

CIBSE

JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

April 2009

Is this eco-house our best hope?



THE INTERVIEW
FROM ENGINEER
TO FACILITIES
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Windcatcher



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plus postage.

From the editor



Is it time to call Kevin?

One of the more off-the-wall but
canny comments I've heard
recently is the suggestion
that Kevin McCloud of Grand
Designs TV fame would make an ideal public
spokesperson for the building services
engineering (BSE) profession. Why? Because
a) he's so well known, and b) he can talk
convincingly about sustainability (as he did
recently at the 'Ecobuild' conference in London
- see page 11).

There's no escaping
the urgent need for the
BSE sector to raise its
profile. For one thing,
if it can't do so now
when global warming
is the hottest topic
around, then it will
never manage it. But,
more important than
self-promotion (however justifiable) is the major
role that the industry has in convincing the public
via the media that one of the best ways to help
save the planet is to make ordinary ageing homes
much more efficient.

The cover feature in this issue offers a strong
example of how this much-needed drive towards
more eco-friendly homes can be achieved (page
32). If the UK government is serious about its
professed aim of achieving near-zero carbon
housing, then it must recognise that potential
savings on carbon emissions from homes will
come largely from established housing stock.

So it's no good simply tightening the
regulations on new builds. Homeowners need
incentives and assistance - as well as a regulatory

stick - to cajole them into making their older
properties much more energy efficient.

Many might argue that a deep economic
recession is not the right time to be pushing
for subsidies for home conversions. But, with
a British Prime Minister keen to spend his way
out of the economic doldrums, what better
investment than creating a nation of energy
efficient housing? This surely should be the
priority, rather than offering to pour funds

into the so-called green
technologies for cars and
other consumable goods.

What our case study also
exemplifies, however, are the
major obstacles that people
may face in seeking to create
a more eco-friendly home
- whether it be planning
red tape or simply that
contractors who can carry
out the work aren't willing or able to do so.

But, as our interview with Terry Wyatt
underlines (page 28), the BS industry needs to get
both its houses in order: as well as helping to win
hearts and minds when it comes to refurbishing
established housing stock, it also needs to come
clean about the poor performance of new builds.
All of which is a very tall order for a profession
that traditionally has a low profile. But perhaps
the likes of Kevin McCloud can help, in terms of
getting across to policymakers and public what
the real issues are around sustainable building.
Does anyone have his number?

The industry
needs to
get both its houses in
order if it is to make a
difference on
sustainability

Bob Cervi, Editor
bcervi@cibsejournal.com

Environmental guidance report published

Guidance has been published to help professionals in the construction and property industry reduce their environmental impact.

The UK Green Building Council's (UK-GBC) report, *Biodiversity and the Built Environment*, contains guidance and recommendations about how the built environment can be beneficial to habitats and wildlife.

It also details recommendations to improve the main sustainability tools, including BREEAM, Code for Sustainable Homes and CEEQUAL, to better incorporate assessment of biodiversity, as well as containing recommendations for the industry, and local and central government to help improve the consistency of biodiversity measurement and reporting, in order to set meaningful targets.

UK-GBC's Biodiversity Task Group has also launched an online 'biodiversity portal', through www.ukgbc.org, which will be updated regularly.

College building projects suspended

Planned building projects in colleges across England have been suspended by the government because of a lack of funding.

Around 79 colleges had been given the first stage of approval in principle by the Learning and Skills Council (LSC), which oversees funding for the building programme. But the government halted the programme, admitting that it could not afford the £2.7bn needed for the projects to proceed.

The sum is in addition to £3bn earmarked for 65 colleges that have already submitted proposals.

The LSC said that it would be able to give the go-ahead to eight schemes that were deferred from December 2008.

The government said current spending, totalling £2.3bn for funding 250 projects across the country, would be honoured.

Ministers blamed the debacle on LSC mismanagement. LSC chief executive Mark Haysom resigned prior to a review by Sir Andrew Foster into the LSC's handling of the situation.

Sector must aim for best possible sustainability standards, warns expert

Building services engineers need to aim for the best possible environmental standards to help the world meet increasingly tough targets on cutting greenhouse gases, a renowned academic has told the *Journal*.

Professor Julia King, vice-chancellor of Aston University and a member of the Committee on Climate Change, whose recommendations have been adopted by the UK government, said current targets for cutting gases may need to be raised if new scientific evidence emerged.

"My personal view is that the challenges [of climate change] will get tougher as time passes, so we should aim for the best now – for example, BREEAM Excellent ratings for buildings – rather than accepting lesser environmental standards," said King, who will be a keynote speaker at this month's CIBSE national conference, where she will discuss the committee's published findings.

The building services industry faces a moral pressure to meet



Julia King: challenges will get tougher

carbon emissions targets in order to leave behind a habitable world in 50 to 100 years' time, she added.

The UK's Chief Scientist John Beddington recently predicted that by 2030 there will be major food, water and fuel shortages, creating political instability, migration and other complex political problems ultimately caused by climate change.

In this context, King said: "I really

do think that we've got to recognise the wake-up call and start making sure that everybody is aligned to make change happen."

Targets are essential in making significant progress, she added. "We very much set the targets within the context of 'this can be done'. There's a lot of analysis to demonstrate that it can be done, and that it can be done affordably or at a relatively small cost in terms of the impact on GDP."

But the targets could become tougher still, should scientific evidence worsen [the prospects for climate change] significantly, she said.

"Emissions in the last five years have grown faster than earlier predictions suggested that they would. I think changes have been happening faster than the predictions were suggesting they would. So, clearly, we need to get a move on in terms of reducing emissions," she said.

For details on the CIBSE conference and to book a place, go to www.cibse.org/nationalconference



First BREEAM Outstanding rating

The 35,500 sq m G.Park Blue Planet logistics centre in Chatterley Valley, Staffordshire, UK, is the first building to achieve Outstanding BREEAM status, according to awarding body BRE. It is projected to save occupiers up to £300,000 a year in running costs. The building has scored "exemplary" credits in four areas of BREEAM and achieved an exceptional standard of sustainability as a carbon-positive development. The new BREEAM "outstanding" rating was introduced in August 2008. A score of 85 per cent must be obtained to achieve Outstanding, compared with 70 per cent for an Excellent rating.

Technician award for CIBSE member

Student member Mark Long was presented with the CIBSE-sponsored Technician Engineer of the Year award at the SummitSkills National Training Awards 2009.

In all, there were 11 categories in this year's awards, held to celebrate the best of apprentices and engineers across the UK. A record number of entries was received, according to organisers.



Professionals predict 50% fall in private new-build schemes

Building services engineering (BSE) consultants are predicting a sharp decline in projects in the next two years as a result of the recession, according to a survey.

More than half of private-housing projects and more than 10 per cent of social-housing schemes are expected to be postponed or cancelled.

The report was published as one leading contractor in the industry, Haden Young, announced plans to make redundancies – raising concerns about the impact of the recession on the sector's supply chain.

The survey was conducted by SummitSkills, the Sector Skills Council for building services engineering, which said that the fall in projects could result in the loss of up to 154,000 jobs among contractors.

The 56 UK-based consultancy firms questioned in the survey said they expected the recession to continue until the end of 2010.

However, the figures also show that, during the past five years, 66 per cent of engineering practices have increased their consultant

numbers, and 64 per cent expect their workforce to expand further by 2015.

While 20 per cent said they were introducing cost-cutting measures, only nine per cent said they currently planned to make staff redundant, and 29 per cent said the recession was having no effect on their business.

SummitSkills chief executive Keith Marshall said: "Our estimates are based on assumptions that can be influenced by numerous variables, but it's inevitable that businesses will be, and have already been,

affected by the recession."

The research concentrated on how the recession may affect the sector's workload across five key areas: private commercial; private industrial; private housing; social housing; and major public works.

The survey found that 98 per cent of consultancies are involved in private commercial work, while 70 per cent are engaged in major public sector work – indicating a reliance on Public Private Partnership and the Private Finance Initiative, the report says.

The predictions are in line with recent Office for National Statistics

figures indicating that the UK construction industry has suffered more than 45,000 redundancies in the three months to December 2008.

SummitSkills said it was already working towards minimising the impact of the recession on the sector's workforce and skills levels through the redeployment and training of redundant apprentices, supporting employers to develop the skills of existing workers in new building services market areas, and supporting how education and training is delivered.

www.summitskills.org.uk

Haden Young redundancy plan a 'tragedy'

News that contractor Haden Young is planning to make redundancies in the UK has been described as a "tragedy".

Haden's parent company Balfour Beatty confirmed it was in consultations on making possible redundancies, but was unable to say how many might be affected.

Terry Wyatt of consultancy Hoard Lea said it was worrying that such a significant company in the supply chain should have to make cuts.

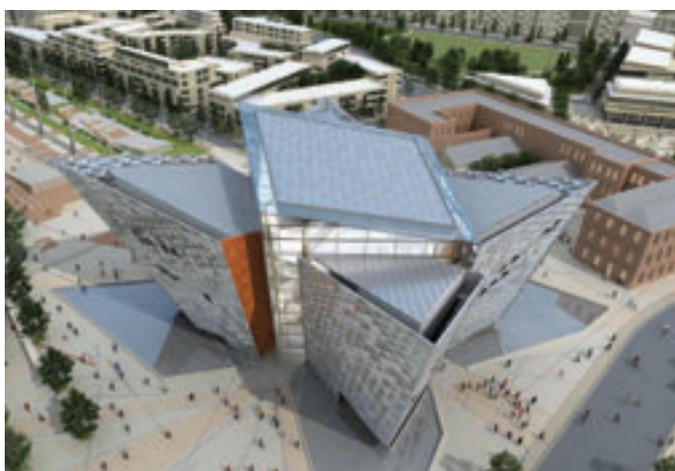
"It's enough to send us all into deep depression to see our very best consulting and contracting firms having to shed staff to stay in business," he said. "Redundancies in our industry are a tragedy beyond most others, we have shortage enough of engineers to do the massive tasks before us and really cannot afford losing any."

Wyatt described what was formerly known as G Nelson

Haden as a significant name from the onset of the industry, which led, with a few others, "to just about everything that we are today".

In a statement, Balfour Beatty said: "We can confirm that Haden Young has consulted a number of employees regarding possible redundancies in the UK. Where possible the company is seeking to find alternative positions."

Terry Wyatt interview, page 28



New development for *Titanic* centenary

The Titanic quarter in Belfast is to become home to the planned new Titanic Signature Project, a visitor centre and exhibition space. Faber Maunsell | AECOM has been appointed to provide mechanical and electrical design services for the £90m project, which will form the centrepiece of the Titanic Quarter, once home to Harland and Wolff shipyard and its most famous product, *RMS Titanic*. The project will start later this year and be completed in 2012, in time for *Titanic's* centenary.

BREEAM standard for specialist buildings

The BRE Trust has launched a new standard for Datacentre schemes in specialist buildings.

The BREEAM Datacentre scheme aims to reduce the cost of assessments and provides a ready-made set of criteria against which developers, designers and clients can assess their buildings.

It has been adopted by the Digital Realty Trust, which will be using the new BREEAM Datacentre scheme for its buildings throughout the world in order to achieve significant environmental and cost savings. The trust has already piloted the scheme on a building in the south east of England, which has now successfully achieved the first BREEAM Excellent rating for a building of its type.

Paul Gibbon, director of sustainability at BRE Global, said: "We have created the new scheme using the BREEAM Bespoke methodology as the development framework to take account of the rise in interest in applying BREEAM to more specialist buildings."

"We will be refining the Datacentre scheme over the first 12 months of its operation following feedback from actual assessments and, in time, these specialist schemes will become part of the standard suite for BREEAM."

BREEAM Bespoke was developed in 2000 for buildings not covered by mainstream BREEAM assessment schemes, such as offices, retail, healthcare and education buildings. www.breem.org

News in brief

Architects hit by recession

Architects in the UK are beginning to claim benefits at a faster rate than other related professions, according to figures from the Office for National Statistics. Benefit claims by architects rose by 760 per cent between February 2008 and February 2009, the biggest increase among recorded professions.

Journal website winner

The winner of the recent CIBSE Journal online survey has been announced. Alasdair Munro of Hulley and Kirkwood Consulting Engineers has won £200 of vouchers of his choice after taking part in the survey.

Buro Happold contract

Buro Happold has been appointed as the engineering consultant for the Barnsley Building Schools for the Future (BSF) programme. The town's 13 existing secondary schools will be replaced with nine Advanced Learning Centres.

Support for new role

CIBSE has voiced its strong support for the government's suggested new chief construction officer role, which will include acting as a champion of the sector. CIBSE said the appointment would "ensure an overall strategic view of construction at the highest level".

Philips buys lighting firm

Electronics company Philips has acquired lighting controls firm Dyalite for an undisclosed sum. Philips said the deal would help it respond to growing demand for energy-saving lighting solutions. Dyalite, which has 130 employees, is based in Australia, UK, China and Dubai.

Advice service planned

A one-stop shop for advice on health and safety and employment legislation is to be piloted. The move was announced by the Department for Business, Enterprise and Regulatory Reform (BERR), which says the advice will help businesses comply with the law and save them time and money. www.berr.gov.uk

Government funding for solar PV dries up



The big rise in interest in fitting photovoltaics has meant the funding has been used up

The UK government has suspended all applications for schools, hospitals and other public buildings for solar photovoltaic (PV) grants, after money ran out four months ahead of schedule.

Phase two of the Low Carbon Buildings Programme provides grants to public sector buildings and charities for the installation of microgeneration technologies.

But the Department of Energy and Climate Change (DECC) has now put applications on hold after

money ran out to fund the scheme. Originally, applications were being accepted until the end of June 2009.

DECC said the reason for the decision was the significant interest shown in PV grants. Originally the money allocated to funding solar PV grants was £17.5m. This was later increased by £7m, but all the money has now been committed. Funding for other technologies is still available.

Hywel Davies, technical director of CIBSE, criticised the decision. He said: "Project managers should be

monitoring spend, they should have been doing a budget, they should have seen it was running out and should have been going back to the sponsoring department and saying 'this is where we're getting to, can we have a managed exit from the programme'. Just pulling the plug from the wall is not the way to do it."

He added: "It's all about managing expectations and, unfortunately, the way this has been done means the expectations are for snap decisions that leave people a bit in the lurch.

"It's not helpful [to the industry] having another work stream drying up right now."

But architect Craig White said: "I actually think PV is not a starting point for a renewable strategy, it's the most expensive and the least efficient. We shouldn't be robbing biomass to pay for PV."

PV worked best as part of a whole suite of renewables combined with energy efficient measures, he said. The real question was whether grants should be used at all to fund new green industry. He believed they shouldn't as they are very expensive to administer.

A DECC spokeswoman said: "We recognise the popularity of the Low Carbon Buildings Programme has led to an oversubscription in solar PV applications. We are discussing with industry what options are open to us to address this."

Strong growth for solar thermal

Solar thermal markets around the world are showing healthy growth rates, new research suggests.

Key factors driving global growth include rising energy costs, changes in building regulations and government incentives.

The study by research body BSRIA shows that the Chinese solar thermal market continues to boom, with some suppliers offering poor-quality products.

In the US, tax credits for solar products helped to produce a 40 per cent surge in solar water heater sales, the report found. Among solar thermal products, flat plate

collectors have proved to be the most popular choice globally – apart from China and Korea, where vacuum tubes are the preferred system.

In terms of material, almost all countries opt for either a u-shaped or heat pipe type of vacuum tube collector. Other types of collectors are popular only in Turkey, France and Switzerland.

Coaxial vacuum tubes dominate the French market, as they are perceived to be more efficient. The market share was expected to reach 55 per cent in 2008.

Combi-applications for sanitary

hot water and space heating are popular systems in Germany, Austria and other northern European countries. However, this is not the case in southern Europe, China, and the US, where systems are only used to supply sanitary hot water.

Prices for solar thermal collectors have risen in the past few years as a result of rising raw material costs. However, there is potential for prices to decrease as competition increases in the market. On average the price of solar collectors in the UK remains higher than in continental Europe.

www.bsria.co.uk

Building teams must work together to ensure sustainability, says study

Building projects need an integrated project delivery team that is able to “design in” sustainable solutions and “design out” waste, says a new report.

A lack of purposeful vision on sustainability means that too many projects fail to be sustainable enough, it suggests.

The traditional procurement practices used by the construction industry act as a barrier to the delivery of sustainable buildings, the new report claims.

The large number of interfaces between the parties involved in the construction process, together with their lack of integration, acts as a block to sustainable building development, it says.

In addition, says the study, “high transaction costs and risk of duplication and re-work” also act as hindrances to sustainability.

The report, *Sustainable Buildings Need Integrated Teams*, published by



the Specialist Engineering Alliance (SEA), promotes a vision for the achievement of sustainability across the built environment that can also add value to the client.

Its recommendations – produced by a group of representatives from contracting, consultancy and manufacturing groups including CIBSE – call on the government to take a lead by commissioning

integrated teams to deliver more sustainable projects.

Funding of public sector projects should depend upon evidence that the procurer has put integrated teams in place for delivering sustainability, it says.

Generally, for all building schemes, it adds, consultants should set stringent sustainability targets and work with the supply chain to ensure they are achieved.

Other recommendations include:

- The appointment by government of a high-profile champion of integrated building teams;
- Integrated teams managing cost collaboratively to ensure all members are incentivised by efficiency gains;
- Teams collecting operating and maintenance cost data for evidence to clients of cost and performance outcomes; and
- Consultants developing better links with manufacturers and distributors,

with common CDP seminars and courses.

SEA president Lord O'Neill, who chaired the report's working group, said the study grew out of a sense of frustration at the construction industry's “patchy” response to the need for sustainable building.

“The project teams themselves have the responsibility for integration,” he said. “Designers and consultants have to be brought into the process and recognise they have responsibility too.”

Peter Cunningham, chairman of the Construction Clients Group and working group, said the report was also about delivering better value for the client via the procurement process.

But the client also needed to “engage” with specialist contractors early on in the process as a way of changing behaviour and bringing about an increased volume of sustainable building.

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News in brief

Plan to boost sustainable housing in rural areas

The UK government has set out plans for providing more affordable housing. It said it wanted to help create strong and diverse rural communities that are able to tackle their own unique challenges at a local level.

A consultation document is due to be published soon on combining existing planning guidance aimed at delivering sustainable economic development in urban and rural areas and town centres. As part of the plan, medium-sized rural towns will be helped to develop sustainable new neighbourhoods, partly through a new £1m competition to encourage best practice.

Guide issued on meeting carbon-cut target in 2010

A new guide has been published aimed at helping businesses and organisations cut their carbon footprint. Published by the Department of Energy and Climate Change, the handbook sets out who will be covered by the Carbon Reduction Commitment, to be introduced in April 2010, and explains what action can be taken. A consultation on the regulations underpinning the initiative has also been launched.

www.defra.gov.uk/carbonreduction

Warning over aircon inspections regime

Building owners with air conditioning systems are being urged to adhere to new inspection legislation or face £300 fines. BESCA, the building services accreditation body, has warned that many owners are unaware of the European Union's Energy Performance in Buildings Directive (EPBD) and legislation in the UK. This requires all air-conditioning systems of more than 12kW to be inspected by 4 January, 2011, regardless of whether the system is in a commercial or domestic property. The first deadline for systems over 250kW passed in January.

www.besca.org.uk

Three schools open as part of city's BSF scheme

The first phase of a £320m investment in the Building Schools for the Future (BSF) programme in Sheffield, UK, has been completed. BSF aims to transform education in the city by providing either new or radically refurbished accommodation for every secondary school by 2014.

Sheffield has 27 mainstream secondaries and three special educational needs secondary schools. The first stage of the programme was to design three large schools – Yewlands, Silverdale and Newfield and Talbot. All three are now open and occupied. Key features include:

- Mechanical and electrical heating and ventilation systems to maximise occupier comfort, good levels of daylight and intelligent lighting controls to maximise energy efficiency;
- Heating and lighting are occupant controllable;
- A BREEAM Very Good Rating.

Consideration has been given to minimising water consumption and energy use and the ecology of the sites has been protected and enhanced.

Faber Maunsell | AECOM was appointed to provide consultancy services for all building services, civil and structural engineering, acoustics, BREEAM, fire and risk engineering, ecology, advanced



Above: One of the first new BSF schools to open in Sheffield on the Newfield site. Left: the new hydrotherapy pool

security, Part L Modelling and flood risk assessment.

Talbot is a Special Educational Needs school and is co-located on the same site at Newfield. It was specially designed for 120 students, and has a high staff-to-pupil ratio and small classes.

As well as general classrooms, the facility includes a hydrotherapy pool, medical, dental and therapy rooms, and a series of hygiene rooms, some of which have shower beds.

Faber Maunsell | AECOM's project manager, Gary Chesher, said: "We created 'streets' within the structure for ease of internal circulation and flexible and adaptable teaching areas that are future-proofed against changing pedagogy and fluctuating pupil numbers."

Sheffield City Council was one of the four Wave 1 Pathfinder Authorities identified by the UK government under the £45bn BSF programme. The Sheffield Local Education Partnership (LEP) is a partnership between Sheffield City Council, Taylor Woodrow and Partnerships for Schools (BSF Investments).

Call to redefine renewables as 'energy efficiency'

The Royal Institute of British Architects (RIBA) has called on the UK government to reclassify district power and heating schemes in order to meet the target of achieving near-zero carbon new buildings.

The call was made as part of RIBA's response to the Definition of Zero Carbon Homes and Non-Domestic Buildings consultation, launched at the end of last year. RIBA has also called for a national energy "trajectory" in order to achieve the government's near-zero carbon aim and decarbonise the UK's energy supply.

RIBA proposes that biomass and district heating systems be

reclassified through building regulations, so that they can be considered measures of energy efficiency in buildings rather than energy generation.

The institution believes that reclassifying allowable renewables as only 'on-site' would simplify the planning process. This, it believes, could easily be overseen by a planning authority based on an objective assessment of available roof area, development density and orientation.

RIBA calls for the planning process be simplified to ensure that all developments are able to accommodate renewables when they become viable.

Alan Shingler, head of sustainability at Sheppard Robson, who led RIBA's response, said: "Whilst we welcome the overall approach, we believe that the proposed legislative framework should not be allowed to confuse or dilute true zero carbon development, which takes a holistic approach to sustainability, including embodied energy, social and economic longevity, and environment and carbon reduction. It is imperative that the definition and its implication become more transparent for both prospective purchasers and investors."

www.architecture.com

Engineers must adopt role of 'second architects' to cut energy

Building services engineers need to be the "second architects" if they are to improve the energy performance of buildings, a recent conference was told. In the past 50 years, building designers have had it very easy, with abundant and cheap energy, according to Cal Bailey, marketing and sustainability director of building services group NG Bailey.

Design, form and function have dominated the built environment, but it is now our engineers who have to take more of a lead, he said at Ecobuild 2009.

"Building services engineers are the second architects of our buildings today and the people who will save us the most money in our buildings," Bailey said.

"If you want to minimise whole-life costs, you need to build it that way. The building services engineer



Cal Bailey at Ecobuild: call for change

is not only the person who can save the planet, they are also the person who can save us money."

Sean Lockie, head of sustainability at cost-management consultancy Faithful and Gould, told the conference that there was a wealth of knowledge currently available to improve buildings' sustainability, but it was nowhere near enough to address the targets set by governments for cutting greenhouse gas emissions.

"We are often disappointed by some decisions our clients make. They say, 'just give me an answer based on the payback,'" Lockie said.

Rather than demolishing buildings and starting again, true energy efficiency lies in transforming the use of the two million commercial buildings already standing in the UK, according to

Despina Katsikakis, group chairman of design consultancy DEGW. She said: "We do not need to be tearing down 1960s and 1970s buildings but reinventing their interiors to support much greater sustainable environments."

Kevin McCloud, the television presenter of *Grand Designs*, said that energy suppliers needed to become energy management businesses, providing the least amount of energy possible while buying up surplus energy generated off-grid.

Crispin Burridge, head of sustainable construction at Marks & Spencer, insisted whole-life costing remained "woefully misunderstood". He argued that, if clients put sustainability as a requirement in their building works contracts, "we can drive the industry to deliver this".



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President: Professor John Swaffield FRSE, FCIBSE Chief executive and secretary: Stephen Matthews

News in brief

YEN Champions Award

The first CIBSE awards recognising the work done by companies in championing young engineers are launched this year. There will be two trophies presented, allowing both large and small companies to compete. The awards are sponsored by Baxi Commercial Division. Entries no later than 15 May 2009. www.cibse.org/yen

Intelligent Buildings Group

The CIBSE IB Group is holding a seminar on 'Sustainability Challenges for Intelligent Buildings' on 12 May 2009, at the Royal Society, London. The seminar will be followed by canapés and drinks. For prices/booking visit www.cibse.org/ibg

New energy web forum

CIBSE Energy Performance Group has launched an 'Expert of the Month' web forum on energy certification. To ask a question go to www.cibse-epg.org/expertZone/expertZone.php If you're not an EPG member, sign up by logging on to www.cibse.org and updating your preferences.

The future's female

As an institution at the forefront of building services, I am acutely aware of our responsibility to actively support initiatives which develop the industry.

To this end, CIBSE has just signed the UK Resource Centre for Women in Science, Engineering and Technology (UKRC) Charter, to pledge commitment to gender equality. By signing up to the charter, we pledge to help raise awareness of the need to address gender equality and to increase the participation and progression of women in the profession.

Indeed, of the 19,700 CIBSE members only 1,012 are women. Perhaps not a great surprise, but certainly something we, as an industry, need to be working hard to address.

You'll have seen in this *Journal* over the last couple of editions two opinion pieces by young female engineers – Morwenna Wilson (February), and Natalie Bell (March) – both of whom have won awards for their achievements, as well as a report on the Society of Public Health Young Engineers Award winners – a team of women. All of this is very encouraging and featuring these women in our



Natalie Bell: the future face of building services engineering?

Journal can help raise awareness of women in our industry.

However, more needs to be done. We must all take responsibility for not only raising awareness of the women who already work in the field, but also for taking steps to encourage women to choose building services engineering as a career and to increase retention of those women already in the sector.

Encouraging women into the industry will benefit us all. A more diverse workforce better reflects the changing demographics of the client base, and can help provide a better understanding of their needs. Research shows

that organisations that proactively seek to recruit and retain women are more resilient to change and are better placed to succeed in an ever-changing world – vital in the current economic climate.

But most of all, with women making up less than 20 per cent of the workforce in science, engineering and technology, can we really afford to lose such a potential resource of talent and promise?

Stephen Matthews,
Chief executive, CIBSE

For more information, and to see the list of organisations who have signed up to the pledge, visit www.ukrc4setwomen.org/html/employers/ceo-charter

Affiliates' day briefing session

CIBSE is holding a special day event for Affiliate members on Friday 17 April 2009, which will provide information on how to become a Low Carbon Energy Assessor, how to upgrade your membership, what the benefits are, gauging the right grade for you, and what's involved in making the change.

CIBSE membership is open to all competent building services engineers for the three corporate grades of membership: Member, Associate, and Licentiate level. If you are currently an Affiliate

member and have the relevant experience or qualifications, you may want to consider transferring.

Let us help you make the next step on your career ladder and find the right path towards registration with ECUK (Engineering Council UK) and progress further towards professional recognition.

There will be two sessions – one at 10am and one at 2pm, both held at CIBSE HQ, Balham. To book your free place, visit www.cibse.org, contact Chloe Lacey on 020 8772 3692 or email clacey@cibse.org

CIBSE adopts BIMM definition

CIBSE, along with a number of other institutions, has adopted a definition of Building Information Modelling and Management (BIMM) to promote consistency.

The definition is: "Building Information Modelling is digital representation of physical and functional characteristics of a facility creating a shared knowledge resource for information about it forming a reliable basis for decisions during its life cycle, from earliest conception to demolition."

The objective is that BIMM can be used to deliver better decision-making, better design, better

co-ordination and information throughout the building lifetime.

Rob Manning, CIBSE vice president, said: "There is a synergy between the concepts of Collaborative Working and the Building Information Model. The earlier all parties can contribute to a model, the more benefits are likely to accrue for the project."

He added: "The whole team has to consider what it wishes to achieve and use software accordingly."

For more details, email Samantha McDonough, policy manager, at smcdonough@cibse.org

CIBSE responds to several key government consultations

The Department of Communities and Local Government (DCLG) consulted on the Definition of Zero Carbon Homes and Non-Domestic Buildings. This proposed a definition of zero-carbon new homes, based on high energy efficiency, on or near-site carbon reduction, and allowable solutions for dealing with the remaining emissions. We pointed out the need to include unregulated energy uses since this will dominate as emissions from regulated uses (covered by Part L) declines. We stressed the need to address non-domestic buildings, particularly existing stock, as a matter of urgency, and suggested a list of 'allowable solutions' including smart meters, exports of low-carbon heat or 'coolth' and off-site renewable electricity connected to the development.

The Business and Enterprise Select Committee last year called on government to appoint a chief construction

officer. The Department for Business, Enterprise and Regulatory Reform (BERR) has consulted on the potential role for such an appointment. Covering procurement, sustainable construction strategy, coordination of public construction programmes and promoting innovation, the paper also considered where such a person would be placed and how senior they would be.

CIBSE welcomes the proposal, but warned that to be effective it would need the gravitas of a very senior civil service position and real power to effect change.

There are real concerns that Treasury is not supportive of the proposal.

CIBSE gave evidence to the Cabinet Office Panel on Fair Access to the Professions, which is looking at barriers to people wanting to enter the professions, and submitted comments to the Health and Safety Executive's draft strategy calling for a more

innovative approach to reducing accidents on site.

A Heat and Energy Saving Strategy has been announced, setting out the government's vision to 2020 and beyond. It seeks views on a range of policies that could help to decarbonise the way homes and businesses are heated, helping to reduce the UK's CO₂ emissions and to contribute to the target of obtaining 20 per cent of all EU energy from renewables by 2020. Contributions to the CIBSE response are welcome from readers.

All CIBSE's consultation responses are available in the Knowledge Bank section of the CIBSE website (www.cibse.org) as well as details of open consultations and how to respond. For information on any of the consultations or issues in this policy update, contact Samantha McDonough, CIBSE policy manager at smcdonough@cibse.org

Future employment course



CIBSE is determined to find low- and no-cost ways for members to keep their skills up to date in this (hopefully fairly short) downturn in the industry.

While inevitably some businesses are having to shed posts, we believe that a sizeable, skilled, and competent core of building services engineers is essential for the achievement of a sustainable economy for the UK and the world. To this end, CIBSE recently ran a Future Employment Course for members to help them stay in work by winning the competition for available posts or, if appropriate, to refocus their skills to fit less-affected areas, such as energy assessment and facilities management.

CIBSE will be running another course on 20 April 2009 in Balham. We are also hoping to include an in-depth session on how to fill in the APEL forms.

For more information and to register for this free course, email: kegggers@cibse.org

Special interest groups membership

Please be aware that CIBSE reviews its special interest group membership regularly.

CIBSE may contact you to confirm that you wish to remain a member of a group. If you do

not respond, your details will be removed from the group's membership, although you will be free to rejoin. Membership of the Heritage, Energy Performance, Natural Ventilation, Facilities

Management and Intelligent Buildings Groups has been most recently reviewed. Visit www.cibse.org and click "Update your details" to amend your details and join, or re-join, a group at any time.

Training and Development

Training and development submissions

The closing dates for annual submissions to be considered at the May and July 2009 Training and Development Panel meetings are 30 April and 20 June respectively.

Training submissions and any queries, plus employers' enquiries and applications for approved company training schemes, should be addressed to Olwen Williams on 020 8772 3605 or at owilliams@cibse.org

Forum – February 2009

A training and development forum was held at CIBSE HQ on 26 February, 2009.

The forum was very successful and attended by delegates from building services consultancies and contracting companies involved in company training schemes.

Presentations were given on different aspects of training and development, including online learning, professional learning, and information on routes to membership and registration. Information was also provided on our in-house Company Briefing Sessions.

If you would like further details about these sessions contact Pearl Mensah, pmensah@cibse.org or call 020 8772 3644.

A further Training and Development Forum is planned for next year. If you are interested in being kept informed, contact Olwen Williams at owilliams@cibse.org or call 020 8772 3605.

CPD Directory update

CPD course providers who would like to apply for an entry into the Directory of CPD Course Providers should contact Olwen Williams, training and development administrator, on 020 8772 3605 or alternatively email her at owilliams@cibse.org

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

The following organisations have recently been added:

AmbiRad Ltd
CIBSE Journal
Cool Designs Ltd
HygroMatik UK
Nordair Niche
Reznor UK Ltd

A concessionary rate is available for entries into some categories.

CPD course speakers

All CPD course speakers are invited to apply for CIBSE membership. For further information, contact Bobby Wright, membership communications manager, on 020 8772 3639 or email bwright@cibse.org

Letters

There's no climate of confusion

Nick Cullen claims that there is a refusal by the "climate change establishment" to listen to criticism (*Journal*, March, page 20). He cannot understand why, given the inherent uncertainties in modelling the climate, that the "consensus of scientists is to accept anthropogenic (man-made) global warming".

It may be that the mass media rarely discusses the uncertainties but it is misleading to suggest that scientists do not. The Intergovernmental Panel on Climate Change's latest report is very specific about the uncertainties and goes to great lengths to try to quantify them. What are not being openly discussed by the media and CIBSE are the predicted impacts of climate change. The IPCC report predicts a rise in mean global temperature of perhaps 4°C by the end of this century. This may not sound like much of a problem to many folk – a pity about the polar bears, but on the positive side, the UK's climate will be like the south of France today. The reality is much more stark. A 4°C rise could result in most of Asia, Africa, Australasia, South and Central America and the US becoming uninhabitable through desertification and flooding.

So, let's continue to argue about whether or not man is causing climate change. It will take our mind off what sort of a legacy we are probably (but not certainly) bequeathing to our children and other living species. And, maybe, just maybe, the "underdog" sceptics are right. Keep clutching at the straws, Nick.

Martin Ratcliffe MCIBSE

No going back on efficient lighting

In the heat of the debate on energy efficient lighting (*Journal*, February, p18; March, Letters), it's worth remembering that lighting consumes nearly 20 per cent of global electricity generation, so we cannot ignore its costs – either in terms of CO₂ emissions, or financially.

However, one of the main sticking points still seems to be the fact that, in most people's minds, energy-efficient lighting is firmly associated with the compact fluorescent lamps of the 1980s. This is no longer the case. CFLs have changed dramatically in terms of shape and style. More significantly, new technologies have now joined this somewhat down-trodden member of the energy efficiency family. Light sources such as halogen and LEDs are now available, giving consumers more choice than ever before. Revolutionary energy saving halogen filament bulbs now offer crisp white



istockphoto

lighting, using 50 per cent less energy than the ordinary household bulb. What is more, they are dimmable, ideal for creating a cosy ambience in any home.

Another exciting lighting development is LEDs, which have already provided decorative elements in our homes. Now, however, they are beginning to be real alternatives to incandescent bulbs. This new breed of LEDs offers functional lighting and can be used in lobbies, stairways and corridors. As its light output and performance improves, LED technology is set to bring even greater energy efficiency and, more importantly, even greater opportunity and choice to homeowners.

Mike Simpson

Technical director, Philips Lighting and Design

Don't offer 20th century solutions

Your recent article on IT cooling was really rather tired (*Journal*, March, p50). To state that IT facilities are getting more power- and cooling-hungry is really not worth mentioning to engineers. To put forward a solution of "more cooling" when we are consumed by reducing our carbon use seems to be trying to bend a 20th century solution to a 21st century problem.

The big players in the IT game are looking at all kinds of interesting solutions, such as floating server farms utilising wind and wave power – server farms delivered in containers with no cooling but using equipment able to run without failure at varying temperature and humidity levels. This is real engineering activity that addresses the problem itself rather than trying to treat the symptoms.

Don't let's rely on manufacturers and suppliers for our information. Their job is to

make us specify their equipment. Our job as engineers is to provide systems that work with as little equipment as possible.

Peter Mills

Principal, MEP Consultancy FZE

United Arab Emirates

pmills@mepconsultancy.com

Engineering an identity crisis

What is a building services engineer? The public don't know, the construction industry thinks it knows and the BS engineer is himself uncertain. The architect believes the BS engineer is responsible for spoiling the aesthetics of his building, reducing lettable floor space and placing carbuncles on his roof; the building contractor believes he is responsible for everything that goes wrong on his contract; and the quantity surveyor believes he is responsible for all cost overruns. Ask a BS engineer to explain his job and he or she will write a specification. Ask his partner what he does for a living and he or she will shrug their shoulders. There is one big advantage that still impresses the neighbours: you can sign their passports if you are one of the chartered variety.

Mike Abbott FCIBSE (retired)

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

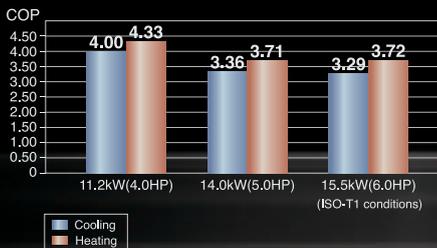
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Facilitating change

The building services sector must embrace operational and facilities management if it is to keep pace with client needs, argues **Geoff Prudence**



It is clear to me that operational and risk management skills need to be further developed by the building services engineering industry. Project teams need to include expertise on operational and risk management to ensure successful, effective building outcomes. When developing the operational service provision for buildings or a portfolio, the management team must consider not just tracking the risks and monitoring them, but understanding the role each member of the team plays in managing the risks to add value. This needs to be underpinned by strong engineering leadership.

In facilities management, engineering-biased managers are best placed to manage the risks through the nature of their experience and can adapt to include 'soft' services, such as catering and security services.

My frustration is that any recognition of building services success, whether it is in published case studies or at awards ceremonies, is usually around building design. Operations and maintenance engineers are not fully recognised in the industry, even though core building services engineering is about managing risks over the life of the building including the statutory compliance associated with health and safety.

Moreover, clients want more than basic project management; they want us as engineers to own the risks associated with buildings and their operations. Otherwise, six months to a year into a new building or a refreshed service contract, expectations will not be met.

Whilst there has always been discussion around closing the gap on design/operations, there needs to be more emphasis both on the design period and in developing skills for operational FMs. Accredited design courses are not developing these FM skills at present and CIBSE has a role to help plug the gap and meet demand for these skills in the future.

We need to get people to graduate from building services design courses with greater operational understanding, specifically around building operational risk management. There's a great

opportunity now, in this time of recession, for engineering managers to take the lead in this area of facilities management.

The engineering-based facilities manager equipped with relevant data will be well placed to understand all the risks and impacts, and be able to make sound decisions to reduce costs accordingly. Whether it's a sourcing strategy, retrofit solutions or plant replacement, it's about managing the risk. FMs need to take ownership to make those decisions – it's cost versus risk, ultimately. This means operational FMs who have an engineering background will continue to be valued as the focus continues on revenue costs, energy and building operational risk management and life-cycle costing.

Companies are looking not only at their business continuity plans, but getting more for less out of existing systems and resources, including people. So there is now, more than ever, greater recognition of the importance of effective operations and maintenance within the FM sphere.

Within the CIBSE FM Group, we are trying to influence and achieve awareness of operational services into design courses at universities and demonstrate that CIBSE is there for all of us involved in building services – not just the design-orientated. This is crucial because the traditional routes for engineers develop into lead operational positions, and FM managers are drying up.

Many FMs are coming through soft facilities management services; but engineers are best placed to maximise the potential for managing building related risks. CIBSE also has the opportunity to help develop the engineering operational management role within the building services engineering industry for what is truly a sustainable solution. ●



In a recession there's a great opportunity for engineering managers to take a lead in FM



Geoff Prudence is chairman of CIBSE FM Group

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The post-build era

Being able to access data on the performance of buildings is a crucial step in monitoring energy efficiency, says **Geoff Russell-Smith**



A few years ago I attended an industry-wide event, and the debate turned to post-build monitoring. The host asked for a show of hands as to who was undertaking post-build monitoring of buildings they had worked on. I eagerly put my hand up to report on some of our recent monitoring work, but I quickly sensed that I was in the minority and had made an industry faux-pas.

I had broken an unwritten industry rule: you don't talk about post-build data and building performance.

A bit extreme? Maybe slightly, but the situation hasn't changed that much. Data on the performance of non-domestic building stock is still difficult to come by.

I don't think there has been a great industry conspiracy about this. It's simply that nobody wants to be professionally associated with a building which might not be an exemplar of efficiency.

The UK Green Building Council's (UKGBC) Code for Sustainable Buildings proposal, if implemented, would insist on the mandatory provision of data in the public domain. This is clearly a step in the right direction, and if implemented, could deliver some revealing results, particularly for a number of existing 'green' buildings that had been billed as environmental star performers. In some cases, we could well be victims of greenwashing hyperbole.

I hope that the Code could also help to tackle some of the issues of Display Energy Certificates. While these have undoubtedly provided visibility on energy performance, they can deliver misleading results. Currently, it is possible for an inefficient building that is half full to receive a high DEC rating. Similarly, a building that is designed to be energy-efficient can also be operated efficiently, but it may get a low rating due to one essential/unavoidable piece of equipment such as a supercomputer.

Critically, I hope greater data transparency for a building across its energy, carbon, water and waste usage might also lead us to have more sensible discussions about the 'real' efficiency and in-situ

performance of products and materials in working buildings.

It might also help us to move firmly away from focusing on capital costs to a situation where specification decisions are instead made by looking closely at the whole-life costs of the building and its specific systems and products.

According to the UKGBC, the proposed Code for Sustainable Buildings will be radically different from the Code for Sustainable Homes. It will provide a framework, which makes use of existing legislation and will include an 'escalator' of mandatory tougher targets leading up to zero-carbon.

We can learn from the experiences in the residential sector. Many housebuilders have been quick to call on the government to 'water down' the zero carbon definition and push back a 2016 deadline for residential. Yet, despite these calls and the current downturn, the Code for Sustainable Homes has helped to galvanise the sector into action.

Look around and there are pockets of activity from both housebuilders and Registered Social Landlords who, on test-bed sites, are trying to understand how they can meet the highest levels of the Code now. Crucially, this process has armed them with better information about the most efficient products and is leading to frank discussions about performance data.

We need more data and greater transparency on new and existing buildings in order to meet the non-domestic 2019 zero carbon target. With the implementation of the Code for Sustainable Buildings, I sense that the days of 'unspoken' data rules could be well and truly over. ●

Geoff Russell-Smith is general manager, Tarmac TermoDeck

It might also help us to move firmly away from focusing on capital costs to a situation where specification decisions are instead made by looking closely at the whole-life costs of the building

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A breath of fresh air

Installing local exhaust ventilation systems in buildings is crucial in order to remove harmful contaminants and protect workers' health, as **Hywel Davies** explains



Every year, more than 4,000 workers in Britain contract occupational diseases, including cancer and serious lung conditions. These are caused by breathing dust, fumes or vapours at work. Most of these illnesses are entirely avoidable with proper local exhaust ventilation systems to remove airborne contaminants before people breathe them in.

Under the Health and Safety at Work Act, all employers have an absolute legal duty to safeguard their workers. In addition, as part of its disease-reduction programme, the Health and Safety Executive (HSE) considers occupational disease to be an enforcement priority, and so plans to raise the profile of local exhaust ventilation and to increase its enforcement activity in this area for the foreseeable future.

HSE recently ran pilot workshops to tell employers in the Midlands about their duties, and to bring the supply side in to explain what is available and how employers can meet their legal duties to the employees in their care.

Local exhaust ventilation (LEV) equipment provides protection in that it is designed to enclose a process which generates hazardous airborne particles, or to capture the hazardous material and draw it away from the breathing zone. The Act requires that these systems be examined annually. Failure to do so can incur prosecution. At present, the HSE estimates that there are 140,000 of these installations operating, of which only half are properly inspected.

Where LEV is needed, it requires careful design to ensure adequate flow rates, correctly directed to draw the contamination into the extract system. The effect of draughts on the performance of the extraction system also needs to be considered.

It is important for the designer to establish what the employer – their client – needs, and to design the system accordingly using the correct hoods or enclosures to control the processes and sources. They should also provide a user manual and log book for the system, which sets out how the system works, and how it should be maintained, in terminology that the employer and users can readily understand.

It is also vital to provide the means to see if the system is not working properly. Installers must put in an LEV system and commission it thoroughly, to ensure that it does adequately control contaminant exposure. The only way to check this is by physical testing to demonstrate that the system controls exposure effectively.

They should also provide a full commissioning report (which goes into the log book). Employees need training to use the system, including confirming for themselves that it is working effectively.

The clear message coming across from HSE is that this issue is important for worker health, and that it will be of growing concern to HSE inspectors. This provides opportunities for ventilation engineers who have the competence to design LEV systems, as there is likely to be growing interest from employers. CIBSE has been recognised by the HSE as having many members with appropriate knowledge in this field.

For those who want to demonstrate specific competence in this area, this can currently be done through the *Basic design principles of local exhaust ventilation systems* qualification, which is offered by the British Occupational Health Society (BOHS).

There is also a need for competent testers. The current recognised qualification for this is the BOHS *Initial Appraisal and Thorough Examination and Testing of Local Exhaust Ventilation Systems*.

CIBSE members are well-placed to engage with the drive to raise standards of occupational health by delivering LEV systems that are fit for purpose and help to prevent the many blighted lives that result from avoidable occupational disease. ●

Hywel Davies is technical director of CIBSE

Under the Health and Safety at Work Act, all employers have an absolute legal duty to safeguard their workers

For more information about LEV, visit www.hse.gov.uk/lev. The site provides further HSE guidance for designers, installers and examiners of LEV, as well as employers and their employees who depend on LEV to protect their health. It also provides links to HSE publications and to other useful information sources.



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Reflected glory

A kind of poacher turned gamekeeper, Eddie Myles has gone from hardman contractor to accommodating facilities manager at Skanska. He tells **Ewen Rose** how being soft can be crucial to a builder, and why private finance deals are important

The move towards a 'softer' approach to construction has been a dramatic but welcome change for Eddie Myles, who has spent most of his career in the cut and thrust of contracting. "It is a lot more pleasant than waking up in the morning and thinking, Who have I got to fight with today?" he muses.

As head of contractor Skanska's facilities management division in Scotland, FM is all that Myles now does. "It is a whole new discipline for construction companies," he reflects. "In Scotland we have transformed ourselves from a traditional contracting business to providing facilities services only.

"You can't afford to think like an old-fashioned builder because you have a long-term commitment to the facility and your profit is on the line for 30 years. It is not the same as having an end product in traditional engineering terms – there is no 'widget' that you can look at and say 'I did that' – it is about providing a customer service." >



Tynewater Primary School in Midlothian, Scotland, one of Skanska's projects



“ Everything is moving so fast. In September, the economy in Scotland was still bouncing – now it is flat ”
– Eddie Myles

> So, he says, he has learnt the secret of being invisible. “If you walk into one of the buildings we manage you won't see Skanska logos all over the place – just one small, discreet office. That is because the building is not ours, it belongs to the user – in many cases that is the local community – and our job is to keep it working. If they hardly notice we are there, we are doing a good job.”

Myles is convinced that as the new-build market shrinks, the pressure is on for owners to “sweat their assets” and squeeze the maximum from the existing stock. This will encourage firms to adopt a model that places greater emphasis on the long-term operation of buildings. To be successful, companies will have to develop improved facilities management expertise – to the benefit of building owners/operators and the environment.

“Facilities services are no longer seen as a bolt-on to M&E [mechanical and electrical services] – it is a totally different business and a radically different culture,” Myles says. “The priorities are totally different, too. We don't necessarily want the cheapest suppliers, but we do want the quickest and most reliable.”

Having a long-term commitment to a facility also means you have the opportunity to influence its sustainability – another increasingly onerous

SKANSKA

As a multi-national and multi-disciplinary construction giant, Skanska is able to monitor the changes from within and without. Its restructuring in 2008 was designed to reflect the shifting market, with an increased focus on providing facilities support for building clients.

Although it is still best known as a main contractor leading large construction projects, Skanska has over £1.5 billion worth of FM contracts across the UK including schools, several hospitals and Ministry of Defence premises.

Around 25 per cent of Skanska's total facilities work in Scotland comes from within the group where the construction arm built the projects. The rest was won on the open market.

preoccupation for building owners. Skanska recently won an award for recovering plastic from clinical waste and transforming it into site hoardings – 96 per cent of all clinical waste is plastic and the vast majority ends up in landfill.

Myles, who is serving his second term as chairman of the Heating and Ventilation Contractors' Association (HVCA) Scotland, started out as an apprentice technician at the Scottish Gas Board in 1969 before moving to the domestic gas and electrical heating installer Alexander Dunn in Glasgow.

“In the Fifties, they had this amazing system that used a double-skin chimney to heat the whole house via the warm air generated by the coal fire. Vents in the outer skin allowed the heat to spread to upper floors. It was fairly effective and innovative for its time, but you don't see much of that kind of thing these days!”

He then became a civil engineering draughtsman when work became scarce in the mid-70s, before moving to Duncan Johnston, a well-known local heating and plumbing company. Duncan Johnston was heavily involved in the emerging new towns of the day such as Cumbernauld and Livingston, where hundreds of nearly identical homes had to be fitted with largely identical gas-fired heating systems.

Rising from the ashes

Great business if you can find it, but the company still went to the wall, despite having £4m worth of business on its books. “It was cash flow that killed it and, the ultimate humiliation, our headquarters building in Strathaven became a potato warehouse. At least a new company rose from the ashes and is still trading in Scotland.”

He sees similar warning signs today, but says the general financial situation is even more volatile. “Everything is moving so fast. As recently as September, the economy in Scotland was still bouncing – now it has gone completely flat.

“Much of the problem is down to lack of confidence caused by the banks refusing to lend money, and it will be the SMEs [small and medium-sized enterprises] that suffer most.”

However, he insists the situation is not all doom and gloom. “All is not lost. There is still a market out there,” >



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Eddie Myles

CV

Since 2003: Head of Skanska facilities management (FM) division in Scotland – involved moving from a traditional M&E contracting business to full FM provision

1987-2003: Regional manager, Scotland, at Andrews Weatherfoil Ltd, which was acquired first by Kvaerner and then by Skanska

1982-1987: Contracts manager for Walker Air Conditioning and then Andrews Weatherfoil Ltd

1969-1980: An apprenticeship with Scottish Gas was followed by posts across the contracting field

Honorary posts included: Chairman of HVCA Scotland, 1997-99, 2008-10

Eddie Myles: yet to see evidence of the new programmes working

he says. “We have two major tenders going out of here [Skanska’s in-house construction division] this week. And while housebuilding has been devastated, the commercial side is still relatively strong.

“However, it is vital that the government primes the market. I am very worried that public sector projects will be held up, just when the industry needs them most.”

This is a major concern for the construction industry as a whole, and is being voiced by the Scottish Confederation of Associations of Specialist Engineering Contractors (CASEC), which is now part of the Scottish Construction Forum that advises the Scottish Parliament. Myles represents the HVCA within CASEC and believes the industry must keep up the pressure on the government to release promised money into the public sector.

He acknowledges that Skanska was a major beneficiary of the PFI/PPP system, but also argues that it has worked by delivering many essential infrastructure projects that could not have been built otherwise.

Myles says that Skanska is living proof that the Public Finance Initiative (PFI) and public-private partnerships (PPP) work.

“In Scotland it [PFI/PPP] has fallen out of favour politically as there was a lot of press suggesting the private sector ripped off public sector clients, but if that did happen, it was only in a few cases early on when some of the public sector procurers were possibly a little naïve.

That is certainly not the case now, as anyone who has been involved in negotiations for PFI/PPP will

confirm. However, I am not aware of any other public service that is as closely-measured and monitored as PFI and PPP providers. And if you don’t perform, it hits your profits.”

He also points to the vast improvement in facilities that the projects have delivered. Where teachers were formerly reduced to teaching in corridors, they are now working in modern, airy classrooms. “One teacher even asked me if he could have his own cupboard!” recalls Myles.

He believes that the sector is even more dependent upon this kind of work, and is worried that the government has yet to properly commit to ‘son of PPP’ – the Scottish Futures Trust projects that have not yet emerged.

“There are several schools and hospital projects coming through – and there is much yet to be done – but most of these are left over from the old PPP agreements and we have yet to see evidence of the new programme working.

“The government is talking about going back to traditional procurement for its vital infrastructure projects. I can’t see how they will get the same value for money or effectiveness that way – and I hope it is not political propaganda that is pushing them down that route.” ●

“ I am worried that public sector projects will be held up, just when the industry needs them most ”
– Eddie Myles



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Simon Weir www.simonweir.com

Work in progress

The building services sector has been failing clients for too long when it comes to energy efficiency and performance outcomes. Terry Wyatt tells **Carina Bailey** what urgently needs to be done

Low-energy buildings are almost universally failing to perform, insists CIBSE past-president Terry Wyatt. That's a tragedy for the nation and ought to be deeply disappointing to their designers. The principal reason is that the building services industry simply hasn't monitored the performance of buildings, and has employed some pretty "sloppy" engineering designs, the Hoare Lea consultant laments.

Wyatt, one of the sector's figureheads, will lay down the gauntlet to his fellow professionals when he gives a keynote speech to the CIBSE national conference, which takes place in London later this month. The sloppiness Wyatt refers to partly lies in an overriding ethos to save energy; some professionals believe that because building services such as ventilation systems consume energy in operation, it will save energy simply to exclude these systems from a building altogether.

How wrong, says Wyatt, who argues it's imperative that buildings are properly engineered. "There's been a tendency to think we don't need to be putting building services in [for example] teaching spaces and halls.

"But when you fail to put them in, the result is what's happening all around us – uncomfortable, hot and sweaty buildings with unhealthy levels of CO₂, contaminants and infection, which also fail to meet the energy targets."

Similarly, if someone puts in a lighting system somewhere, he says, it is idiotic not to have it coupled with a control that switches it on, up, down and off as needed. And yet this has been done time and again, even in supposedly iconic buildings specially designed for 'daylighting'.

Some could accuse Wyatt of being overly critical, but he believes it's "a time for honesty". He says that, unless we want to feel the economic pain, "we really have got to get our act together now and come up with proper design solutions". He adds: "We are seeing packaged, high-performance, off-site manufactured buildings coming in from Germany and Scandinavia which have guaranteed performance. We will see more of this happening if we don't come up with the goods."

To beat our current failings, Wyatt believes, building services systems need to operate autonomously, or they are destined to fail. "If you haven't properly engineered the system in a building and are relying on people doing something, it will not happen – it will fail. It must either completely work by itself or, if it's decided people will want the ability to change it themselves, then it must default to where it should be every couple of hours."

This will enable a building to adjust its systems and energy consumption automatically to the levels designed for. This sort of 'dynamic response' is fundamental to the process of dynamic demand management of energy use that is soon to play a big part in the nation's energy strategy.

Wyatt is also critical of some clients. He says that, if a building's services aren't designed properly in the first place, the first thing a client will do will be to install the "least efficient equipment" to counteract the problem. This will also create unhealthy environments where the risk of catching infections, such as respiratory illnesses, increases.

"If you don't properly engineer [a building], users make it worse by the cheapest possible solution. Less performance is always less."

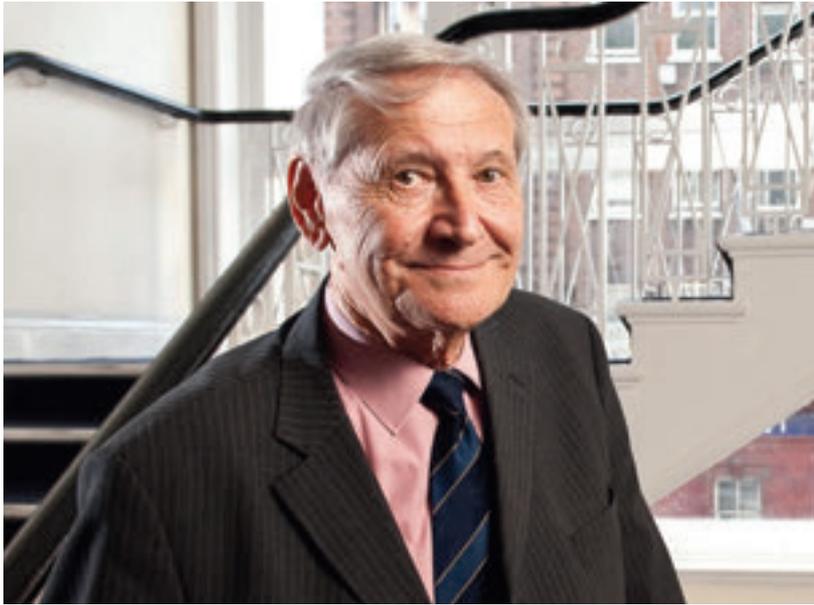
So can we hope to meet the government's future near-zero carbon targets? According to Wyatt, we're not even meeting existing ones yet. "We have to look at why we're not meeting them, and we will only know that when we monitor them and investigate why that's so. A negligible level of such investigation is being done."

He blames the low price of energy, relative to incomes, for this lack of investigation. The reality is that most people have no idea how much they are consuming, least of all where it's being consumed, and expecting them to be interested in how the systems work is ridiculous, Wyatt concedes.

So the answer has to lie with engineers. "It's got to be engineering that comes up with the solution, and we are failing," he says.

"We're failing to deliver the buildings that are required, >

Speaking out:
Terry Wyatt is a keynote
speaker at this year's
CIBSE national conference



Terry Wyatt is adamant that post-occupancy evaluations are essential

“For all the intention that goes into building design at the moment, the reality is completely different”

and we have to sit down and honestly look at each of our buildings – especially when they’re iconic ones that are obviously nowhere near the ambition behind the project when they were originally instigated.”

Wyatt is adamant that post-occupancy evaluations (POEs) are essential. “We need to have POEs coming from the buildings we have put up in the last five to 10 years, which applies to schools more than anything. There’s this enormous school building programme and I know of no full POEs that will show what works and what doesn’t and how best to pursue it.”

Why aren’t more POEs being carried out? Because, says Wyatt, there’s no income from having a look and investigating it – despite an agreement between client and architect/engineer to check the building is performing as intended from the outset.

Clients are often not so keen on such performance inspections: potential occupiers wouldn’t be thrilled to see that the building is performing badly. Most people care only for a property’s location, rentable cost and how it looks – which pushes the industry towards producing fashionable buildings, making appearance more important than performance, insists Wyatt.

Far too much money is still spent on trendy architecture, rather than on its performance, he says, but he concedes that the introduction of energy certificates for buildings could become a force for change, encouraging people to ask about a building’s energy efficiency and thus emphasising its importance.

The massive plans for schools and other public buildings are a different matter and need to be transparent as to their performance and energy efficiency. He adds: “We’ve known energy certificates are coming in, we’ve known building regulations are coming in, with Part L and so on. There has been enough legislation to call on

Utilities need to offer incentives for CO₂ cuts

In his CIBSE annual conference speech, Terry Wyatt will also focus on managing energy demand more efficiently through dynamic demand control technologies. More tonnes of carbon could be saved through dynamic demand than any other single action, Wyatt insists.

But, if we haven’t got systems properly engineered, under control and monitored, then “we don’t have any hope of being able to manage our demand – we won’t know what it is and we certainly won’t have the facility to do anything about it,” he says. However, to make this happen, industry needs an incentive from utility companies in the form of different rates according to demand – similar to peak and off-peak train fares.

Wyatt says: “We’ve got to be able to manage our demand both in timing and the amount that we wish to have at any time.”

If demand were managed through dynamic software, it would remove the need for electricity companies to have huge amounts of energy already generated for use at peak demand times. He says the national grid also needs to be adapted to accept energy coming from renewables, as building services engineers are being increasingly asked to install them on projects.

us to deliver better buildings and to ‘back us up’ over how this is to be achieved, but we are guilty – we haven’t done so. We have to admit we have not delivered.” But there’s no reason why the industry can’t reach its targets very quickly, according to Wyatt, because “there’s no rocket science in this, it’s painfully obvious what needs to be done.”

Wyatt believes that the best approach now, as regards school buildings, would be to copy what’s being done in Germany and Scandinavia, as POEs have already been conducted there. He also thinks building design is approached in the wrong way in the UK: engineers should recall that people need to be cooled rather than heated, and so should be concentrating on how to do that, rather than on heating buildings with ridiculously high temperature sources.

The heat generated by occupants can be used to warm the fresh air to 20°C without having to use any other form of heating system. Extra heat which couldn’t be generated from a heat recovery mechanical ventilation system would only be needed in extreme cases of cold weather and should always come from low temperature sources.

“I’m sick and tired of being given 20 reasons why the buildings are not being properly engineered, instead of the one reason needed for them to do it,” bemoans Wyatt. “They will, I fear, only do that when they fully feel the consequences of not going all the way and not doing it properly.” ●

CIBSE

Sign up for the conference

The CIBSE National Conference, ‘Engineering excellence: the way to a sustainable business, future-proofing the building services industry’, will be held on 28-29 April at the Russell Hotel in London. Topics include sustainability in building services and in business, and case studies on low-carbon solutions. There’s also a conference dinner and debate sponsored by the Young Engineers Network. As well as Terry Wyatt, other keynote speakers will include Professor Julia King of the Committee on Climate Change; Mike Hogg of Shell Gas Direct; and Professor David Fisk of Imperial College London.

To book a place, call 020 8675 5211, email eventbookings@cibse.org or visit www.cibse.org/nationalconference

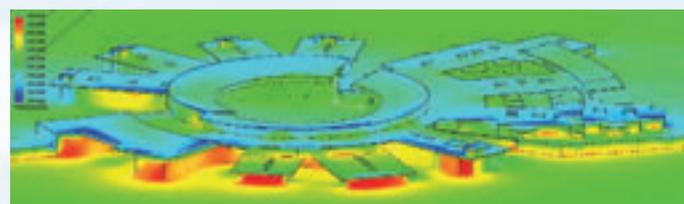
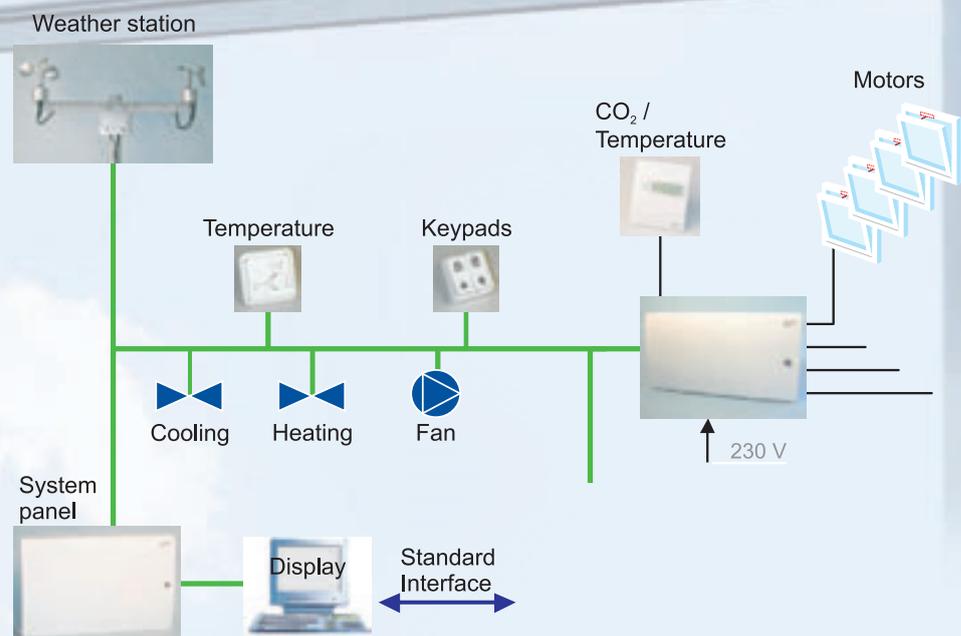
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Snapshot of the future

Potential savings on carbon emissions generated by the UK's housing stock will come largely from converting existing buildings, including millions of energy-hungry older properties. **Ewen Rose** reports on an award-winning refurbishment project that shows how Victorian housing can be made much greener



Improvements to this Victorian property in Brighton, UK, resulted in a 72 per cent cut in CO₂ emissions, winning the CIBSE Low Carbon Refurbishment award. Pictured on facing page outside the house is co-owner Sigrid Stagl

Austrians Sigrid Stagl and Peter Kaufmann transformed their Victorian home in the Preston Park area of Brighton, UK, despite the fact it is situated inside a conservation area – which meant they had to fight hard for local authority approval.

The outcome of the scheme – which won the CIBSE Low Carbon Refurbishment Project award for 2009 – was a 72 per cent cut in CO₂ emissions, using mainly sustainable materials while retaining the original character of the 1887 property.

“Our project demonstrated that the 40 per cent house scenario – where CO₂ emissions are reduced by 40 per cent – is achievable and more,” Stagl says. “Even Victorian houses can become sustainable homes using existing technology.”

Both Peter and Sigrid are social scientists at the University of Sussex, and neither has any design or

technical expertise in sustainable building. Coming from Austria where a large number of ‘passive’ houses are already in operation, they felt it must be possible to do something similar in Brighton.

“Our initial plan to have a passive solar house built was impeded by the lack of affordable building plots in the city of Brighton,” says Stagl. “Driving by car to an eco-house outside the city did not seem coherent to us. Hence, we ended up buying a lovely Victorian house where we could walk to the city centre and cycle to the university. However, the house was far from our green aspirations and from our expectations of living conditions.”

The lessons learnt and their subsequent struggles to transform this end-of-terrace house – with “inappropriate heating” including electric storage heaters, minimal insulation and dampness in two walls – could considerably ease the pain for others similarly inspired to reduce their carbon footprint. >



Simon Weir www.simonweir.com

Outcomes

Transforming a typical Victorian house

Refurbishment outcomes

Total CO₂ emissions cut by 72 per cent – from 14t to 3.8t per year

CO₂ emissions cut by 80 per cent if calculated per m² – the additional living space pushed down the total figure

A more healthy living environment – radiant heating, reduced damp, more natural lighting

Reduced energy bill by two thirds

Payback period for solar heating system: seven years approx (at current energy prices)

Retained original character

Technology

A+ rated appliances throughout

Low-energy induction hob

Condensing boiler

Energy controls – including thermostats in every room.

Energy-saving lamps

Water-saving shower heads

Solar heating

Underfloor heating

Radiant wall heating

Barriers

Poor building fabric

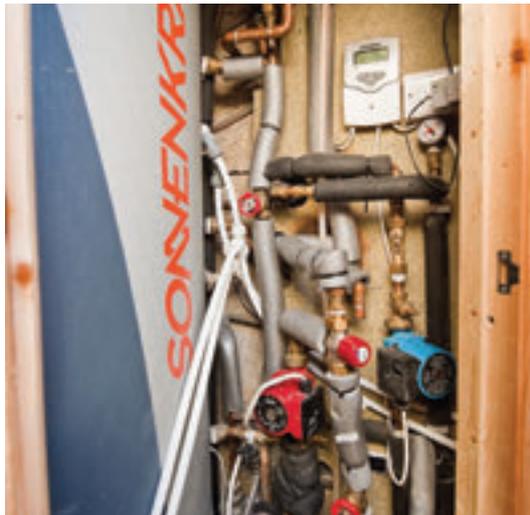
Planning objections

Lack of qualified installers

User behaviour

Urban density

Lack of space



Solar panels are linked to a 500-litre cylinder concealed in a closet. It provides 150 litres of hot water as well as low-temperature hot water for the radiant wall system and underfloor heating

> Insulation

The first step was to improve the building fabric to reduce heat loss. External wall insulation was immediately ruled out because it would contravene conservation area restrictions. So internal magnesite-bound wood wool insulation was added to all external walls to a depth of either 50mm or 25mm.

Radiant wall heating was also applied to several walls – hence the difference in insulation depths – providing U-values of between 1.2 and 1.6. The insulation also helped to overcome some severe damp problems in the external walls. They were able to add 50mm of insulation to the loft – which was extended – but had to use boards due to space restrictions.

The radiant heating installed uses 30 per cent less energy than conventional radiator systems, due to the larger surface areas, which means comfortable heat can be provided at water temperatures as low as 35 to 40°C. The couple have found that there is more even heat distribution with this approach, with fewer airborne particles and the benefit of dispensing with radiators.

“Shortly after moving into the house, sitting next to walls was unpleasant,” says Stagl. “The cold would come straight through. Now walls and windows are so well

insulated that sitting next to them is no problem. The radiant heat from the wall feels very pleasant – rather like sun-rays. You get the best sensation of this in the shower enclosure because the tiles radiate the heat even better than plastered walls,” she adds.

Heating

They have had to make compromises along the way, though. Their first choice of heating was wood pellets combined with solar, but the lack of storage space and shortage of suitable suppliers made the wood element difficult. The second choice was a ground-source heat pump, but the garden was too small for ‘slinky’ loops and a borehole too expensive at around £8,000 plus the cost of the heat pump. They also ruled out an air-source heat pump on the grounds of noise.

So it was decided that solar energy would have to bear the brunt of the load. Four solar panels, each comprising >

“Our main focus must be on transforming the existing housing stock” – Russell Smith

Housing stock challenge of turning Britain’s homes green

According to the UK Sustainable Development Commission, 75 per cent of existing homes will still be in use in 2050 – by which time the country is due to have reduced its carbon emissions by 80 per cent, according to government targets.

Before the housing market crashed, the UK was modernising around 150,000 houses a year, through new builds and refurbishments.

“Some 27 per cent of our total energy use is consumed in homes – the single biggest chunk,” says Russell Smith, of residential refurbishment company Parity Eco Solutions. “Our main focus must be on transforming the existing housing stock.”

Smith has turned the refurbishment of Victorian semi-detached homes into ecological test projects,

but believes we still have a lot to learn. “There is a big gap in our knowledge about how to tackle this challenge,” he says. “We need to take on more projects to plug that gap.”

Parity achieved a 72 per cent reduction of carbon emissions per square metre on one London property it refurbished, and the eco measures only added 15 per cent to the total cost, according to Smith. He says the greening of this house will pay for itself in less than eight years.

“Trades people are the key influencers in the process of making homes more sustainable,” adds Smith. “They need to be keenly aware of that responsibility and of the impact each element of their work has on the overall performance.”



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“Our project shows that reducing CO₂ emissions by [more than 70 per cent] is achievable”

– Sigrid Stagl

> 15 evacuated tubes, were specified and linked to a 500-litre cylinder that is now concealed in a closet behind the bathroom mirror and provides 150 litres of hot water. The cylinder also provides low-temperature hot water for the radiant wall system and the underfloor heating that was installed in the kitchen and loft conversion.

A gas condensing boiler was installed, instead of the biomass option, for back-up heating. It was over the solar array that the couple had their biggest battle with the local authority. Originally, they were told that the panels would have to be hidden on an east-facing roof – making them almost totally impractical – or blended into invisibility with the existing tiles. This lack of flexibility put the whole project in jeopardy. Later, as local authorities apparently came under more pressure from government to approve eco-projects, Brighton and Hove Council removed its objection.

“Not only did we get the green light, Brighton and Hove Council gave us a £1,000 grant for the solar panels on top of the government subsidy,” Stagl says. “The planning officer even said they wished they had more applications like ours.”

The boiler is switched off between May and September, when all hot water is provided by the south-facing solar system. “It feels nice to take a shower with water that was heated by the sun; it’s a bit silly, because physically the water feels the same, but it still seems to make a difference,” says Stagl. “Ideally we would have liked to bring the whole house up to passive solar standards, which has been shown to be possible by projects in Austria, but it would have been much harder and our lack of experience would have been even more of a problem.”

Glazing

The ageing, single-glazed windows, with U-values of between four and five, were replaced by double-glazed soft-wood windows adapted to meet conservation area requirements. (U-value of the glass is 1.1, and of whole window including the frame 1.3.) Six additional windows were added in the south wall to improve the amount of natural light and to provide passive solar heating, along with five roof lights in the loft extension. The original wooden floors were retained as far as possible. In the



The period Victorian windows have been replaced with wooden double-glazed ones to meet conservation requirements

lounge and hallway the floors were lifted and underlaid with 10cm of polystyrol insulation. The wood in the kitchen could not be restored so a new tiled floor was laid with underfloor heating and 10cm of insulation. Often, with so-called green projects, the original design intentions can be lost once the building is occupied. Stagl and Kaufmann have also taken on a lodger, which has meant the systems have had to adapt, but overall they believe the efficiencies are still achievable in the long run.

“You do learn, of course, as you go and having other people in the house with different preferences – for example, 23°C-plus for room temperature day and night) makes the system quite a bit less efficient as the boiler runs through the night. User behaviour is important,” Stagl cautions.

This experience has taught the couple that it might have been better to avoid individual thermostats in each room. “Easy access to temperature controls can lead to ‘silly’ behaviour – just because it’s possible,” Stagl adds.

The shortage of suitably experienced installation firms meant the pair had to employ four different contractors at different stages as “we could not find one who could do it all in one go, let alone at an affordable price”.

However, they believe that the lessons learnt, and the number of interested contractor visitors both to the house and the couple’s website, suggests the UK could soon have a larger population of installers capable of taking on this kind of project. ●

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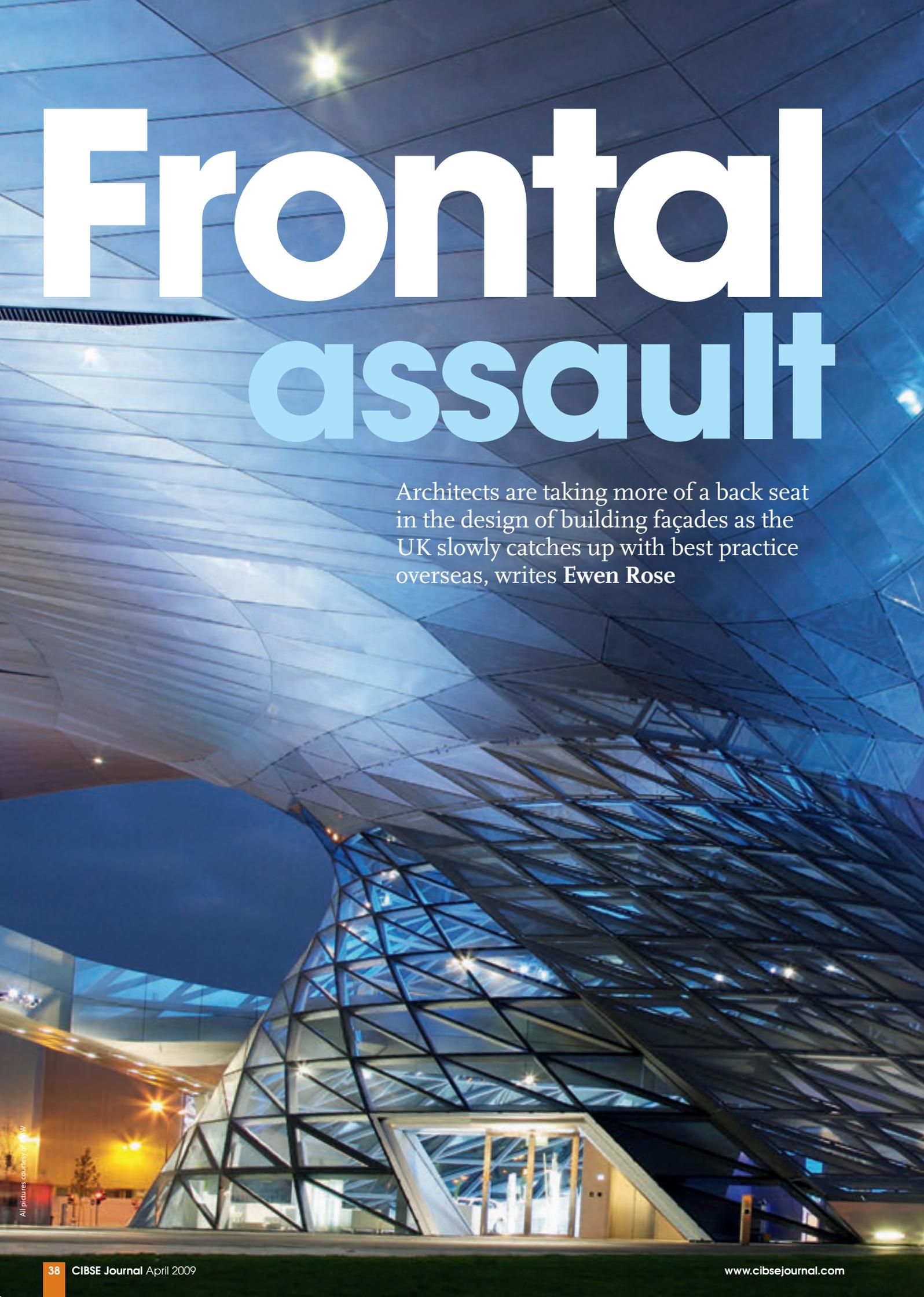


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Frontal assault

Architects are taking more of a back seat in the design of building façades as the UK slowly catches up with best practice overseas, writes **Ewen Rose**

The BMW world building in Munich, Germany, has a 36,700 sq m integrated façade

The time of the mechanical engineer is upon us. According to some experts, it is essential that this discipline is involved from the start of any design project to ensure the façade performs correctly.

So says Sean Affleck of Make Architects: “M&E specialists are vital for façade design as their early involvement allows us to integrate the building services with solid façades.

“A few years ago, structural engineers jumped in and took the lead, but now it’s [the turn of mechanical engineers] because the façade is the biggest influence on the services and vice versa,” Affleck told a recent Society of Façade Engineering conference.

It is commonplace in Germany for there to be collaboration between different engineering disciplines to deliver better façade design, and also for wider use of façades with integrated heating and cooling systems. However, this kind of collaboration is a rarity in the UK despite the similar weather conditions, according to experts.

John Ahern of the Royal Institution of British Architects believes the British approach to design is holding back the wider use of integrated façade. “If you are going to use an integrated façade you must design

“ John Ahern of the Royal Institution of British Architects believes the British approach to design is holding back the wider use of integrated facades ”

it in from the outset, but because of our construction process you rarely get services experts involved early enough,” he says. “It also requires clients to pay more money up front for more detailed testing early in the project.”

The planning process is also seen by some as a hindrance to this approach. It is relatively easy for the big, signature architects to get planning approval for something innovative like an integrated façade, but it is harder for smaller practices to demonstrate buildability on more run-of-the-mill projects.

The lack of competition in the market is also a problem as specifiers prefer to be able to compare suppliers’ products and there are very few integrated façade systems available in the UK, it is argued.

However, architectural practice Josef Gartner has been supplying this type of solution to the German market for more than 40 years. Bernhard Rudolf, an architect with the firm, points to the success of a 37,600 sq m integrated façade installed in the BMW World building in Munich. This steel frame façade includes heating, sprinklers and electrical services.

He says this type of curtain walling can deliver better heat and cool-air distribution, as well as more-even temperatures across the occupied space because >



> of the much larger surface area. As a result, heating temperatures are also much lower, thereby reducing energy consumption and avoiding condensation. These systems can automatically switch between heating and cooling without any need for system changes.

Interior designers and fit-out teams like this approach because there is no need for radiators, Rudolf points out. Having water continually flowing through hollow sections in the façade also provides fire protection by keeping the steel members cool, although many UK local authorities still seem unwilling to accept that this removes the need for many of the fire-safety services demanded as part of the planning process.

Rudolf argues that designers must recognise that you can't heat higher than 60°C with an integrated façade, and that the cooling temperature is limited by the dew point.

However, the availability of this type of advanced design approach means architects can look beyond the vast amounts of glazing still being used in modern buildings, according to Make's Affleck, who calls for the industry to be more flexible.

"With building design there is never a completely right answer, but there is definitely a wrong one," he says. "People are obsessed with views, yet we regularly see that the blinds are drawn as occupants desperately try to reduce the impact of solar glare and to preserve their privacy.

"We need to use light more cleverly. What is wrong with blanking out part of the window to improve the insulation? That way we can improve the building's performance and still preserve the view."

Make is designing façades to work as cooling towers by collecting rainwater that is then channelled through the building envelope to create evaporative cooling, which can work well in conjunction with chilled beams, for example.

The BMW World building, above and below, has a steel frame façade that includes sprinklers, heaters and electrical services, delivering better heat and cool-air distribution

"These wet and warm surfaces are also ideal for growing plants, so you can create a living façade that changes colour with the seasons, and also provides natural cooling," Affleck says.

Architects are more aware of the importance of using modules to provide greater solidity to the structure, which can also deliver better solar control while also ensuring that buildings are self-shading.

Graham Dodd of consultancy Arup says it is now possible for façade design to be more creative and less energy-intensive because designers have access to a wider pallet of materials. "We must look at how facades can become energy producers rather than just being passive filters of light, heat and sound. Façades must be able to pay back their energy debt."

Arup is developing a tool that helps designers select façade materials based on their energy performance. They are working towards greater use of phase-change materials that are extremely light, but replicate the performance of more traditional, heavier alternatives.

The sophisticated reflective properties of electrochromic shading, for example, put the building in complete control of the progress of energy in and out of the occupied space. Aerogel insulation is another developing concept that gives excellent insulation performance from a very low-mass material.

"If you simply reflect energy back out of the building, then it is wasted," Dodd insists. "We have to get to the point at which PV [photovoltaic] panels become cheap enough to completely clad a building so we can gather the energy and convert it into something useful."

He adds that façade designers are moving towards a cradle-to-cradle model, eliminating the concept of waste and learning from nature. "Being less bad is no longer good enough," he says. "We must get to a point where we are not throwing stuff away, but are re-using materials and components – we must design for dismantling, not demolition." ●





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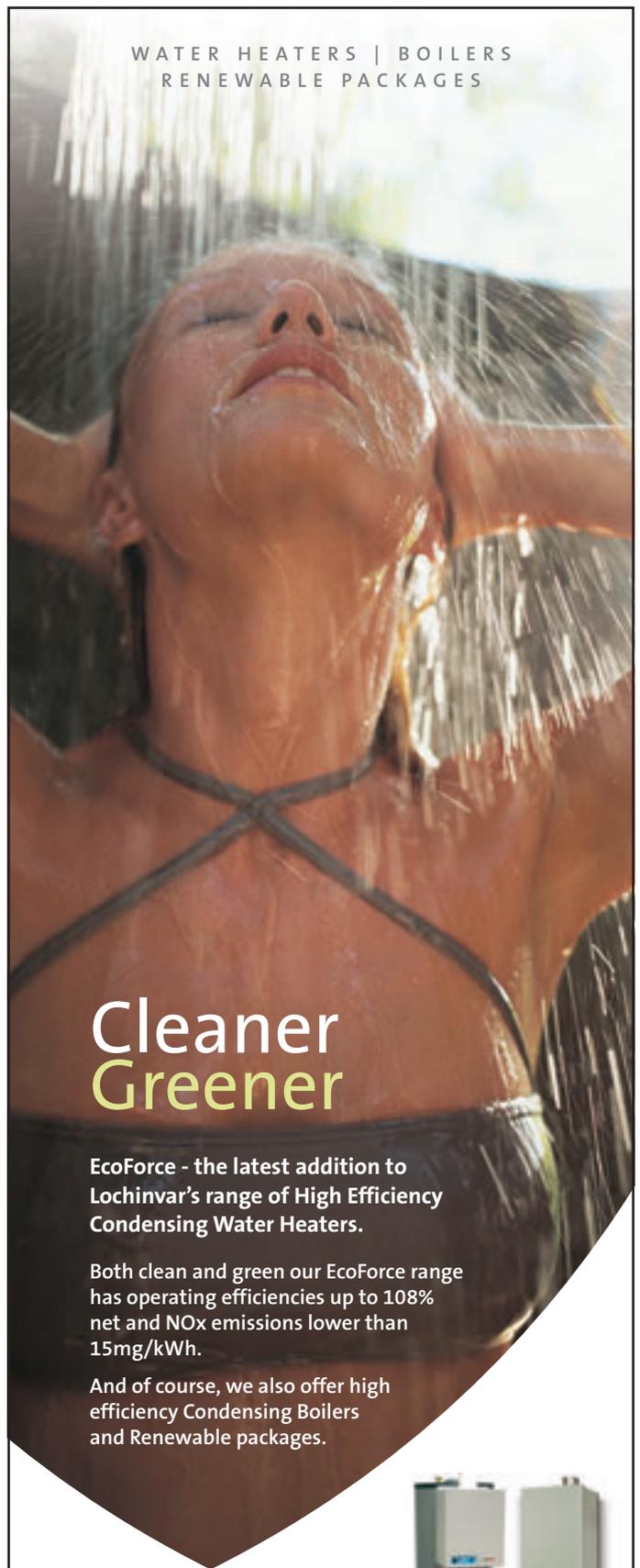


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Green discoveries

One of the best ways to show how a building is environmentally friendly is to use the technology involved as a teaching aid. A notable example of this is a new local authority discovery centre in South Wales, writes **Paul Haddlesey**



All pictures courtesy of Faber Maunsell | AECOM

The Margam Discovery Environmental Centre aims to showcase renewable energy in action. It combines sustainable performance with the educational role of informing visitors about low-carbon design.

The council's vision for the Discovery Centre – which is due to open this month at Margam Park in South Wales and operated by the Field Studies Council – is to support the wider community and educational activities within the park. It includes an environmentally-sustainable visitor centre and sustainable energy showcase centre.

The Discovery Centre comprises single-storey accommodation which includes teaching labs, WCs, kitchen, refectory and reception, plus a two-storey residential block. Most of the single-storey accommodation is supported off the ground on stilts.

The residential area is made up of a two-storey accommodation block with 34 en-suite bedrooms, with facilities for disabled people and those with special needs. The building also houses an area for the public including a reception, public toilets and changing facilities.

Enhancing the centre's educational role, many of the building services have been made highly visible with graphical displays of energy consumption and savings.

"The timber framed building is a flagship development which had sustainability as a guiding theme from its very inception," says senior mechanical engineer Sarah Gealy, of consultancy Faber Maunsell | AECOM.

"The development is a highly visible symbol of recognition in Wales and illustrates how sustainability can play a key role in the future development of all buildings. As such, it is a working example of how inspired design and quality of construction can deliver exceptional value and sustainability."

Off-site build

For maximum efficiency and to minimise environmental impact, the timber-framed building has been largely constructed off site, using timber from sustainable sources and prefabricated modules being assembled on site.

To minimise heat loss and the need for mechanical services, the building has been insulated to standards in excess of Building Regulations requirements. The external walls have a design u-value of 0.23 W/m²K, while the roofs and floors have design u-values below 0.15 W/m²K.

Space heating in the teaching block is provided by an underfloor heating system served by a 150kW wood pellet biomass boiler, which also serves radiators in the accommodation block. As there is considerable fluctuation in occupancy levels of the residential accommodation, the space heating in these rooms is controlled in relation to occupancy while maintaining frost protection when rooms are unoccupied.

The boiler is designed to meet 50 per cent of peak heating loads and is expected to meet all heating requirements through most of the year, using locally sourced wood pellets derived from wood waste. Wood pellets for the biomass boiler are stored in a high capacity external silo to minimise frequency of deliveries and



thus reduce the carbon footprint of the site even further. Another important consideration in the design was that the buildings should offer low cost of ownership. A key element of this is automation of the fuel supply to the boiler, where minimum input is required from maintenance staff. Ash created by the biomass boiler is used as a fertiliser on the surrounding grounds.

As biomass is considered to be a carbon-neutral fuel, the use of a biomass boiler has been predicted to reduce CO₂ emissions by 40 per cent, giving the centre a predicted carbon footprint of less than 10kg of CO₂/m² a year.

The centre required a mains gas supply for the kitchens, so the designers decided to optimise performance of heating plant by including a gas-fired condensing boiler. Supplementing the biomass boiler in winter, this uses the low-return water temperatures from the underfloor heating to maximise condensing. Hot water in the teaching block is provided by solar thermal panels, supplemented by the boiler plant when necessary. Hot water for the accommodation block is provided by the boiler plant.

Natural ventilation

The centre is designed to be mainly naturally ventilated via a combination of opening windows and automatic roof lights, the latter being controlled via rain and temperature sensors to prevent overheating in summer and provide occupant comfort. Mechanical ventilation is restricted to toilets and en-suite bathrooms to comply with Building Regulations.

Rainwater is stored in a below-ground water tank and used for flushing WCs and urinals within the public toilets. Mains cold water is used as a secondary source of supply to the tank to ensure minimum water levels are maintained.

The north-facing roof lights also help to maximise penetration of natural daylight while minimising solar heat gains. Daylight is supplemented by predominantly fluorescent artificial lighting, using a combination of high frequency T5 sources in teaching areas and compact fluorescent in accommodation areas.

In order to provide demand-controlled lighting, the classroom lighting is linked to photocells to dim the lighting in response to daylight levels, while occupancy

The Margam Discovery Environmental Centre in South Wales, above and left, recently opened, aims to be a showcase for renewable energy in action

detection is used in all areas of variable occupancy. All services are controlled through a building management system, with extensive monitoring of energy consumption to ensure that systems are operating at maximum efficiency.

“A key element of the centre’s purpose was that visitors should be able to see the services that contribute to its low-energy performance and understand more about low carbon technologies in real situations,” explained Siân Lewis, senior electrical engineer at Faber. “Consequently, all of the renewable technologies are designed to be visible to visitors to demonstrate the benefits of renewable energy. For example, the solar water heating system is linked to a display monitor with a graphical representation of the system’s operation,” she continued.

“Similarly, a plasma monitor in reception, linked to the BMS, will provide visual displays of a range of energy parameters. The biomass boiler and silo are also very visible through an inspection window between the reception area and the energy centre,” she added.

While financial constraints prevented the use of photovoltaics (PVs) for power generation, a 50W PV module has been installed as an interactive teaching aid. This small scale system uses external pole-mounted PV modules to generate sufficient power to run a radio or desk lamp.

“Throughout its design, the project has been characterised by its need to not only make effective use of renewable and low carbon technologies to meet the sustainability criteria of the client, but also the requirement to use these systems as teaching tools. While this presented us with some design challenges, it also made for a very interesting and satisfying project,” Gealy concluded. ●

■ **The project has been characterised by its need to not only make effective use of renewable and low carbon technologies, but also the requirement to use these systems as teaching tools** ■
– Sarah Gealy

Collaborators

The services were designed by the Cardiff office of Faber Maunsell | AECOM working closely with client Neath Port Talbot County Borough Council, concept architects the Welsh School of Architecture, and architects Loyn & Co.

The project also received support from the Welsh Assembly Government and was funded through a £5.6 million grant from the European Regional Development Fund and Local Regeneration Fund.



Getting into hot water

Renewable water-heating technologies are becoming more of an attractive green option, but there are a number of pitfalls in trying to marry up different systems.

Ian Vallely reports

As higher insulation standards and improved air tightness have reduced the demand for space heating, so hot water has become the dominant heat load in many modern buildings. As a result, water heating has started to move rapidly up the energy-saving agenda.

The demand for better energy-saving performance has, in turn, led to an increase in the use of renewables such as solar thermal, and ground and air source heat pumps to preheat the cold water in water-heating systems. Yan Evans, technical director of boiler maker Baxi Commercial, says: "Rather than raising the water temperature using gas from, say, 10°C to the preset temperature of 60°C, you can preheat it with a renewable source.

"For example, if you size a solar thermal system correctly, you should hardly have to use any fossil fuel in the summer months. At other times, if you raise the water temperature from, say, 10 to 20°C using solar thermal, you will reduce the building's carbon footprint."

Paul Marsden, UK sales manager of heater manufacturer Lochinvar, agrees that preheating with renewables is an environmentally-responsible strategy. However, he also sees a danger: "Solar thermal and water heating are familiar technologies and most people know they can incorporate both, but there appears to be a lack of understanding across the board – from clients, contractors and consultants – about how to integrate the systems to get the best out of them for the money invested."



"There appears to be a lack of understanding across the board – from clients, contractors and consultants – about how to integrate solar thermal and water heating systems"

> – Paul Marsden



" You can't guarantee that solar energy will be sufficient to keep the domestic hot water vessel at 60°C "
 – Kevin Stones

> Indeed, the marriage of different technologies associated with water heating raises a number of issues, says Evans. "Every day now we see schematics across our desks containing a mixture of heat sources in the plant room. But this throws up difficult design issues. For example, if it is a split system, there will be boilers and water heaters.

"You might also see combined heat and power (CHP), maybe a ground source heat pump, and perhaps a biomass boiler. When you have a mixture of heat sources that have different limitations and different hot water temperature outputs, you must make sure you are getting the most out of each individual piece of technology and that they are not fighting each other."

That is why the designer must be mindful of the performance benefits and limitations of the different pieces of equipment, Evans adds. "I think that, as a consulting engineer, you have to develop a control strategy that allows you to get the best out of each individual technology and therefore the best out of the system as a whole."

He offers this example of the design difficulties associated with a system that includes CHP and solar thermal: "You would size your CHP for the base load; CHP likes to have both space heating and hot water loads because, in the summer, when there is no heating load to sustain the operation of the CHP unit, it needs to have access to the hot water load.

"If you add a solar thermal system designed to satisfy summer hot water demand, then you are not putting any load onto the CHP unit. And therein lies the problem – this mix of technologies could cause the CHP to cycle on and off – something the CHP engines don't like. Equally, the solar system displaces natural gas, but the environmental benefit of the CHP unit is not the gas it is displacing; rather, it is the electricity it is saving. The carbon emissions from electricity are higher than those from gas.

"So you are effectively using a renewable to switch off a low carbon technology that has more of a carbon benefit than the renewable does."

It is fairly common to separate the solar circuit from the domestic hot water supply and preheat the cold water going into the domestic hot water cylinder. However, there is an alternative, according to Kevin Stones, engineering and services director of



Eco-Knight non-storage condensing water heater

manufacturer Hoval: "You can use solar energy, but you would also have, say, a coil in the cylinder linked to a boiler or other heat generator to bring the temperature up if needs be."

Storage solution

Alongside the rising use of renewables such as solar thermal technology, there has been a significant growth in hot water storage. Take, for instance, an apartment block with 150 apartments. Rather than bringing solar energy into individual apartments, it might make more sense to have a central thermal store feeding the apartments. However, more storage for preheating increases the risk of legionella, warns Stones: "You can't guarantee that solar energy will be sufficient to keep the contents of a calorifier or domestic hot water vessel at 60°C [to prevent legionella], so there is a need for an anti-legionella pasteurisation cycle.

"Some form of back-up heating facility will ensure that the temperature of the vessel is lifted to ensure that any legionella-type bugs that may be present are killed off. It's not ideal because you lose the stratification in >

Renewables: Sources for water heating systems

Solar thermal: There are, according to Lochinvar, two basic types of solar thermal collectors – evacuated tube and flat plate. While the flat plate has been used extensively, especially in domestic properties, evacuated tube panels with their higher overall efficiency are better suited to our northern hemisphere climate. Some manufacturers have guides to solar thermal systems installation and design.

Ground source heat pump (GSHP): This is an electrically-powered system that uses the earth's relatively constant ground or groundwater temperature to provide heating, cooling and hot water. GSHPs move heat that already exists. Results are lower energy consumption, as well as lower maintenance and life cycle costs. However, their initial cost can be higher than conventional systems.

Air source heat pump (ASHP): This takes energy from the air and raises it to a higher temperature using a process which is similar to a reverse refrigeration process. According to one supplier, Danfoss, ASHPs are ideal for very tight spaces, as well as within an eco-architectural design or within the design of a building that has large internal areas such as audience halls and public places.

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An example of a solar collector

■ When you have a mixture of heat sources that have different limitations and different hot water temperature outputs, you must make sure they are not fighting each other ■

– Yan Evans

> the vessel that helps the heat transfer.” But it has to be done in accordance with UK water and health and safety regulations, he points out.

If you are preheating a direct-fired storage water heater, then the water heater will be storing the water at 60°C. Typically once a week the solar control unit is made to switch on a shunt pump that moves the hot water at 60°C between the storage inside the water heater to the bottom of the preheat cylinder to kill any legionella that may be present.

However, Evans adds: “Some people get a little paranoid about legionella. They like to run legionella cycles every day. If you take your solar thermal up to temperature via that route once a day you are effectively taking the load away from the solar thermal system, negating its effectiveness.”

So it is important to consider the management of the risk of legionella carefully, says Evans: “For example, cycling at midnight might sound like a logical time to do it. But if you have a very well insulated solar cylinder and there is no draw off overnight, come six o’clock in the morning, when you have run your legionella cycle at midnight, there is no load to offer the solar on that day when the sun comes up.”

When it comes to ‘clean’ or ‘dirty’ energy sources, Ant Wilson of consultancy Faber Maunsell | AECOM insists that consultants should “think electric” if they’re serious about sustainability. “At the moment, we say electricity is not sustainable because it is a secondary energy (because we use gas and coal to generate it). But if we didn’t use these fuel sources, electricity would not be seen as dirty,” he says. “You might say electricity is too expensive to heat water, but if you went onto, say, a half-hourly tariff, you could take advantage of cheap electricity.” That implies a need for water storage because it would involve using electricity directly, like a kettle.

There is an alternative way of using electricity, says Wilson: “You could use an air-to-water heat pump. If we can put in one unit of electricity and get out three units of heat – and some of the newer heat pumps allow this – then surely a heat pump solution driven by electricity would be a good way to heat hot water. Linking this with a large store to flatten out the demand for electricity could then save money.” ●

The CIBSE *Solar heating design and installation guide (Domestic Building Services Panel)* is available from the CIBSE Bookshop at www.cibse.org

Dry cycling Saving energy through intelligent control

Even when standard controls and a building management system are in place, many boilers waste energy through dry cycling, according to Tony Willis (pictured), technical sales director with Sabien



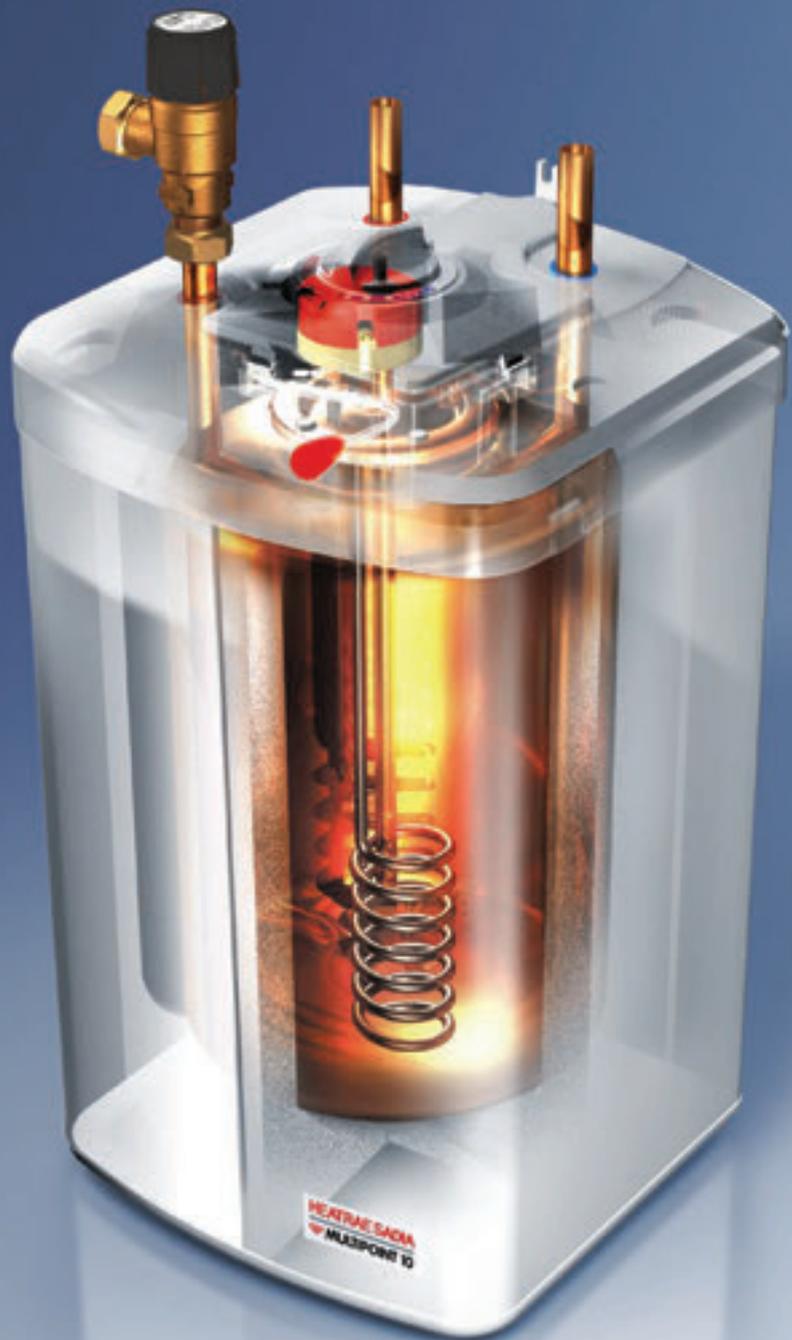
Technology. However, he claims that his company has a solution. Dry cycling occurs when boilers fire to compensate for standard heat losses

from the boiler, without contributing to the building heating and hot water demand.

Willis says: “Taking effective control of dry cycling can reduce the boiler’s fuel consumption by as much as 25 per cent, the operative word being ‘effective’. To do so it’s necessary to optimise the system through intelligent analysis of the boiler’s flow and return water temperatures. This can be achieved by retrofitting an ‘intelligent boiler load optimisation’ system that will minimise dry cycling while ensuring the boiler’s designed set point temperature.

“Intelligent boiler load optimisation is able to recognise and identify dry cycling by constantly monitoring the boiler’s thermal response to changing loads every 10 seconds.

“Two digital temperature probes measure and monitor the boiler flow and return temperatures. The onboard software calculates the temperature gradient over time and determines when the boiler should fire for true building/heating demand and when it should remove/inhibit unnecessary boiler firing and energy consumption.”



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Guiding light



Most lighting-design schemes are overseen by generalists who need an easily accessible guide they can use on site. A new handbook has just been launched to fulfil this and other needs, writes **Paul Haddelsey**

You could be a student seeking a general overview of lighting design. Or you might be at the other end of the professional ladder – a specialist in a particular field of lighting who wants to apply your knowledge in a different way. The authors of a new lighting handbook say that their publication can meet a wide range of needs through its practical, accessible approach to design.

The *SLL Lighting Handbook*, described as the first of its kind, has been published to plug a gap in existing Society of Light and Lighting (SLL) publications.

“We already have the Code for Lighting, which explains design criteria and how to perform calculations; and we have the lighting Guides, which go into great detail on specific applications,” explains co-author Peter Boyce. “However, there was nothing in between to provide a

general overview of lighting, and that is what the *SLL Lighting Handbook* is designed to do.”

Launched in the centenary year of the Illuminating Engineering Society, a forerunner of the SLL, the new handbook is the first step in making general lighting information more accessible, according to co-author Peter Raynham: “To that end, it has been designed to be a genuine handbook that will easily fit in a briefcase and can be taken out to site.”

Boyce adds: “It’s not aimed at very experienced lighting designers as most of them already have this knowledge, and although many more lighting schemes are being given to specialist designers, these still only account for about five per cent of lighting designs in the UK.

“As a result, the majority of lighting designs are carried out by people who do not specialise in lighting, but would like to have the knowledge to think about their designs more broadly. Or they may be specifying lighting to comply with a certain lighting guide, but lack the knowledge to fully evaluate the proposals.

“In addition, there are lighting designers who are very experienced in a particular field – such as church or theatre lighting – who get involved in other types of lighting occasionally. They will

also find this very useful.” Another role for the handbook is that of a general lighting textbook for students. “While there are many good lighting textbooks around, there is no book that brings all of this information together in a single place,” explains Raynham.

Light and vision

The handbook is divided into three main sections – fundamentals, technology, and lighting applications. The contents page provides detailed sub-sections for each of the three, so that a particular requirement can be easily found.

Fundamentals focuses on information about light and vision. This section covers photometry and explains the terminology commonly used in lighting design. As such, it will be a valuable resource for those who are involved in basic lighting designs using software to carry out calculations without necessarily understanding the terminology used in the software.

This is followed by a detailed sub-section on vision, explaining the working of the eye and how it adapts to different light conditions and the significance of spatial, temporal and colour thresholds. Important factors such as photopic, scotopic and mesopic vision are also explained in relation to the different visual responses to light sources with varying spectral composition. Just as importantly, it discusses the factors that contribute to visual discomfort and how lighting design can minimise this.

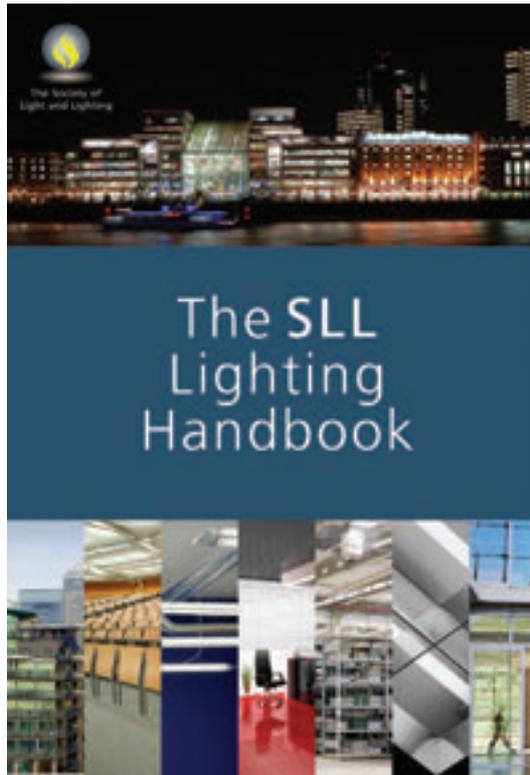
Section two of the publication is concerned with the underlying technology of lighting; encompassing light sources, control gear, lighting controls and luminaire design. The chapter on light sources ranges from the ways in which visible and non-visible radiation are produced, via the various mechanisms that can cause luminescence to the types of lamps in common use.

Each major type of light source is described in detail, taking in spectral compositions and how light is produced, as well as how the lamps are manufactured and implications of the construction on lamp life and efficacy. Lamp characteristics are also summarised in a ‘quick reference’ table.

“We often find that people who are only involved in lighting design don’t fully understand how factors such as wattage can impact on the luminous efficacy for the same type of light source,” Boyce says. “This section of the handbook will help those people understand the implications of changing such design parameters.”

Nature of daylight

Daylight as a light source is also addressed in detail, with an emphasis on understanding how the availability and nature of daylight vary through the day and through the year. There is also an additional chapter on the subject of daylighting in the applications section that addresses ways of introducing daylight as well as the complications that daylight can cause, such as glare and solar heat gains. Also included in the technology



section are chapters on control gear, luminaire design and lighting controls, each including a general description followed by more detailed information. In fact, this pattern of increasing complexity through each chapter is consistent throughout the publication, enabling people to dip into the basics – such as factors to consider for a particular application – at the beginning of a chapter and then proceed to more detailed information if they wish.

The applications section consists mainly of overviews of different types of lighting – industrial, office, retail, and so on. There is also a separate chapter on emergency lighting.

The purpose of these sections is to provide an overview that will cover the main points for each application, with references to where more detailed information can be found. For example, the chapter on sports lighting includes the general principles and goes into more depth for the most popular sports that require lighting. Readers are then referred to the *SLL Lighting Guide 4: Sports Lighting*, should they require more specific information.

“Each section has about 10 to 12 pages, whereas the more detailed lighting *Guides* may have over 100 pages, so the two work well together,” Raynham says. “As such, it will address around 90 per cent of the lighting schemes that people will come into contact with, and they will have to turn to the lighting *Guides* for the remaining 10 per cent.” ●

The SLL Lighting Handbook is available from the end of April at the CIBSE bookshop, www.cibse.org. For information about the SLL, visit the society’s website at www.sll.org.uk

“ This new guide will address around 90 per cent of the lighting schemes that people will come into contact with ”
– Peter Raynham

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Biggest fan turns to biggest fan manufacturer

Fläkt Woods has completed refurbishment work on what is believed to be the world's largest fan, part of the giant S1MA, the biggest transonic wind tunnel in the world located at the ONERA facility in Modane, France.

A major fan upgrade was required, and the bulk of the work involved replacing the two giant counter-rotating fans (15m in diameter, weighing 58 tons per impeller and requiring 88 MW power).

The contract to replace impellers was awarded to Fläkt Woods after engineers demonstrated detailed solutions to overcome



the problems of wear and tear of the blades.

After nearly four years of extensive work, the project is now complete, and energy savings above 10 per cent have been obtained.

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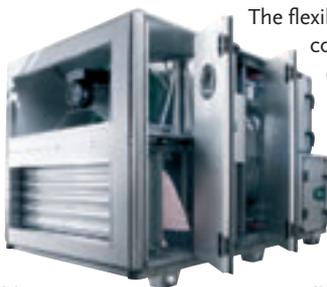
● Visit www.aircraftairhandling.com

Fläkt Woods launches a new AHU range

Fläkt Woods has launched a new eQ range of air handling units, which will replace the company's EU range.

The eQ is even better than the EC range. It is available in 17 sizes with airflows ranging from 0.1-9 m³/s, and the majority of the components are made in-house.

The range covers every possible need, from single supply air units to integrated solutions with heat recovery and advanced controls. Clever design and a



dedicated supply chain means that eQ can meet the needs of the most urgent projects.

The flexible design, energy-efficient components and brilliant control system provides a new benchmark for the industry.

The intelligent casing design and energy-efficient components make the eQ cost-effective. It is suitable for installations in industrial premises and public buildings,

as well as dwellings, schools, offices, shops and hospitals.

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A lesson in fuel efficiency

A new fuel-efficient heating system has been installed to replace the existing 27-year-old boilers at Ashville College in Harrogate. Two Buderus GB312 200kW output, floor standing, condensing boilers now meet all the heating requirements for the entire building.



The Buderus GB312 boiler is a high performance, condensing boiler with an advanced cast-aluminium heat exchanger which provides efficiencies of up to 108 per cent (NVC). Six outputs are available from 90kW to 280kW and boilers can be fitted individually or as part of a pre-assembled 2-boiler cascade kit. Multiple low-NOx pre-mix burners provide a wide modulation range making the GB312 flexible enough to suit a variety of commercial installations. Its compact dimensions, and relative light weight make it easy to transport. A fully-insulated casing minimises thermal losses, and makes the boiler whisper quiet.

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BTU (Heating) Limited are the 'Toast of Surrey 2009'

BTU (Heating) Limited, part of the BTU Group of Companies, Guildford, has won the Toast of Surrey Business Awards 2009, for its 'outstanding contribution to the Surrey business community'.

Paul Merritt, chief executive of the BTU Group of Companies, accepted the award.

BTU (Heating) Limited installed the UK's first operational fuel cell system in 2004. It has recently contributed to the LEPA Renewable Energy Programme for the London Fire Brigade, which won the Renewable

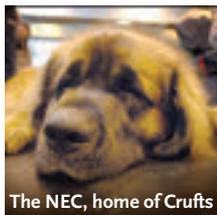


Energy Project of Year at the H&V Awards in 2008. BTU is interested in negotiations for the implementation of the Clinton Climate Change programme through the application of energy-efficient technologies.

Products & Services

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Grundfos visit the NEC



The NEC, home of Crufts

When the NEC was opened in 1976, it heralded the way for a new generation of exhibition sites. Over the intervening years, the exhibition centre and central arena

have seen many additional structures added.

The forum and arena areas are currently undergoing a £28m redevelopment that will create new hospitality areas, bars, restaurants, improved backstage areas and extra seating, bringing the main arena capacity to 14,000. Part of the redevelopment includes the upgrading of the M+E system, and this is where Grundfos Pumps has been able to offer its expertise.

Grundfos, which worked with consultants Hulley & Kirkwood and contractors W T Parker, supplied a wide range of products via Pipe Center. The pumps and booster sets plus ancillary equipment will fully update the heating and chilled water systems.

By selecting Grundfos variable-speed pumps, the new arena and forum areas can be assured that the Grundfos pump solution will not only meet the huge variation in demand, but will do so in an energy-efficient way.

● Call 01525 850000 or email: uk-sales@grundfos.com

New hotel room controller from MHI makes it easier to chill out

Mitsubishi Heavy Industries (MHI) has launched a simplified, easy to use air conditioning controller designed for use in hotel rooms. The RCH-E3 is based on the



well-established RC-E3 controller, which has been proven in use with MHI's VRF systems. The new hotel room control panel retains the best features of the existing model, including the easy-to-read LCD display and installer-friendly two-

wire installation, but only has the functions which a hotel guest will need.

Mitsubishi Heavy's RCH-E3 offers the user control over on/off operation and fan speed, but users are unable to dial in excessive temperature settings which could reduce system efficiency. User adjustment of cooling and heating is restricted to a range of 16 to 30 degrees. The programmable timer functionality has also been removed from the new unit – this, and other advanced functions, are also controlled centrally through the hotel's BMS.

● Visit www.mhie.com for more details

Energy expert aims for eco-efficiency in his home

Dr Michael Lamperth of Imperial College London is a world-renowned developer of energy-efficient vehicle technologies. He has equipped his family home with a super-efficient home heating system featuring solar heated hot water and a wireless Honeywell CM Zone system for control of individual radiators.

These controls avoid energy wastage by heating rooms only when needed and then only to a preset temperature for the time of day.

"The Honeywell wireless CM Zone control system transmits from a central unit to wireless controllers on radiators," he explained. "It groups rooms as heating



zones, depending on when they are used. This ensures only rooms being used are heated to temperatures necessary for comfort.

● Visit www.cm-zone.com or call 01344 656511

Lumicom sees upsurge in demand

According to luminaire recycling specialist Lumicom, the last six months has seen significant growth in the number of organisations taking advantage of its recycling



services, in terms of both requesting advice and sending luminaires for recycling.

A not-for-profit accreditation body, Lumicom is able to act on behalf of many different lighting manufacturers, providing a single point of contact and a simple and transparent process for both end users and manufacturers. Lumicom can take end-to-end responsibility for the compliant disposal of luminaires, backed by a comprehensive audit trail, and it is responsible for handling the majority of discarded luminaires in the UK.

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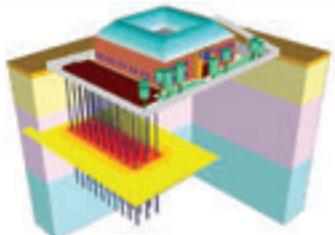
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The properties of air

If there is a need to examine the performance of a ventilation or air conditioning system, or simply a requirement to understand the condition of the atmosphere in and around the built environment, it is important to have an understanding of the properties of air, and specifically of humid air. These psychrometric properties provide a common method of analysing the changes in temperature and moisture content – and consequently energy – that take place in every heating, ventilation or air conditioning (HVAC) system in a building. This article will look at the basic parameters that combine to provide a psychrometric toolkit. A later article will consider the applications of these properties using the psychrometric chart.

Air is normally considered to be a mix of dry air and water vapour. 'Normal' dry air itself is mainly nitrogen (N₂) and oxygen (O₂) with traces of argon (Ar), carbon dioxide (CO₂) and other gases (see Table 1). Water vapour (H₂O) constitutes about 0.40 per cent of the whole global atmosphere and typically makes up one to four per cent of the mass of the combined air mixture at the Earth's surface. The molecular actions of the gases combining together have been determined by the Gas Laws and it is assumed that for the work in HVAC these 'ideal gas law' relationships are valid. From these laws, the characteristic equation for any gas is given by $pV = mRT$ (see box overleaf for

definitions of the symbols). This equation allows calculation of the properties of gases under different pressures and temperatures. The value of R, the specific gas constant, may be obtained for any gas by considering the molecular mass, M, of each of the constituent gases where $R = R_0/M$ and R₀ is the **Universal Gas Constant** of 8314.7 J · kg⁻¹ · mol⁻¹ K⁻¹. For

Gas	Molar mass	Proportion	Mass fraction
N ₂	28	x 0.7803	= 21.86
O ₂	32	x 0.2099	= 6.704
Ar	40	x 0.0094	= 0.376
CO ₂	44	x 0.0003	= 0.013
Average molecular mass			28.97

Table 1 – The Molecular Mass of Dry Air

example, using the information from Figure 1, the gas constant for dry air is given by $R_0/M = 8314.7/28.97 = 287 \text{ J} \cdot \text{kg}^{-1} \cdot \text{K}^{-1}$. The molecular mass of water vapour is 18 and so the specific gas constant may be obtained from $8314.7/18 = 461 \text{ J} \cdot \text{kg}^{-1} \cdot \text{K}^{-1}$

These relationships can also be usefully employed to examine the properties of other gas mixtures – as might be found, for example, in controlled specialist environments.

The air **dry bulb temperature**, θ (°C), is the temperature measured using a standard thermometer that is shielded from any radiant heating or cooling effects. (And, of course, is most frequently sensed using an electrical or electronic device.)

> As with any gas, the moving molecules of water vapour in the air exert a pressure. This **vapour pressure**, p_v (measured in p_a or mbar), is related to the mass of water vapour in the air – the more molecules present, the higher the vapour pressure. If molecules of water vapour were to be continually added to a volume of static air (for example, from a room humidifier) then at some point the air would not be able to support any more molecules – the air is said to be **saturated** at that point and any further water molecules added will simply condense out. The **saturated vapour pressure**, p_s , will have been reached – the actual value of this is related to the dry bulb temperature of the air; air with a higher dry bulb temperature will have a greater potential to hold water vapour, and so will have a higher saturated vapour pressure. The vapour pressure of water vapour in humid air compared, as a percentage, with the saturated vapour pressure of air at the same temperature gives the **relative humidity**, Φ (%) and $\Phi = p_v/p_s \times 100\%$.

The **partial pressure** of the water vapour adds to the partial pressures of the other gases in the air, to produce the **atmospheric pressure**, p_a , so giving $p_a = p_{da} + p_s$ (this relationship is known as **Dalton's Law**) – the standard value of atmospheric pressure is taken as 1013.25mbar (101.325 kPa). The atmospheric pressure will alter with both weather and location and so the relative effect of the vapour pressure will also change.

The mass of the water vapour in 1 kg of dry air is termed the **moisture content** g (kg/kg_{da}) – this is really a ‘vapour’ content and information from the USA will refer to this as humidity ratio. To avoid errors in writing down small numbers associated with moisture content, the units of g/kg_{da} are frequently used in place of kg/kg_{da} ($1g/kg_{da} = 0.001kg/kg_{da}$).

As an example of using the relationship $pV = mRT$, the moisture content, g , of a mixture of dry air and water vapour may be found from a knowledge of the partial pressures in the air. So:

$$\text{mass water vapour / mass of associated dry air} = m_s/m_a \text{ and since } pV = mRT, \text{ then } m = pV/RT, \text{ and so } (p_s V/R_s T) / (p_a V/R_a T) = (R_a/R_s) \times (p_s/p_a) = 287/461 p_s/(p_a - p_s) = 0.622 p_s/(p_a - p_s).$$

By comparing the moisture content in humid air as a percentage, with the moisture content of saturated air (at the same temperature) the **percentage saturation**, μ , may be determined where $\mu = g/g_s \times 100$ per cent. The numerical values of percentage saturation, μ , and relative humidity, Φ ,

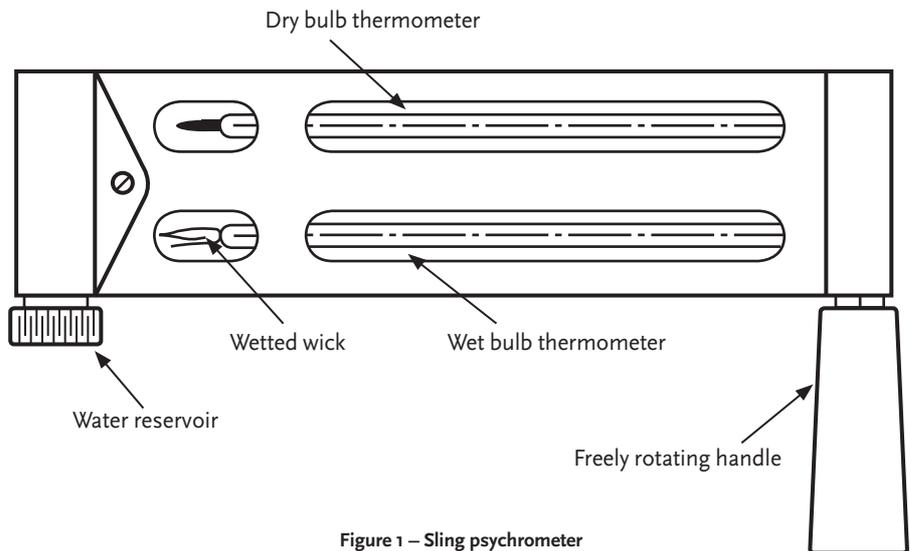


Figure 1 – Sling psychrometer

produce similar values and are practically interchangeable for HVAC calculations.

Specific Enthalpy, h (kJ/kg_{da}), is the heat content of humid air per kg dry air – it is relative to the enthalpy dry air at $0^\circ C$. Air with higher temperature and/or with moisture will have a positive specific enthalpy (more commonly referred to as simply ‘enthalpy’). The range of conditions likely in HVAC enthalpy can be estimated from $h = (1.005 \theta) + g (1.89 \theta + 2501)$; however, more precise results may be obtained using relationships in *CIBSE Guide C 2007*.

The thermodynamic **wet bulb temperature**, θ' ($^\circ C$), is a useful means of determining the moisture content of the air at a particular dry bulb temperature. The wet bulb temperature is the temperature that a sample of air would reach if it had a fine spray of water added to it (the water being at the air dry bulb temperature) without any external heat being added or taken away (this is known as an **adiabatic process**). Some of the sprayed water will evaporate into the air – the heat to cause that evaporation being taken from the air itself and so the air dry bulb temperature will drop until the point where the air is **saturated** (with water vapour). At this point the dry bulb temperature = wet bulb temperature, and the air is said to have reached its **dew point**: if the air dry bulb temperature is then reduced, or more water vapour is added to the air, then condensation will occur.

Practically, the wet bulb temperature is measured with a thermometer with a wetted material wrapped (or more frequently a wick fed from a reservoir of distilled water) around the thermometer's bulb at the same temperature as the air dry bulb temperature. The evaporation (or drying) of the water from the wick into the surrounding air needs energy, and this is mainly taken from

the thermometer's bulb, so reducing the temperature as read from the stem of the thermometer. The fewer molecules of water vapour in the air (and hence the lower the air vapour pressure), the more molecules of water will be able to evaporate into it from the thermometer's wetted surface bulb and so the lower the wet bulb temperature.

The difference in the value of the wet bulb temperature compared with the air's dry bulb temperature, $(\theta - \theta')$ (K), is known as the **wet bulb depression**, (wet bulb is always less than or equal to dry bulb temperature). Dry bulb temperature and wet bulb depression tables (or calculations) can be used to determine the air moisture content. The recording of the wet bulb temperature is commonly undertaken in two ways – the *screen* wet bulb, θ'_{sc} – and the much more useful *sling* wet bulb θ'_{sl} . The two values are likely to vary slightly from each other. The screen wet bulb is recorded by a static wet bulb thermometer placed in air (frequently outdoors in a *Stevenson's Screen*), and the sling wet bulb is measured where there is air movement across the thermometer's bulb (ensuring that any evaporated water is carried away from the bulb and so does not locally increase the vapour pressure). These measurements may be undertaken in a number of ways including the *Sling Psychrometer* (see Figure 1) and the *Aspirated Hygrometer*.

Obtaining the properties

CIBSE Guide C (2007) has lists of the values of all the properties of air as described above for various dry bulb temperatures. The guide also includes sets of equations that will allow determination of values for other gases that may be used in spreadsheets or computer programmes to the Characteristic Equation may be used in conjunction with the Gas Laws.

Module 3

April 2009

1. Based on the data in the article, what would the approximate specific gas constant be for nitrogen?

- A 287
- B 297
- C 307
- D 317
- E 327

2. Which of these is the most appropriate description of saturated air?

- A Air that has some water vapour in it
- B Air where the dry bulb temperature is less than the wet bulb temperature
- C Air that if the dry bulb temperature is reduced condensation would occur
- D Air where the percentage saturation is greater than the relative humidity
- E Air where the vapour pressure is greater than the saturated vapour pressure

3. Based on the data in the article, if the atmospheric pressure is 101.325 kPa and the vapour pressure 1.325 kPa, what is the approximate moisture content of the air per kg dry air?

- A 4.24 g/kg
- B 5.24 g/kg
- C 6.24 g/kg
- D 7.24 g/kg
- E 8.24 g/kg

4. Which of these is the most accurate statement?

- A Wet bulb temperatures are a measure of radiant cooling
- B Wet bulb temperatures provide a direct measure of comfort
- C Wet bulb is higher than dry bulb for saturated air
- D Screen wet bulb is more accurate than sling wet bulb temperature
- E Wet bulb will be lower when the vapour pressure is reduced

5. The psychrometric chart dates back to work undertaken when?

- A Sometime between 1800 and 1850
- B Sometime between 1850 and 1900
- C Sometime between 1900 and 1950
- D Sometime between 1950 and 2000
- E 1906

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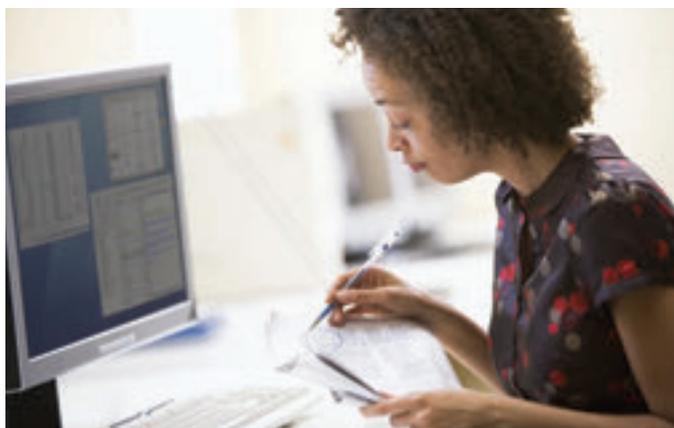
Recession busters

Specialist building services recruiter **Ben Byram**, from technical recruitment company the Nes Group Limited, gives his advice on how to find a job in difficult times

The R-word has dominated the headlines so far this year. The banking crisis, housing crisis, employment crisis have all secured unrivalled column inches. The UK economy is in recession, redundancies are the highest they have been for 10 years, and jobseekers face more competition than they have done before.

For building services, the contract market has felt the biggest impact and, as a result, many contractors have been advised to consider joining a company as a member of staff, rather than remaining a contractor. If you find yourself out of work, either through redundancy from a permanent role or due to an increasingly challenging contract market, there are ways you can improve your job search.

The nuclear industry remains buoyant, so those with nuclear experience are at an advantage. Councils and local authorities as well as other government-funded sectors also offer various opportunities. But for commercial, retail and residential sectors it's a different story. For some, the solution could be to consider using earlier experience to secure work. For example, a design engineer may have the on-site experience to work as a resident or project engineer, and so could consider



such opportunities if they arise. With fewer jobs available, it is also important that you utilise your network of professional contacts. CIBSE membership can help enormously: take advantage of the opportunity to attend meetings, social functions and member-networking events to extend your business contacts, and utilise their online discussion forums. Other online tools, such as specialist

“With fewer jobs available it's important to utilise professional contact networks”

business networking website LinkedIn, allow you to maintain contact with the people that you meet throughout your career – informing them of your availability for work and finding out about vacancies through their contacts.

Specialist building services recruitment consultants anticipate an increase in demand for contract and permanent personnel at the start of the new financial year, when funding becomes available within some of the larger multi-discipline consultancies that have had recruitment freezes in place until now. While this does not guarantee work for the building services professional, it is certainly a welcome move for much of the industry and a positive sign for those seeking work.

Movers & Shakers



Elta Fans has appointed **Damian Buxton** as its new financial director. Buxton is a qualified management

accountant and has been part of the Elta Fans family for more than 10 years, joining the company in the role of financial controller in 1997. His new role he will help develop the business.



Independent engineering and environmental consultant Gifford has appointed **Glen Irwin** director,

to lead the group's building sciences teams. Irwin is expected to bring a “new perspective and energy” to Gifford's building sciences-led approach to sustainable building design.



Elta Fans has appointed **David Osgerby** as its new managing director. He will support the group

management team on strategy and operational matters and aims to at least double the size of the business.



Iain Pickles has joined TEST (Total Energy Savings Techniques) as its sustainable technologies

manager for energy solutions. In his new role he will help a wide range of organisations monitor and control their energy costs.



Michael Wilkshire has been appointed as senior practice manager at The Management

Recruitment Group's building services division. He has 15 years of services recruitment experience.

New members join CIBSE

CIBSE has recently welcomed nearly 30 new members to the Institution. Of those 14 are international members from Hong Kong, and Douglas Alexander King, from Bath, has had his membership upgraded to Fellow. The full list is:

FELLOW

Douglas Alexander King Bath

MEMBER

Christopher John Bennett Huddersfield

Chun Hon Howard Chan Hong Kong

Wai Lun William Chan	Hong Kong
Wai Chung Chan	Hong Kong
Robert Clegg	Ormskirk
Hugh Jamies Cunningham	Belfast
David John Doherty	Celbridge, Eire
Yat Man Ryan Fan	Hong Kong
Chi Fai Foo	Hong Kong
Ian David Gow	Abu Dhabi
Wei Yu Ho	Hong Kong
Vijay Kumar	Dubai
Ming Lo Kwok	Hong Kong
Chun Yu Johnny Lai	Hong Kong
Helena Lee	London
Yee Man Annie Leung	Hong Kong
Patrick Daniel McAuley	Coleraine, Eire

Kieron Gerard McGovern	Blackrock
Rachel McKenna	Newcastle, Co Dublin
Wai Sum Man	Hong Kong
Neil Marsh	Dubai
Amelia Katherine Milne	London
Faidon Nikiforiadis	Salford
Yat Fai Dicky Poon	Hong Kong
Cho Ming Tang	Hong Kong
Ho Yin Tsang	Hong Kong
Paul Reuben Wilkinson	Hong Kong
ASSOCIATE	
Gary Hearn	Corby
John James McCullough	Carrickfergus



Would you like to join our Award-Winning team?

If it is your personal mission to improve and excel through experience, then i-Prophets is the employer for you. We take pride in our people and are currently looking for enthusiastic, hard working individuals to fill the vacancies listed below.

Low Carbon Energy Consultant

£32,000-£40,000 plus car allowance

2 roles (1 Midlands, 1 South East/London)

The key function of the role is to deliver the consultancy offerings of i-Prophets Energy Services to a high standard. Those consultancy services are to include general energy surveying and auditing, monitoring and targeting implementation, energy certification and renewable feasibility studies. Significant experience in an aspect of energy management and professional recognition is essential. Energy Assessor Accreditation (EPC or DEC or Air Conditioning) and Carbon Trust Accreditation is desirable.

Energy Surveyor/Assessor

£25,000-£32,000 plus car allowance

South East/London

The ideal person for this role should have a background in one of the following: building surveying, building services, site measured surveying or architectural experience. As an energy assessor, the role will conduct energy performance certificate assessments (for transactional and display purposes) across the South East of England, managing time between site assessment and desk calculation. At least one stream of Energy Assessor Accreditation (DEC/EPC/Air Conditioning) is essential.

Energy Solutions Sales Executive

£25,000-£40,000

2 roles (1 North/Midlands, 1 Southern England)

This role requires a good knowledge of the energy efficiency management sector with a proven track record in either consultancy or software sales. Reporting to the Sales and Marketing Director, the role would suit a flexible and committed individual with an outgoing and innovative character, with the ability to sell the i-Prophets range of energy solutions and software.



For more information:

Tel: 0845 003 9086

careers@i-prophets.com

www.i-prophets.com/employ.php

i-prophets
energy services

advice
when you need it


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a Randstad company



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0800 169 0863

www.hillmcglynn.com



CITY SURVEYOR'S DEPARTMENT

Mechanical Engineer (Building Services)

£32,510 - £38,880 pa inc. plus £3,000 Market Forces Supplement depending on experience

The City Surveyor's Property Services Division is responsible for the delivery of a range of construction, improvement and refurbishment projects of varying complexity, as well as providing a maintenance and repair service to the operational property assets (including the Guildhall, Mansion House, schools, markets and Court buildings), and to an extensive portfolio of commercial investment properties in the City and West End.

An opportunity has arisen for an experienced Mechanical Building Services Engineer to join the team in a wide and varied role. In addition to managing repairs, maintenance and minor projects you will assist and advise on building mechanical services maintenance and appropriate contractual arrangements. You will be suitably qualified with experience of managing contractors and with the ability to provide cost-effective and innovative solutions to a wide range of challenges. Experience in working with commercial properties in particular will be welcomed.

Benefits include a contributory final salary pension scheme, interest free season ticket loan, flexible working hours and generous leave entitlement.

To apply online, please visit www.cityoflondon.gov.uk/jobs

Alternatively, please contact the Corporate Recruitment Unit on 020 7332 3978 (24hr answerphone) or email: cru@cityoflondon.gov.uk quoting reference SUR080. A Minicom service is available on 020 7332 3179.

Closing date: Tuesday, 28 April 2009.



The City of London Corporation is committed to Equal Opportunities and welcomes applications from all sections of the community.



www.logicrec.com

CHARTERED ELECTRICAL ENGINEER - BUILDINGS

Permanent - Hampshire - Up to 55K plus package on top

This vacancy is to work within a multi-disciplinary engineering team within a large project supporting ongoing MOD contracts.

You will be responsible for the production of electrical services designs for stand alone accommodation facilities and installations for use by the armed forces on deployed operations, and this will include the production of conceptual electrical installation designs through to detailed construction designs, specifications and equipment selection, bills of materials and requisitioning.

You will also be interpreting the clients brief to produce electrical services designs to support proposals and construction/installation programmes.

Such electrical services include low voltage power systems, duty and standby power generation, lightning protection, lighting and control systems, fire detection systems and integration of all packages such as security systems and IT infrastructure.

**** Certification as a Chartered Professional Engineer is required ****

Requires sufficient professional experience to assure competence as a fully trained professional. Responsible for leadership of a functional area on a small project or a segment of a larger project.

Involves a great deal of organising, work prioritisation and related skills, and includes a great deal of peer interface to properly complete tasks via teamwork. Competency with Microsoft Office - Word, Excel, Project & Outlook AutoCAD, Hevacomp would be advantageous.

Why choose LOGIC?

All of our consultants have 'numerous years' of industry experience. We fully understand 'your' market and our clients, so 'you' can expect the best service, the best contracts and the best permanent jobs both in the UK and Overseas.

Contact Rob Norris or Mike Lower now for a discreet and informal chat:
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For more information contact Mike McNally,
Hays CIBSE Appointments Director.

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East Lancashire

Estates & Facilities

Estates Operations & Maintenance Manager

Band 8b £43,221 - £53,432 p.a.

37.5 hours per week, Permanent Contract

Based at Accrington Victoria Community Hospital (under review)

The Estates & Facilities Service, currently based within Accrington Victoria Hospital, is looking for an enthusiastic and self-motivated person to join the existing team, to assume responsibility for the safe and efficient management of the complex day to day maintenance activities and the safe and efficient operation of all plant and equipment.

In this vital role, you will lead a small and highly skilled in-house maintenance team and will manage the use of specialist external contractors in the provision of a safe and comfortable environment for all patients, staff and visitors.

It is essential you hold an Engineering degree or equivalent, have an appropriate management qualification and 'Chartered Engineer' status. You should have extensive experience of working at a higher level within an Estates environment, preferably within the NHS, along with experience in the operation and maintenance of building and engineering services. The ability to understand technical drawings and plans, and manage complex capital programmes and projects are also essential.

Utilising your expert communication and listening skills, you will have the ability to work effectively as part of the team and secure team member co-operation. You should also have the ability to demonstrate effective leadership and managerial qualities, as well as the ability to work alone using initiative.

As you will be required to travel to different NHS East Lancashire premises you should be a driver with access to a vehicle for work purposes.

Appointment to this post is subject to a Standard Disclosure with the Criminal Records Bureau.

Informal enquiries to David Peers, Associate Director, Estates & Facilities on 01254 359008.

To apply for this position please visit www.jobs.nhs.uk using the reference number 638-FIE-AS-005.

Closing date: Wednesday 22 April 2009.



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Want to make a real difference to your local community? Work with us and help to transform North Lincolnshire towards a better future for all.

ASSET MANAGEMENT & CULTURE

Energy Manager

Ref: PRC00009

Grade 9 SCP 37 - 41, £30,456 - £34,107

37 hours per week

Hewson House, Station Road, Brigg, DN20 8XJ

You will act as the council's principal advisor in respect of all building related energy performance issues. You will lead, improve and co-ordinate all aspects of the energy performance of the council's buildings (strategic and operational) including the legislative compliance, delivery of reductions in CO₂ emissions and all utility energy use together with achievement of wider sustainable construction techniques and building management. This includes ensuring compliance with all relevant CO₂ energy related legislation.

The Energy Manager post will be supported by, and have line management responsibility for, an Energy Management Officer.

For further information please contact Nolan Bennett (Maintenance Services Manager) or Chris Ramsbottom (Head of Construction) on 01724 296719.

Application forms, job descriptions and employee specifications are available at www.northlincs.gov.uk

Alternatively for an application form and job description, please telephone 01724 296466 (answer phone), or email lauren.cole@northlincs.gov.uk

Closing date: Thursday 14 May 2009



BENEFITS PACKAGE

Excellent final salary pension scheme, job share, child care vouchers, career break, maternity & paternity leave, development opportunities, minimum 23 days holiday plus Bank holidays and, where applicable, generous relocation package, flexible working hours and homeworking. The Council operates a no smoking policy.

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Opportunities to make a difference

- Int/Senior Electrical Design
- Sustainability Consultant

CBG Consultants Ltd is an award winning mechanical and electrical consultancy with attractive offices in Oxford and London.

We are looking to appoint an enthusiastic and motivated intermediate to senior level electrical building services design engineer and a sustainability consultant to assist with our diverse range of projects.

We offer a great package and a fantastic training programme with opportunities for development and career progression.

Please contact Julie Edginton for job descriptions and application forms.

CBG Consultants Ltd

South House, 3 Farmoor Court, Cumnor Road, Oxford OX2 9LU

Email: je@cbgc.com
Tel: 01865 864500

www.cbgc.com



Specialists in Sustainable Engineering



Confronting Inequality
Celebrating Diversity

Energy and Sustainability Manager

Grade 9, £37,651 - £43,622 p.a.

Ref: REB0730

Estates and Facilities

We are seeking an experienced individual to lead our approach to carbon management and sustainability in our estate. You will develop and manage a carbon reduction programme including being responsible for managing the CRC programme on behalf of the University, procure the University's utilities achieving best value and ensuring financial and legal probity, assisting in setting and embedding change and the sustainability agenda into the Department and across the University.

You will be expected to have extensive knowledge and experience of energy/utility procurement and management, including managing budgets, working with computerised energy management and targeting and monitoring systems and understand sustainable construction. A clear understanding of current and pending energy legislation is essential and knowledge of all the likely carbon and energy issues that the University faces is also key.

Ideally, you will have strong project management experience with excellent analytical and communication skills and be able to demonstrate a good track record in procurement and management of utilities and budgets as well as having sound knowledge of wider environmental issues. You should be enthusiastic, self-motivated and ready to deliver significant change to this evolving institution.

For an informal discussion contact Russell Smith, Estates Manager, Engineering and Building on 01274 233496 or e-mail R.M.Smith2@bradford.ac.uk

How to apply

Closing date: 1st May 2009, 5pm.

jobs@bradford.ac.uk tel: 01274 233091

(minicom: 01274 235807)

Applications from agencies will not be considered.



www.bradford.ac.uk/jobs

INVESTOR IN PEOPLE

ENERGY ★ ENTHUSIASM INSPIRATION

Building Services Manager

Skipton, North Yorkshire

One of the UK's largest building societies, we have over 600,000 customers and more than 80 branches across the country, from Aberdeen to Plymouth. Our ongoing success, and everything we do, is driven by the core values which are at the heart of our business - enthusiasm, fairness, ownership and trust.

This is a key role in which you'll manage all aspects of building services at our main site in Skipton and a number of other locations around the town - with the primary aim to ensure the availability and efficient operation of all mechanical and electrical services, as well as a prompt response to all reported repairs and breakdowns.

You'll also be responsible for the preparation and control of both maintenance and capital project budgets, and the management of a dedicated building services team whose training, development and motivation will also be a focus of the role.

To maintain the highest of standards in building services, not least when it comes to health and safety, you must be a CIBSE member with significant experience in a similar role. A confident communicator and people manager, you've also a degree level qualification in Electrical or Mechanical Engineering.

If you're inspired, and want to share in our success as one of the UK's largest building societies, just go to www.skiptoncareers.co.uk



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To advertise your jobs with CIBSE Journal contact:
Ali Scott 020 7324 2787 ali.scott@redactive.co.uk

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The official magazine of the Chartered Institution of Building Services Engineers

The home of building services vacancies in print and online



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If you recommend a friend or colleague to us and we place them in a permanent or contract role then we will give you up to £500 as a thank you! For more information or to recommend a friend please call or email us.

Lead Mechanical Design Engineer | London | to £55K+ | ref: 1246

Working for an award winning consultancy we are looking for a technically competent engineer with a solid track record in healthcare. This is a key position within the company and major hospital project experience is essential. You will be leading the healthcare team and be instrumental in moving the division forward.

Design Manager – Rail | London | £NEG! | ref: 1545

Our client is a large multi discipline consultancy and has a strategic requirement for a Design Manager for its overseas Rail operation. We are looking for an experienced individual with a solid track record in the Rail sector to be responsible for project delivery and implementation for all overseas projects. Some overseas travel will be required.

M&E Engineer - Tunnelling | London & Surrey | £40K - 50K | ref: 2015

As an M&E Engineer, you will be involved on site and in the design office with construction supervision, project management and design on a range of projects. The role will involve mechanical and electrical engineering activities associated with the design of tunnels, buildings and a wide variety of defence projects.

Senior Electrical Design Engineer | Surrey | to £46K+ | ref: 2009

Our client is a leading consultant working on several high profile projects. They are looking to strengthen their team with an experienced Electrical Design Engineer. Ideally Chartered, you will have a background in major projects. Specific sector experience including healthcare, rail and commercial would be useful.

For more information or a confidential discussion please contact Mark Butter

T: 02392 603030 F: 02392 603031

E: mark.butter@blueprintrecruit.com www.blueprintrecruit.com

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SALARY (£45k/£50k) + CAR

Initially, the appointed candidate, will work from home prior to our opening of an area office.

Whilst supporting the specification of our products with consultants the post requires actively developing the market and identifying new product opportunities.

Ideally, candidates will have 5 years experience and a formal qualification in the HVAC industry with a solid awareness of environmental issues and a belief in the attributes of mechanical systems over natural vent.

Technical expertise and communication skills are essential to assist clients with application.

If you're ready for a new, exciting and rewarding challenge email, in the first instance, your CV with a covering introduction to:



hr@airhandlers.net or write to

Air Handlers, Bute Street,
Waste, Salford, M50 1DU.

No agencies need apply.



Diamond Light Source is a new synchrotron and a leading scientific facility of its type in the world. Located on the Harwell Science and Innovation Campus in South Oxfordshire, we host research facilities supporting cutting edge research in all fields of science.

Building Services Engineer

Ref: DIA0514/TH

Circa £33k

We need an experienced hands-on Building Services Engineer to take responsibility of a number of exciting projects. In this varied role, you will assist the Beamline Design Co-ordinator as follows; liaise with different departments through the whole project life cycle, liaise with consultants and facilitate good communication and exchange information and ideas with the project team, advise clients on appropriate procurement methods and expertise required. With a degree or equivalent qualification, you will be a skilled communicator both on paper and in person. You will be competent in AutoCAD with expertise in mechanical or electrical services with an understanding of project management procedures.

We are committed to equality of opportunities for all and offer a competitive salary (dependent upon skills, qualifications and experience), comprehensive benefits, an index-linked pension scheme and flexible working hours.

For an application form and further information including work visa requirements please visit our website at www.diamond.ac.uk or telephone our recruitment line on 01235 778218 (answer phone) or write to us at the address below, quoting the appropriate reference number.

Closing date: 1st May 2009.



diamond

www.diamond.ac.uk

Diamond Light Source Ltd, Diamond House, Chilton, Didcot, Oxfordshire OX11 0DE



BSV provides a specialised recruitment service to the Consultancy and Project Engineering Building Services industry.



Electrical Design Engineer

London/Midlands, £45K-£55K + Bens
ref: 10925

A fantastic opportunity has arisen within a busy multi disciplined consultancy. This established firm has a number of long term hi-spec residential and refurbishment design projects which are greatly in need of a Chartered Electrical Engineer. You will be based in either London or the Midlands and be given full design responsibility. For the right engineer, an excellent remuneration package is on offer.
Contact Darren 01486 768600 to find out more.

Energy Assessor / Surveyor

London, £35K+ £55 Bens
ref: 10921

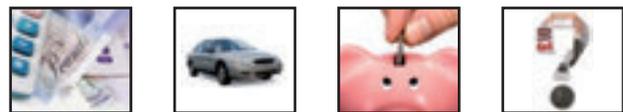
Our Client, a busy specialist in property management, require an Energy Assessor to carry out Commercial Property surveys. Key tasks involve producing EPCs, undertake modelling and produce reports containing findings and recommendations. Ideally you will be a CIBSE Low Carbon Consultant with good Part L knowledge. Excellent salary with excellent prospects.
Contact Vanessa 01483 768600

Mechanical Design Engineer

London, Sth East £45K+ £55k Bens
ref: 10898

A worldwide HVAC manufacturer is creating a new Building Services department and require a Chartered Building Services/Energy Engineer to complement the team. Good low energy design experience required - a unique opportunity. Contact Darren 01486 768600 for further details.

www.bsvconsultants.co.uk
Call 01483 768600 or email darrenw@bsvconsultants.co.uk
We have similar a variety of professional Building Services vacancies in many regions of the UK that we would like discuss with you in confidence.



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Events & Training

NATIONAL EVENTS/ CONFERENCES

- **28 – 29 Apr 2009 CIBSE National Conference 2009**
Hotel Russell, London
For more information, contact CIBSE events on 020 8675 5211 or email lpenson@cibse.org
- **29 Apr 2009 Review of the Code for Sustainable Homes as design guideline**, organised by the Centre for the Built Environment Buchanan House, Glasgow
For more information, contact 0141 273 1411 or email cbeinfo@gcal.ac.uk
- **07 May 2009 CIBSE AGM and Presidential Address**
Royal Society, London
For more information or to book, call 020 8772 3613 or email wwilliams@cibse.org
- **07 May 2009 CIBSE FM Group AGM and visit/discussion**
Location tbc
Contact 0207 803 3749 or email leon.markwell@ecovetfm.co.uk
- **12 May 2009 How can intelligent buildings challenge sustainability**
Royal Society, London
Contact 0208 774 2705 or email eve.dsouza@mottmac.com
- **13 May 2009 Energy Efficient Heating CIBSE**, London
For more information or to book, contact 020 8675 5211 or email eventbookings@cibse.org
- **13 May 2009 Urban wind turbines – saviours or statues**
London South Bank University
For more information, email ewenrose@btinternet.com
- **13 May 2009 AGM and Daylight Group Forum**, University of Greenwich, London
For more information, email graham.philips220@ntlworld.com
- **14 May 2009 2009 BCIA Conference – Energy under control: solutions to save money and energy**
Coventry
For more information, visit www.bcia.co.uk/events
- **18 May 2009 EPCs 2009: the real effect on the market**
CIBSE, London
For more information or to book, contact 020 8675 5211 or email eventbookings@cibse.org
- **21 May 2009 Building**

- Services and Education Schemes: successfully designing building services for schools and colleges**
London www.hveducation.co.uk
- **01 – 04 June 2009 INSITE09 Conference** BRE, Watford
For more information, visit www.insite09.com/index.jsp
- **17 June 2009 Building Services Awards**
Hilton, Park Lane, London
For more information or to book, contact on 01252 781178 or email maria@createvents.co.uk
- **20 – 21 June 2009 Building Services Engineering Football World Cup**
Liverpool
For more information go to www.buildingservicesworldcup.com
- **27 – 30 July 2009 11th International Building Performance Simulation Association Conference and Exhibition: Simulation – From Research to Practice**
University of Strathclyde, Glasgow
For more information visit www.bs2009.org.uk

SOCIETY OF LIGHT AND LIGHTING

- For more information on the events listed below, visit the SLL special interest group via www.cibse.org
- **21 Apr 2009 Office Lighting Debate** Institution of Structural Engineers, London
- **13 May 2009 Lighting Masterclass: The Drivers of Design** HMS Belfast, London
- **19 May 2009 AGM, Presidential Address and Awards Reception** Royal Society of Arts, London
- **18 June LR&T Centenary Symposium** Location tbc

CIBSE/OTHER TRAINING

- **21 Apr 2009 NATIONAL SEMINAR: Building Regs Part L2: How to Demonstrate Compliance**, a CPD course offered by CIBSE
London, Course code A282
For more information, visit www.cibse.org/midcareercollege or call 01223 880016
- **07 May 2009 Masterclass: An Introduction to Sustainable Buildings** London.
For more information, visit www.rtpiconferences.co.uk

Energy under control

The Building Controls Industry Association (BCIA) is staging its one-day conference in May and this year its theme will be 'Energy under control: solutions to save money and energy'.

Much of the responsibility for saving energy in buildings now falls to facilities managers, and the BCIA is keen to help these building management professionals understand how controls can help them with this task and reduce costs. Energy savings are a cost-effective way to reduce outgoings – and building controls play a vital role in helping end users identify areas of energy waste and manage how energy is used.

BCIA President Doug Robins says: "BCIA member companies are well placed to offer clear advice on how building management professionals can start making savings through straightforward control strategies that are relatively cheap to implement.

"We want our 2009 conference to highlight this point, and to allow members to interact directly with the people who use our products



BCIA President Doug Robins

and services." The BCIA Conference will also include a unique round-table element during the day, in which facilitated discussion groups will address hot topics identified by delegates before the event.

The conference will end with a panel discussion and Q&A session.

For details of the conference, taking place on 14 May 2009, visit www.bcia.co.uk

CPD TRAINING

Unless otherwise stated, for more information visit www.cibse.org/midcareercollege or to book, call 01223 880016 or email courses@cibse.org

- **21 Apr 2009 Effective People Management and Communications Skills for Engineers** London
- **21 Apr 2009 NATIONAL SEMINAR: Building Regs Part L2: How to Demonstrate Compliance** London (see also left)
- **21 Apr 2009 Unvented and Other Types of Efficient Hot Water System** London
- **22 Apr 2009 Negotiation Skills for Engineers** London
- **22 Apr 2009 Air Conditioning Basics 1 – Comfort, Climate and Heat Gains** London
- **22 Apr 2009 Electrical Services Explained – special three-day course** Birmingham
- **23 Apr 2009 Designing and Developing Biomass Heating Systems** London
- **23 Apr 2009 Managing Change** London
- **23 Apr 2009 Air Conditioning Basics 2 – The Air Conditioning Process** London
- **24 Apr 2009 Fire Detection and Alarm Systems for Dwellings – BS 5839-6: 2004** London
- **24 Apr 2009 Preparing FM and Maintenance Contracts** London
- **27 Apr 2009 Mechanical Services Explained – special three-day course** Birmingham
- **28 Apr 2009 An Introduction to Electrical Services in Buildings** London
- **28 Apr 2009 How to Specify Lighting – Office Lighting** London
- **29 Apr 2009 An Introduction to Combined Heat and Power (CHP)** London
- **29 Apr 2009 Electricity at Work Regulations Explained** London
- **30 Apr 2009 Monitoring and Targeting** London
- **31 Apr 2009 Managing Human Behaviour in Fires and Emergencies** London

CIBSE National Conference

28 & 29 April 2009, Hotel Russell, London



Engineering Excellence: the way to a sustainable business

With topics covering how to future proof your business, add value and updates on the new Part L2010 and EPBD 2010, this is one event you can't afford to miss!

Key speakers include:

Professor Julia King, Board Member, The Committee on Climate Change

Professor Dr.-Ing. Francis Allard, Universite de La Rochelle, and President REHVA

Mike Hogg, General Manager, Shell Gas Direct

Professor David Fisk, Imperial College London

Terry Wyatt, Consultant to Hoare Lea

Steve Irving, Faber Maunsell

Paul Decort, Principal Building Services Professional, CLG

Bill Bordass, William Bordass Associates

Alistair Gutherie and Beccie Taylor, Arup

**LAST CHANCE TO BOOK!
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For further information or to book your place at this industry leading conference please call us on **020 8675 5211**, e-mail us at eventbookings@cibse.org or visit us at www.cibse.org/nationalconference for details.

There are opportunities to exhibit at the National Conference and opportunities to promote your organisation to all attendees. Please contact Jill McGimpsey for full details and prices on 020 8772 3630 or email jmcgimpsey@cibse.org

CMR AIR MANAGEMENT SYSTEMS

Pressure and air volume monitoring and alarming

DPM Panel Pressure Monitoring Transmitter

The DPM pressure and velocity transmitter is just like the P-,V- or VP-Sensor, it can measure low air pressure and air volume. It has also the facility to provide a low and high alarm relay output. Time delays are adjustable for both relays. Alternatively, one relay is used as low and high alarm and the second relay is used to switch on the buzzer. A mute facility shall cancel the second relay to mute the buzzer. It has a PID control loop and two modbus rtu communications for a remote display and the central BMS. All adjustments can be made from the front keyboard. The DPM is calibrated to traceable national standard and calibration certificates are supplied as standard.



DPM Pressure Transmitter

Central Monitoring Panel

CMR manufactures a stand alone monitoring panel which can contain up to 30 DPM pressure or velocity transmitters. The colour coded PVC tube can be pushed onto barbed nipples situated at the top of the panel. The tubing can be configured to either measure room differential pressure or individual room pressure against a common datum. Red and blue PVC tube is normally used to measure the velocity pressure across the CMR Velo Probes, Flow Grids, Oval Flow Probes or the Venturi Ducts. The tube can run up to 200m and still have an accurate measurement. The 0..10V, 4..20mA or modbus rtu and alarms can be connected to any computer monitoring system. It is a compact solution, which is factory tested and ready for installation on site. All DPM instruments fitted come complete with calibration certificates. Future calibration is easy as all equipment is centrally located in a plant room and not within the clean areas or around the duct work.



DPM Monitoring Panel

CMR Portable Calibrator with Traceable Calibration Certificate

CMR manufactures manual portable and automatic calibrators, which are used to check and calibrate any pressure or velocity pressure transducers in the field. The most popular type is the CAL95 which has a built in hand pump to generate the pressure for the transducers to be checked. It has an LCD display to indicate the reference pressure. The CAL95 has an output voltage signal which can be connected to a chart recorder or computer scada system to record the calibration pressures. The instrument is used by many commissioning and controls engineers worldwide. The Calibrator comes with a traceable calibration certificate.



CAL Calibrator

Precision components for ventilation and process control

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e-mail: sales@cmr.co.uk



See us also at www.opus-bs.com or www.cmr-controls.com