate PH Engineer to lead the Department.

Senior Mechanical/ Sustainability Engineer

City of London

45,000-£50,000 Plus Benefits

A pioneering architectural practice with a large building services division is currently seeking a senior engineer to work in a diverse role between their Mechanical Engineering and Sustainability Department. Reporting to the Associate Director you should be an experienced mechanical engineer with passion and experience in sustainability discipline within the built environment.

Building Services Design Manager Hertfordshire

£50,000-£55,000 Plus Benefits

This international residential developer is currently looking for a Building Services Design Manager, to manage the design process on a number of new developments in and around London. This is a fantastic autonomous role working on a number of well known, high end developments. This developer is well established in the UK Market and are renowned to employ some of the best talent. Candidates should have a design background and experience working on residential projects.

Thermal Modeller Liverpool

£30,000 Plus Benefits

Are you an experienced sustainability consultant/ thermal modeller currently working within the Building Services industry? My client has a fantastic opportunity for an experienced thermal modeller to join their office in Liverpool and build a sustainability department. The ideal candidate will need excellent experience in using TAS/ IES thermal modelling and have ability in creating 3D models.

Find more jobs online at
conradconsulting.co.uk

For more information about any of these positions, please contact graham@conradconsulting.co.uk or call 0203 1595 387

For a confidential chat, call us 8am to 8pm on 0203 1595 387

FRONT LINE EFFICIENCY

Bedfordshire Police has delivered a 25% cut in energy bills in two years through its energy-saving initiatives, and now plans a further reduction of 20% in the next three years. The force's **Nigel Achurch** explains



An initiative to improve its energy efficiency has already led to huge energy savings at the police force estate, which comprises 41 properties spread over 19 sites, plus three radio mast sites.

The Bedfordshire Police Environmental Strategy 2013-18 aims to protect the environment, while delivering value for money. The key elements include conserving resources, minimising pollution and waste, maximising recycling, and monitoring and reviewing progress.

To improve the environmental efficiency of its 31,646m² estate, the force is looking at occupancy profiles of its buildings, targeting controls and assessing opportunities to improve building performance during refurbishment projects.

The renewal of services will also offer opportunities for increased energy efficiency, both in the specification of plant and equipment and subsequent control. Meanwhile, the strategy will facilitate potential ongoing renewable energy use within the sites.

According to the strategy, all new properties will aspire to BREEAM Excellent standards of environmental management.

Why did Bedfordshire Police Force undertake an energy reduction programme?

With a change in the management of the estates and facilities department within Bedfordshire Police two years ago – combined with central government funding of policing forces being hugely reduced – we took the decision to re-examine every area of revenue expenditure that was

Publishing recycling figures makes people sit up and take notice, and adds a small element of competition between the sites

taken, and one of the largest areas was the utility costs.

The estate had received some funding for environmental projects in the past, but this was largely used for updating plant and equipment, rather than setting new philosophies and targets.

What are your goals?

To achieve a further reduction of 20% in the next three years. However, this will largely be achieved through the loss of redundant building stock, resulting from the adoption of agile working and mobile policing technology.

What energy reduction initiatives has Bedfordshire Police embarked on?

Assessing the utilisation of each area of the buildings and areas, and dividing them into both nine to five and 24-hour use groups.

This allowed us to target the controls at the nine to five group, and to use low energy options for the 24-hour group. This looked at heating, cooling and lighting, as well as extensive improvements in insulation and heat recovery technology.

All options were considered, but because funding was increasingly difficult to secure, only the options with very short paybacks were implemented, with the more costly options integrated when areas were refurbished.

What has been the most effective strategy?

The division of areas between the two working times, plus re-organising

teams and units on similar working patterns onto the same floor/area, while being mindful of the need for internal communication between the teams. Small changes in office arrangements and location achieved huge results.

Are the organisation's employees being encouraged to save energy?

We publish our recycling figures monthly, and have invested in a real-time energy monitor located within our main headquarters reception.

Publishing the recycling figures makes people really sit up and take notice, and adds a small element of competition between the different sites. But by far the most unexpected success has been the energy monitor, and people's fascination with how much energy they are personally responsible for.

How do you ensure the philosophy of the low carbon strategy is embedded in the organisation?

The organisation is small and there are few with the power to influence purchasing and strategic acquisitions.

All our procurement documentation has our environmental strategy embedded within it, and I sign off all mechanical and electrical, building and facilities projects, so there is little option for specifiers, consultants and contractors to do anything else.

NIGEL ACHURCH is estates and facilities manager at Bedfordshire Police

Events & training

NATIONAL EVENTS AND CONFERENCES

SLL Young Lighter of the Year and LuxLive
19-20 November, London
The finalists of the Young Lighter of the Year present their papers, before the winner is announced at LuxLive.
www.sll.org
www.luxlive.co.uk

Emex
19-20 November, London
The Energy Management Exhibition, at ExCel, will explore the latest measures to reduce energy use through technology and training. CIBSE Certification will be at stand B55.
www.emexlondon.com

CIBSE GROUPS, REGIONS AND SOCIETIES

For more information, visit www.cibse.org/events

YEN North West Region: Inter-professional networking event
6 November, Manchester
Join other young industry professionals for an evening of entertainment and networking.

Yorkshire Region: Chairman's annual award dinner
7 November, Leeds

Merseyside & North Wales Region: Annual dinner 2014
7 November, Liverpool

Northern Ireland Region: Annual dinner
7 November, Belfast

East Midlands Region: TM54 Operational Efficiency
11 November, Kegworth
An evening seminar.

ANZ Region – New South Wales: AS1668 information and Section J update
11 November, Sydney
The latest monthly seminar.

North East Region: Sustainable living intelligent buildings upon Tyne
11 November, Newcastle
Professor Derek Clements-Croome presents.

ANZ Region – Western Australia: Latest R&D in public health engineering
11 November, Perth
The latest in a line of bi-monthly seminars.

HCNW Region: Design risk management – spotlight on CDM 2015
11 November, Milton Keynes
Gillian Birkby, legal adviser to the Association for Project Safety, will discuss the implications of the consultation on the new CDM regulations.

WIBSE: Peer-2-Peer mentoring. Negotiating a better salary
12 November, London
Continuing the mentoring series for women.

Merseyside & North Wales Region: BIM debate
13 November, Merseyside
A panel of experts puts forward its perspective on BIM.

HCNW Region: Services at the skyline
13 November, London
James Thonger, of Arup, describes his design contribution to 122 Leadenhall Street – the Cheesegrater.

South Wales Region: Annual dinner
14 November, Cardiff

WIBSE London Role Model Series
18 November, London
Kath Fontana, MD of BAM FM at BAM Construct UK, presents.

SoPHE: Installation best-practice forum
18 November, London
Discussions relating to the application and installation of crimped-pressure pipework fittings.

SoPHE: Corrosion and scale control in commercial heating and secondary hot-water systems
19 November, Manchester
Chris Hayes and Dr Graham Hancock, of Sentinel Solutions, present.

CIBSE Intelligent Buildings Group: Biomimetic architecture
19 November, London
This seminar will review lessons from nature that can aid building design.
www.cibse.org/ibg

East Midlands Region: Autumn dinner-dance
22 November, Nottingham

HCNE Region: Delivering sustainable buildings
25 November, Colchester
Author of *Delivering Sustainable Buildings*, Mike Malina, gives his overview to delivering sustainable buildings.

Hong Kong Chapter: Joint symposium 2014
25 November, Hong Kong
The annual event brings together international and local speakers.

West Midlands Region: TM guides
26 November, Birmingham
An evening presentation by Hywel Davies.

East Midlands Region: Pressurisation, pumps and pipes
27 November, Northampton
Evening seminar.

SLL Masterclass Series
27 November, Dublin
Continuing the Society of Light and Lighting 2014-15 Masterclass series.
www.cibse.org/sll

East Anglia Region: Annual dinner 2014
28 November, Cambridge

CPD TRAINING
For more information, visit www.cibse.org/mcc or call 020 8772 3640

Air Con: Psychrometric charts application
3 November, London

Legionella: Role of the responsible person
4 November, London

Lighting and energy efficiency
4 November, Leeds

Building services explained for FMs
5-7 November, London

Design of ductwork systems
5 November, London

Practical controls for HVAC systems
6 November, Manchester

Intro to 11kV (high voltage) distribution
7 November, London

Energy strategy reports
7 November, London

The commissioning process
10 November, London

Lighting and energy efficiency
11 November, London

Designing water-efficient hot and cold supplies
13 November, London

Energy Building Regulations: Part L
13 November, Exeter

Energy-efficient heating (upgrade and operation)
14 November, London

Electricity-at-work regulations explained
14 November, London

Preparing FM and maintenance contracts
17 November, London

Mechanical services explained
18-20 November, Manchester

Wiring regulations: 17th edition
20 November, London

Building drainage explained
20 November, London

Energy management system: ISO5001
21 November, Birmingham

Fire codes: Building design and management
21 November, London

Intro to residential building services
25 November, London

Electrical services explained
25-27 November, Manchester

Practical LV fault analysis
25 November, London

Low and zero-carbon energy technologies
25 November, London

WRAS water regulations
26 November, London

Fire risk assessment to PAS 79
28 November, London

ENERGY ASSESSOR TRAINING

For more information visit www.cibse.org/events or call 020 8772 3616

DEC Training
4-6 November, London

EPC Training
11-12 November, London

Writing a comprehensive and compliant A/C report
12 November, London

Air-conditioning inspector training
18 November, Manchester

Part L course
18 November, London

Carrying out a complex AC survey
24 November, London

Help upgrading your membership

CIBSE membership briefing events offer advice and support to members considering upgrading their membership, and help guide them through the requirements to reach their goal. If you are considering



upgrading your membership – or want to know what's involved in taking the next step – speak to the CIBSE membership team at one of these events:

- 19 November, 6-8pm, CIBSE YEN membership and registration briefing session, AECOM, Cardiff
- 20 November, 5.30pm, CIBSE, London
- 26 November, 6-8pm, Birmingham Chamber of Commerce
- 4 December, 6-7.30pm, BDP, Manchester

For more information, visit www.cibse.org/briefings and to book your place email membership@cibse.org

Recognising the people, products and projects that demonstrate engineering excellence in the built environment

CONGRATULATIONS TO THE 2015 SHORTLISTED ENTRANTS

WINNERS ANNOUNCED ON TUESDAY 10 FEBRUARY 2015 GROSVENOR HOUSE, LONDON

Join CIBSE and the shortlisted teams for an evening celebrating the very best in building performance

Make sure to book early to secure a front row seat



“ For us at Spirotech UK Ltd the event represents great value for money whether it’s with a sponsorship package or just booking a table as a way to say thanks to your most important customers. ”

*Martin Wilkinson
National Sales Manager
Commercial,
Spirotech UK*

VIEW THE SHORTLIST AND BOOK YOUR TABLE AT:
www.cibse.org/bpa

 @CIBSEAwards

Headline sponsor:



In association with:



For sponsorship enquiries please contact jim.folley@redactive.co.uk or 020 7324 2786

Sponsored by:



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.

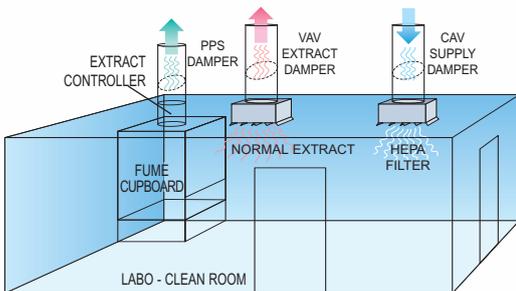


DPM PRESSURE SENSOR

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

