

CIBSE

JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

August 2010

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big on efficiency

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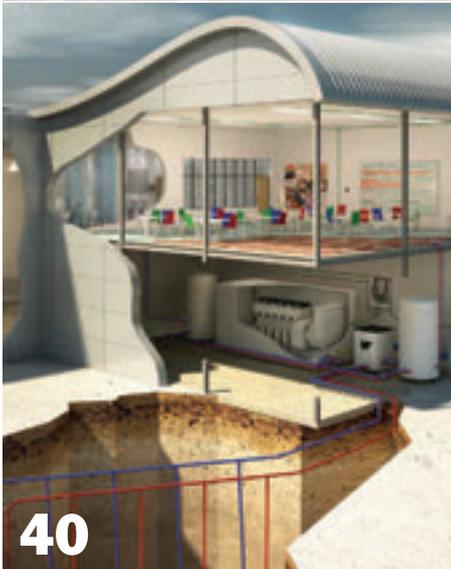
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Sustaining our future & refurbishing our past

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From the editor



Lessons learnt, lessons lost

Building Schools for the Future (BSF) was very far from perfect, and Education Secretary Michael Gove was right to point to faults in the scheme, which in some instances included delays, overspends and, yes, some ‘needless bureaucracy’. But was this any reasonable basis for scrapping it altogether, when there was room for achievable improvement?

In announcing the end of BSF, Gove also cancelled 735 school projects that had been agreed under it (see our news and news analysis this month). This decision wasn’t about ridding the nation of a useless or corrupt building-improvement programme; it was primarily about seizing an opportunity to save tens of billions of pounds in one fell swoop.

Gove has suggested that he does indeed still want a schools infrastructure that is top class. And it seems that we will still see, in the future, capital investment in schools. The Department for Education (DfE) and Partnership for Schools, the body that oversaw BSF, will work together on reviewing this area.

But this isn’t a government bent on investing in public services any time soon. Meanwhile there are hundreds of schools that are – and will remain – unsuitable learning environments; there is plenty of evidence to show the improved learning outcomes gained from better school buildings, particularly from ventilation system technology.

Meanwhile this green-tinged coalition government continues to press carbon-cutting targets on the public sector. It would be very useful to calculate the impact of the loss of investment in more efficient buildings on the sector’s overall carbon footprint.

Another major lost opportunity from BSF’s demise is an engineering-learning one. Designers, engineers, architects and other professionals who have contributed to the devising and building of whole new schools in recent years have provided many important lessons on how to get these challenging and complex environments ‘right’. These lessons won’t be lost altogether, of course, but the incentive and desire to push for design innovation and creative engineering solutions could well disappear under the government’s low-cost approach to improving school premises.

One lesson that building professionals can pass on to ministers, free of charge, is that good buildings are built for good clients – those who are demanding and challenging, and who are prepared to invest in innovation (which can mean low-cost ‘passive’ solutions as well as complex gadgetry). So our question to Gove is: with the loss of BSF, how will the government ensure

it is a good client who can foster energy efficient and suitably healthy and comfortable learning environments for the next generation (on whom we will depend for a healthy GDP)?

Let’s now hope that many of the BSF projects that have been placed in limbo – 151 schemes under review might or might not face closure – will be reprieved. This is not an issue of pumping more public money unnecessarily into the construction sector just because it is in the doldrums – it is a question of investing for the future. BSF wasn’t broken; it could have been fixed. But now that it is gone, the construction industry as a whole must demand that a new, improved version be devised, and soon.

Bob Cervi, Editor
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Scrapping BSF was really about saving tens of billions of pounds in one fell swoop

News in Brief

Academy for change

Laing O'Rourke and the University of Cambridge have announced the creation of a new multi-disciplinary academic centre of excellence to advance the engineering profession. The Laing O'Rourke Centre for Construction Engineering and Technology is planned to play a key role in shaping the future of the construction industry by responding to environmental and sustainability challenges.

New energy forum

The Associate Parliamentary Renewable and Sustainable Energy Group (PRASEG) Solar PV Forum has been created for industry and ministers to consider issues such as the success of the Feed-In Tariff scheme, and to debate the numerous regulatory challenges still facing the technology in the UK.

'Raise your game'

The UK's chief construction adviser, Paul Morrell, said that 'irrational exuberance' in the construction industry must end. Speaking at the Joint Contracts Tribunal reception, he said that the key to industry success was for it to 'raise its game' by increasing the level of standardisation throughout the sector, and ensuring payment down the entire supply chain.

Green energy cuts

Funding for deep geothermal energy generation has been cut by £1m as part of the government's early round of planned cuts, totalling £6.2bn. The Department for Energy and Climate Change also announced it is cutting £3m from the Offshore Wind Capital Grants Scheme, and closing the Energy Saving Trust's technology trials early in order to save £700,000.

Second look at NPS

A second consultation on the draft energy National Policy Statements has been announced by the Department of Energy and Climate Change. The final version should be ratified by parliament next spring. www.decc.gov.uk

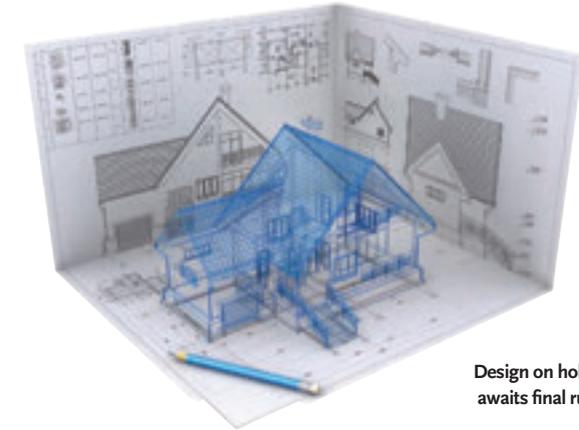
Part L may face six-month delay under new review

Changes to Part L of the Building Regulations could face a six-month delay as a result of a government review.

Part L 2010 is due to be introduced this October. But the new coalition government has decided that all new legislation introduced since the beginning of the year now needs to be reviewed by the Department for Business, Innovation and Skills' Reducing Regulation Committee – which includes Part L.

If the October deadline is missed, Part L will have to be delayed by at least six months, as regulations can be introduced only twice a year, in April and October.

A spokesman for the Department of Communities and Local Government told the *Journal* that, as yet, there is no official timetable in place stating exactly when Part L will be reviewed. But he added: 'Our intention is to introduce the changes to Part L of the Building Regulations in October, as approved



Shutterstock

Design on hold? Industry awaits final rule changes

by parliament.' There is also concern over the availability of the SAP software required to support the changes. The spokesman confirmed that while 'some of it is already available, other versions are on course to be available by October'.

The Home Builders' Federation has written to Andrew Stunell, Building Regulations minister, asking for the new Part L to be delayed to give industry more time

to get used to the software.

But Hywel Davies, CIBSE technical director, said he is currently unaware of any issues being raised in the industry about Part L.

He added: 'Generally, with the pressure to deliver low carbon premises, this sort of call from sections of the industry doesn't help to create the picture of a sector that's committed to delivering on the low carbon agenda.'

Ministers order inquiry into construction costs

The government has ordered an investigation into why major infrastructure projects cost more in the UK than other countries.

The review was announced as part of Chancellor George Osborne's June 2010 Emergency Budget. Terry Hill, leader of Arup's global transport market, has been appointed as chairman of the steering group overseeing

the investigation. It is being managed within HM Treasury by Infrastructure UK, an advisory body to government.

The investigation is based on initial evidence suggesting that the costs of building infrastructure in the UK, when compared to other EU and non-EU countries, are higher. Its key aims will be to identify ways to deliver

improvements to reduce the costs of investing in infrastructure. Hill said that a saving of as little as 10 per cent – on a total spend of £400bn – would represent 'a serious sum'.

The inquiry will cover areas including the structure of the industry; procurement processes for public contracts; and bureaucracy and overregulation.

Tripping the light fantastic

The PALME Middle East awards have been announced, with Edinburgh's Lighting Design Partnership International winning Best Use of Exterior Lighting for its work on the Bahrain World Trade Centre. The awards celebrate achievements in professional lighting, audio, music, entertainment, audio visual and systems integration.





The government says it is committed to continue investing in school buildings

School refits 'can cut the UK's debt'

Refurbishing existing schools rather than building new ones could help reduce the UK's financial deficit while significantly raising educational standards, according to new guidance on school construction.

Rethinking school capital investment: the new 3Rs?, published by Davis Langdon, Scott Brownrigg and the British Council for School Environments, explores a range of options for the schools market – and, taking into full account impending cuts in capital expenditure on the schools estate, the document explores the cost-benefit analysis of each principle.

The publication comes shortly after an announcement by the Department of Education in June, announcing plans to relax planning rules to allow derelict commercial and residential buildings to be brought back into use as schools.

Scott Brownrigg's architectural director, Michael Olliff, said: 'Concerns over the state of potential public finances, the increasing need to reduce carbon emissions, questions over the suitability of PFI [Private Finance Initiative], the rise of parent-promoted free schools and the drive to increase the number of independent academies, are all pointing to a future that will ensure that the refurbishment of existing buildings could be seen as the redevelopment option of choice.'

www.scottbrownrigg.com
www.bcse.uk.net

Tim Soar

Plea to salvage school design plans from axed BSF scheme

Any future plans for school rebuilding should make use of preparatory work already done under the scrapped Building Schools for the Future programme (BSF), councils are insisting.

Last month Education Secretary Michael Gove announced the closure of BSF and the cancellation of 735 school projects under the programme. A further 151 projects are due to be reviewed.

The structure of BSF required councils to carry out detailed public consultation, and to recruit and commission designers and architects ahead of programmes being given the final go-ahead, according to the Local Government Association (LGA).

The LGA says that preparatory work and plans drawn up under BSF should be eligible for consideration under any new programme aimed at sharing out capital funding.

Cllr Shireen Ritchie, chair of the Children and Young People's Board at the LGA, said: 'It is encouraging that Michael Gove has stressed his commitment to getting more core funding directly to schools, via councils.'

'Councils cannot now send good money after bad, so any future plans for school rebuilding should use preparatory work that has been done already, as far as is practical.'

The LGA added that more than £203m has been spent by 75 councils, preparing for school

rebuilding projects that will not now go ahead or will be reviewed. It said 88 councils are affected by the BSF project cutbacks and reviews.

■ Kickstart, the scheme aimed at rejuvenating stalled housebuilding schemes, has been wound down following a decision to cut £220m of funding to the Homes and Communities Agency (HCA). The agency had already lost £230m of funding in May. The HCA said it would still be able to meet existing contractual commitments across all of its programmes, and would provide funding for those 'round-two' Kickstart schemes approved before 6 April.

www.lga.gov.uk
See *News Analysis*, page 12

Institute to seek natural solutions

Construction of the £25m teaching and research facility at Aberystwyth University has begun. The centre is intended to form a new institute at the leading edge of environmental and agricultural science, with the architectural solutions designed to work in a natural way with their environment. Completion is due in July 2011.



News in Brief

Fire inquiry studies refurb

The second part of a London Assembly investigation into fire safety in tall and timber-framed buildings has considered the impact of refurbishments on residential blocks, and the difficulties in identifying competent persons to carry out fire risk assessments.

Previously the Planning and Housing Committee heard evidence about the role of planning and building regulations. A report is expected to be published by September.

Construction 'stressed'

Construction and property workers are more likely than any other profession to turn to drink as a way of coping with work stress, a new survey of 3,000 people by Medicash has shown. It also revealed the industry suffers from the highest rate of sickness absence.

www.medicash.org

Regional funding support

A two-year, £1bn regional growth fund has been set up by the government to replace the Regional Development Agencies in a bid to support capital projects in areas hardest hit by public spending cuts. Both private bodies and public-private partnerships will be able to apply for funding, which will be used to help tackle issues such as planning and housing.

New parliamentary group

The new All-Party Parliamentary Group for Excellence in the Built Environment has been officially launched. The group will introduce a Commission on Excellence in the Built Environment to challenge ideas, thinking and expectation from outside the parliamentary and construction boxes.

Sprinklers bill is back

Lord Harrison's re-drafted Private Members Bill for domestic sprinklers has been re-introduced to parliament. The government will now assess the impact of sprinklers for residential use, including the cost and benefits of installing them.

Huhne outlines coalition's 'green deal' for homes

The government has pledged a major overhaul of the UK's existing homes to save energy, carbon and costs.

Chris Huhne, Secretary of State for Energy and Climate Change, told delegates at the UK Energy Summit that the government intends to launch its Green Deal, which will better insulate up to 14 million homes street by street and aid the economic recovery.

Speaking at the event he said: 'At the moment, we may as well be burning £50 notes outside our front doors. We use more energy per home than does Sweden.'

Under the deal, previously proposed in the Conservative party manifesto, energy companies and high street stores will help guide customers through a 'simplified process' to get their homes insulated, with the cost paid back through future energy cost savings.

Those in fuel poverty will be



Lefferts Pitarakis/AP/Press Association Images

Chris Huhne... promising homes overhaul

given extra help, Huhne said, and local authorities would help energy companies to reach those who live in houses most in need of better insulation.

The government is now looking at applying the principle to businesses, too, he added.

The creation of a Green Investment Bank (GIB) has also been proposed by the coalition, which would see the Carbon Trust, the Energy Technologies Institute and the Technology Strategy Board's low carbon programme scrapped and taken over by the GIB.

A recent report by the Green Investment Bank Commission concluded that: 'The disparate collection of institutions and funds, often with similar objectives and very little accountability for the delivery of specific goals, has resulted in duplication and inefficiencies.'

It also said businesses and investors found it hard to navigate the bureaucracy.

The report added that up to £550bn could be needed between now and 2020 to meet the UK's climate change and renewable energy targets.

<http://snipurl.com/yc3mg>

A bit of Rome in Cumbria

A £6m 'sustainable' heritage attraction is to be built in Cumbria, UK. Hadrian's Wall Heritage is behind the Roman Maryport Visitors' Centre project, which will eventually house local Roman artefacts. Preliminary work started in January, with work on site expected to begin in 2011. Multi-disciplinary consultancy Capita Symonds will provide a wide range of building and other services.



F-gas needs enforcement, says report

The Air Conditioning and Refrigeration Industry Board (ACRIB) is calling on the UK government to start enforcing the EU's F-gas regulations.

A report by ACRIB into the effectiveness of the regulations found that it needs better policing to ensure compliance.

The regulation aims to contain, prevent and reduce emissions

of fluorinated greenhouse gases emitted by technologies in the refrigeration, air conditioning and heat pumps sectors.

The recommendations in the paper will form the basis of the UK input to the EU's review of the regulation, which is due in July 2011.

The report has been backed by all ACRIB member organisations, including CIBSE.

CIBSE'S Non-Compliance Costs Campaign to highlight low compliance air-conditioning and f-gas legislation was launched earlier this year. It is supported by a number of organisations. The campaign's demands include passing responsibility for enforcement from trading standards to a new body. www.cibse.org/noncompliancecosts www.acrib.org.uk

Ministers take back planning powers

Ministers are to be given new powers to grant planning permission for major new infrastructure projects.

The move was announced by decentralisation minister Greg Clark, who also confirmed that the Infrastructure Planning Commission will be abolished.

The IPC was set up eight months ago by the previous Labour government.

Clark said it will be replaced by a new 'rapid and accountable' system whereby ministers, and not unelected commissioners, will take the final decisions on new infrastructure projects, such as offshore wind farms and nuclear power stations.

An infrastructure planning unit will be established in the Planning Inspectorate to fast-track major projects, and ministers will take decisions on applications.

Clark said: 'The previous system lacked any democratic legitimacy by giving decision-making power away to a distant quango on issues crucial to every community in the country.'

In addition, all National Policy Statements (NPS), described as future infrastructure blueprints, will have to be ratified by parliament.

The proposals received a cautious welcome from the Renewable Energy Association (REA), but it questioned why the system only applied to projects above 50MW, when the vast majority of projects are smaller.

Gaynor Hartnell, REA's chief executive, said: 'We need rapid



Ministers will take final decisions on developments such as offshore wind farms

and consistent decision-making for projects approved by local authorities under the Town & Country Planning regime, that strikes the balance between local

accountability and strategic national priorities.'

Until the IPC can formally be closed, it will continue to consider and determine applications.

Councils to be 'free' to prepare local plans

The government has also announced that it is abolishing Regional Strategies with immediate effect.

The strategies would have seen 3m homes built nationally by 2020 through centrally imposed building targets. The strategies were put in place by the previous Labour government, despite fears that it would force councils to cut into the greenbelt. According to ministers, councils will now have the freedom to prepare their local plans without having to follow top-down targets from regional quangos and bureaucrats that prescribe exactly what, where and when to build.

In other planning changes, housing minister Grant Shapps confirmed the creation of Local Housing Trusts (LHT) to build new community developments. LHTs would have to show they have the support of the local community for planned housing developments, but Shapps said any developments put forward should meet basic planning criteria without the need to lodge specific planning applications.

The trusts will be set up under the Decentralisation and Localism Bill, due to be introduced this autumn.

Consultation on microgeneration launched

The coalition government has launched a consultation on its proposed microgeneration strategy.

The government's ambition to help develop the industry, create more job opportunities, and make sure customers can trust the green technology they buy.

Climate change minister Greg Barker said: 'I want to see more homes, communities and businesses generating their own

energy. By becoming more self-sufficient we can create sustainable local energy economies. I want to work with industry to overcome the challenges it is facing. Together we will create a marketplace for jobs and prosperity.'

The consultation will look at four key areas:

- Quality – to ensure that consumers have confidence that equipment and installation is reliable;

- Technology – to examine how to improve products through more trials;
- Skills – to develop the microgeneration supply chain; and
- Advice – to provide more accessible advice and information about microgeneration to homeowners, communities and small businesses.

Send comments on the consultation by 22 December to microgenconsult@decc.gsi.gov.uk

News in Brief

Body to cut waste

A body is being set up by government to help oversee the original £6.2bn of cuts it announced, including construction spending. The Efficiency and Reform Group, a Joint Treasury-Cabinet Office body, will have the power to make sure departments work together to tackle waste and improve accountability.

Costs soar under PFI

The use of the Private Finance Initiative to fund social housing is not value for money, according to a report by the National Audit Office. It found 21 of the 25 projects signed to date experienced cost increases, with 12 of these spiralling by more than 100%. It also found that all signed projects researched were delayed on average by two and a half years. www.nao.org.uk

First new prison in six years

Work on the new £100m, 900 prisoner-place Belmarsh (West) Prison started last month – the first new Private Finance Initiative-funded prison to reach financial close in England and Wales for six years. The new facility in Greenwich, London, will be operational in early 2012, and the custodial service contract will run for about 25 years.

Aiming to 'thrive'

A new report claims it can help architects and engineers 'thrive' in today's gloomy economic climate. Deltek, a software provider, produced *Thriving in 2010 and Beyond: A Practical Guide for Architects and Engineers*. Deltek says it is based on responses from 326 senior people. www.thrivingreports.com

Ashden winners announced

The 10th annual international Ashden Awards for Sustainable Energy – which reward businesses, schools, local authorities and charities making significant carbon savings through the use of renewable energy or energy efficiency measures – have been announced. Six UK organisations were among the winners this year. www.ashdenawards.org

News from institutions

Supporting industry training

The Centre for Efficient and Renewable Energy in Buildings (CEREB) was officially launched at London South Bank University, supported by the Electrical Contractors' Association. The industry teaching centre has ground-source heat pumps, solar shading and uses thermal mass. The ECA is also launching a new management development training programme across the UK to help contractors develop their careers.

New identity for CHPA

The Combined Heat and Power Association (CHPA) celebrated the launch of its new brand and website at its annual President's Reception. The CHPA also introduced its document on *Integrated Energy: The role of CHP and district heating in our energy future*. The publication explains how CHP and district heating can contribute to the UK's energy challenges. www.chpa.co.uk

New awards launched

The heat pump industry has launched its own dedicated awards. The National Heat Pump Awards 2011 will be held on 23 June 2011 in Birmingham, supported by industry and its patron organisation, the Heat Pump Association (HPA). The closing date for entries is 4 March 2011. www.national-heat-pump-awards.co.uk

HVCA joins group

The HVCA has become a member of the UK Contractors' Group, which represents construction companies. It is hoped the move will help the industry to speak with one unified voice.

RAE elects new Fellows

Fifty-three UK engineers have been elected to the Royal Academy of Engineering following its annual general meeting in London. The complete list of new Fellows for 2010 is available at www.raeng.org.uk in the news releases section.



New policies are needed to drive carbon cuts in sectors such as power generation, the CCC report argues

Carbon targets may not be achieved, says CCC

A major acceleration in the pace of carbon cuts is still required for Britain to achieve its own legally binding emissions targets.

In its second report to parliament, the Committee on Climate Change (CCC) warned government that a step-change was still needed in residential and non-residential energy efficiency improvement, and renewable heat and electricity, despite greenhouse gas emissions falling by 1.9% in 2008 and 8.6% in 2009.

The CCC attributed this fall to the recession and other factors such as fuel prices.

The report said: 'There is no evidence of broad outperformance

on implementation of measures in 2009.

'In the absence of such a step change (ie based on the rate of implementation of measures in 2009) there would be a gap of around 35 Mt CO₂ relative to the (currently legislated) third interim carbon budget, and 150 Mt CO₂ relative to the intended third budget.'

It added that while progress has been made developing approaches to drive the step change, new policies are still required in order to reduce emissions in the power, buildings, transport and agriculture sectors.

The UK Green Building Council welcomed the report. Paul King,

chief executive, said: 'There's no escaping the implications of this report – we need to up our game if we're to meet our legally binding carbon targets.'

'A lot rests on the upcoming Energy Bill and government's plans for a "Green Deal" scheme for households.'

But the Renewable Energy Association warned that, once the recession is over, the emissions floodgates could open unless more is invested in energy efficiency, and it called on the government to introduce the Renewable Heat Incentive as planned.

The CCC's next progress report to parliament will be in June 2011. www.theccc.org.uk

WSP mulls further job losses

Multi-disciplinary international group WSP has admitted it is talking to staff about the possibility of job cuts, as reductions in government spending continue to take effect.

Just a year ago the company laid off 1,000 staff worldwide, with 120 jobs going in the UK. While it is not being specific about the potential number of redundancies, the

company confirmed that it is talking to its highways team.

The company said: 'WSP is experiencing the same challenging market conditions as our competitors.'

'The recent measures by the government to reduce the UK budget deficit have resulted in changes in our workload, and it is

therefore necessary to align our resources and cost base to our future workload.'

Meanwhile US engineering firm URS Corp has won a bidding war to buy Scott Wilson, one of the firms heavily involved in the design of the Crossrail project. The 290p-per-share offer values the company at £223m.

Only 'one tenth of firms' have registered for CRC

Only one in 10 firms has registered under the Carbon Reduction Commitment Efficiency Scheme (CRC) despite the threat of penalties, new figures reveal.

The CRC was introduced by Labour to encourage companies and public organisations consuming at least 6,000MWh of electricity a year to be more energy efficient. Organisations have to buy carbon credits to account for their expected energy consumption for the year ahead, which can be traded with other organisations.

But data released at the end of June by the Environment Agency, which manages the scheme, showed that 522 of an anticipated 5,000 full CRC participants had registered in the first three months of its introduction in April.

Those organisations that still haven't registered have now missed the opportunity to enter subsidiary companies separately, despite this deadline being extended by a month.

Any participant that misses the



Retail chains are among firms that come under the CRC scheme

final registration deadline of 30 September will incur an immediate fine of £5,000, plus an additional £500 per working day past the deadline, up to a maximum of 80 days.

Dave Lewis, head of business energy services at energy group npower, said: 'The slow rate of registration so far indicates that many organisations may not be actively tracking their energy use

from 1 April this year in preparation for the year-end footprint report. The longer organisations take to track this, the more challenging the task will become.'

But Gaynor Hartnell, chief executive, the Renewable Energy Association, said: 'We have great sympathy for companies caught up in the CRC. It is a very confusing policy and you don't necessarily benefit by applying common sense.'

Revamp for CIBSE low carbon awards

CIBSE's low carbon awards have been revamped for next year to encompass a wider range of participating projects.

The Building Performance Awards 2011 will still reward excellence in the development and management of low carbon buildings, but they will also reward performance.

There will be 14 categories based upon a building's lifecycle, designed to incorporate each stage in the development of a building. They will reward the initial training and skills of the people involved, through to the products, the commissioning and, finally, those who are operating the buildings.

The aim is to demonstrate the value that building services engineers, consultancies and other professionals can have on the development and operation of buildings that really work.

The awards will be hosted on 9 February 2011 at London's Grosvenor House Hotel. For full criteria information and to enter, visit www.cibseawards.org

Seeing red

The 2010 Serpentine Gallery Pavilion by French architect Jean Nouvel has been unveiled in London. The project was created with the support of sponsors, which this year included engineering consultant, NG Bailey. The firm carried out the installation of the electrical services to the pavilion, which consisted of the feature lighting, small power/distribution to the bar area and the green screen CCTV display.



Lost learning opportunity?

Axing the Building Schools for the Future programme will add to industry's woes and could see the loss of further design innovation. But, reports **Carina Bailey**, not everyone is pessimistic about the cuts

The closure of the Building Schools for the Future programme could lead to the collapse of small firms, redundancies and falling design standards, some in the industry fear.

Education Secretary Michael Gove announced last month that the whole BSF scheme was scrapped with immediate effect. This meant 735 school building or ICT projects planned under BSF were cancelled.

Gove said BSF was axed because of the state of public finances, claiming it would have been 'irresponsible to carry on regardless with an inflexible and needlessly complex programme'. The government is now conducting a review of all investment in schools, early years facilities, colleges and sixth forms. Sebastian James, group operations director of DSG International and review chairman, said: 'I feel very passionately that we can build a schools infrastructure in Britain that is truly world-class, while significantly reducing our spending.'

Partnerships for Schools, the body tasked with carrying out BSF, is now working closely with the review team and the Department for Education.

According to market analyst Glenigan, the impact on industry of stopping BSF will be dramatic. Cancelled projects that were due to start in 2010 are worth a total of £12bn. Those planned for 2011 and 2012 are valued at £22bn and £24bn respectively.

But the design of new schools still set to go ahead will no longer benefit from the Commission for Architecture and the Built Environment's (CABE) design advice service after that too was axed.



Critics of the closure of Building Schools for the Future fear that many dilapidated premises will not now be refurbished

■ **An opportunity that is now lost is the volume of schools designs that would have provided projects to apply the 2010 Part L regulations** ■ – Martin Mayfield, Arup

CABE's school design panel was set up in 2007 to tackle the poor standard of new schools being built. This followed an earlier audit by CABE (in 2006), which found that the design quality of secondary schools built between 2000 and 2005 was not good enough. Under the new system, all bids had to go

through CABE. After the minimum design standard was introduced, any that didn't meet its assessment criteria didn't go forward.

Matt Bell, CABE's director of education, says this review service meant that project teams placed a higher priority on design, which continued to improve.

Bell says: 'If the government doesn't want to continue with BSF, that's its prerogative. We absolutely buy into the need for a cheaper, simpler procurement process.'

'There are obviously going to be much fewer rebuilds and much more refurbishment, but provided we can hang on to the evidence and the conviction that the school estate does matter hugely, and that we can find intelligent ways to have good teachers and buildings, then there's no reason to be unduly bleak about the future.'

But Carl Saxon, partner at Hoare Lea, fears the cutbacks could mean cost-cutting creeping into

Alamy

design: 'Many believe the design quality for school projects may suffer, particularly as there may be increased financial pressure to lower design standards to save money on the schemes that survive.'

Saxon says that the lack of further investment in efficient new buildings will hit the country's ability to meet the government's stringent carbon targets: 'With current building stock being retained, energy usage and consequent energy bills for individual schools are unlikely to reduce in line

■ The worry is that investment could switch to a narrower view and simply look at building condition not building purpose. I think that would be a loss ■ – Matt Dickinson, Max Fordham

with government local authority spending cuts.'

Kaval Patel, associate director, building services at Buro Happold, agrees that the loss of CABE's design advice could 'mean a slowing down in the pace of improvements for the foreseeable future'. He says that the depth of cuts were more significant than most in the industry expected, which will ultimately have a deep impact on the anticipated growth that the industry was relying on.

But, he says, it is not all bad news: 'Currently, all new schools

need to hit stringent energy and CO₂ targets as a given. With the new Part L due to come into force in October this year, closure of the BSF programme may not, therefore, have such a significant impact on sustainability, as the new legislation will help to drive CO₂ emissions lower for all buildings.'

But Martin Mayfield, UK, Middle East and Africa education leader at Arup, warns: 'An opportunity that is now lost is the volume of schools designs that would have provided projects to apply the 2010 Part L regulations.'

Mayfield describes the loss of BSF as a 'significant blow to the construction industry', with billions of pounds worth of work lost that he believes will hit designers, contractors, and many sub-contractors and suppliers hardest.

He says: 'It could lead to smaller companies collapsing and redundancies can be anticipated from some larger firms. Margins will be under pressure as those firms engaged in BSF look elsewhere to find work.'

Richard Evans, commercial director at heater manufacturer Buderus, says shutting BSF would be a blow for the commercial heating industry too: 'Scrapping the scheme now leaves many contractors with substantial costs in what is already a difficult economic climate for the private sector.' Evans says the government now needs to put a coherent energy policy in place quickly, to limit the damage to the heating sector.

Mayfield says it is imperative that, whatever may be considered as a replacement for BSF, it be introduced quickly. If not, the sector risks losing the skills and knowledge built up over the last few years.

But it is the millions wasted in bid costs that has angered

In numbers Cuts to school building developments and refurb

1,592	Total number of schools that came within the Building Schools for the Future (BSF) scheme*
102	Local authorities involved with BSF; 88 councils are believed to be affected by BSF cutbacks or reviews
735	BSF projects cancelled by the government
151	Projects that are additionally 'for discussion'. Decisions will be made on an individual basis
547	Projects that are unaffected by the cuts. All have reached financial close
159	Projects that have been completed and are also unaffected by the cuts

*Some schools fall into more than one of the above categories
Source: Department for Education

Ty Goddard, chief executive of the British Council for School Environments, who also points to the initial confusion over which projects would survive the cuts, following the publication of Gove's inaccurate list of schools affected.

'This is a bitter blow for an industry that Office for National Statistics figures appear to show is deeper in recession than previously thought, says Goddard. 'The cancellation of BSF leaves much of the school estate beyond its design life and unfit for purpose.'

However, Terry Wyatt, an adviser to Hoare Lea, believes the closure of BSF could in fact pave the way for future refit projects that could have huge benefits for building services. Wyatt foresees lighting, heating and ventilation becoming major areas for future work, involving high efficiency equipment and controls, with off-site packaged unitary modules being sought – which should bring

important developments to the sector.

'All in all, I truly believe there is a new and significant opportunity for our industry – arising and actually assisted by the closure of the BSF programme,' says Wyatt.

Matt Dickinson, partner and schools specialist at Max Fordham, shares Wyatt's view, stressing the market has changed, not disappeared. He says: 'Refurbishment, extending and remodelling existing buildings can be viable to meet energy targets and broader education outcomes and community needs.'

'The worry is that investment could switch to a narrower view and simply look at building's condition, not building purpose. I think that would be a loss.'

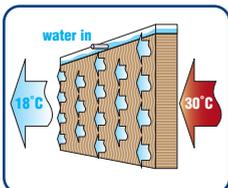
'The optimistic view is that the CRC Energy Efficiency Scheme is mandatory; the drive for energy efficiency will not go away with the closure of BSF.' ●



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Young engineers in the spotlight



Left: IMA Cooling Systems' Richard Corby (left) and Shaun Dugard (right) with CIBSE president Rob Manning
Above: Alison Kilby and Roger Olsen, from Arup

Arup, Imtech Aqua Ltd and IMA Cooling Systems have been announced as winners of the Young Engineers Champions Awards 2010.

Now in their second year, the awards – sponsored by Baxi Commercial Division – recognise innovation in developing engineers of the future, and seek to reward those organisations that proactively champion industry's young people.

Rob Manning, CIBSE president, said: 'For our industry to be successful in meeting our targets we must attract the brightest and best to the industry and retain them. To do so needs the pledge of support from our industry leaders.'

'These awards reward those who are supporting and encouraging young talent, and allow those organisations shortlisted to cement their reputation as a champion of young engineers.'

Also speaking at the event, Keith Clarke, chief executive of Atkins, highlighted the challenge faced by the industry to meet the UK and

global emissions targets, stressing that this would only happen because of engineers. He said: 'The UK has the best engineering reputation in the world. It's an opportunity and time to relish and a time when engineering can come to the fore.'

Each of the winning companies showed particular commitment to championing young people in the building services engineering industry, and to supporting them in employment and education.

Arup won the award in the large company category, and was recognised for its commitment to supporting and maintaining young engineers, despite difficult economic conditions. Imtech Aqua Ltd won the medium company category for a strong all round submission, with 30% of engineering staff developed through their own company, as well as being active in the community and local schools. IMA Cooling Systems took the small company trophy, with their sophisticated

and tailored training programme and their all round submission, which was seen to be particularly impressive for a company of its size. IMA Cooling Systems also won the overall category of 'Champion of Champions'.

Richard Corby, IMA's service manager, said: 'We are proud of what we've achieved in the last 10 years at IMA and recognise the continued need for young

engineers to come through the company and be supported.'

The winners each received a trophy and £1,000 of CIBSE training vouchers.

Each of the runners up, Anderson Green Ltd, CBG Consultants Ltd and Parsons Brinckerhoff (Asia) Limited, were commended for their commitment to supporting young engineers across the industry.



Tom Fielding-Fox of Imtech Aqua Ltd, Yan Evans of sponsor Baxi Commercial, and John Wardley of Imtech Aqua Ltd, winners of the medium company category



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Training and development

Submissions

The closing dates for annual submissions to be considered at the September 2010 Training and Development Panel meeting is 7 September.

Training submissions and any queries, plus employers' enquiries and applications for approved company training schemes, should be addressed to Parvin Begum, training and development administrator, on 020 8772 3612 or via pbegum@cibse.org

Help test new online interface

A new online interface, the CIBSE Knowledge Portal, is to be launched to improve access to information.

The portal will ensure all of the institution's codified information is available via an online interface, with enhanced searching and browsing capabilities.

Direct links to the LUCKINSlive product directory and BSI standards are some of the extra features that will be included to assist members and others in their day-to-day work.

To make sure the interface offers the searches and results members need, CIBSE is looking to form a user group to test it for user friendliness and intuitiveness during its development stage.

If you are interested in helping to test it, and could spare time for two or three meetings in the next four months, email amyiona@cibse.org

Mortally wounded or just sick?

As someone who commutes by train, I have plenty of time to read the newspapers and to reflect on the current mood of the industry. The other day I sat next to a chap who works in construction.

Our conversation started with: 'I have been wondering what the chief construction adviser, Paul Morrell, is really likely to achieve, and what the consequences of his final Innovation & Growth report could be...' Our discussion continued ... 'Construction is sick. It has been for some time.'

In 1992 it was sent to the doctor and got a prescription for 'Constructing the Team' from Dr Latham. It failed to respond. In 1998 Dr Egan prescribed 'Accelerating Change', which resulted in no noticeable change of velocity. Now Dr Morrell is writing

a new prescription, hoping for a wonder drug to cure the greed and waste in a fragmented industry.

How many people have stopped to entertain the thought that the real problem is that UK construction is currently not fit-for-purpose, and that it lacks any of the ability, will or leadership to arrest a state of terminal decline: lacking the discipline to produce a product on budget, to cost and to spec.

Perhaps the challenge of delivering a low carbon built environment is actually beyond the industry, and it just isn't up to adapting to meet the challenge? Perhaps Paul Morrell's task is not so much to provide a blueprint, as to pen the epitaph?

I have certainly heard – and repeated loudly – 'if construction cannot do the job, then we have to find a mechanism that can'.

Perhaps the large retail giants will be taking on the challenge of shifting 21 million retrofits over the next 20 years, providing a packaged solution to the consumer as they do now for a wide range of other non-food items?

And for the big boys, perhaps the larger developers will get together with a few large services providers to deliver a larger-scale version for the commercial sector?

Where does that leave our members? Still providing professional knowledge and advice? CIBSE still concerned with membership and university accreditation? Still producing guidance – but in the same way?

It was at this point that I woke up, still on the train, newspaper on the floor. A bad dream, I hope ...

Stephen Matthews
Chief executive

The great renewable heat debate

The new coalition government has been active in many areas in its early days in office. One area has been subject to much discussion, reporting, and even rumour: the Renewable Heat Incentive (RHI).

Initially, it was not mentioned in the coalition agreement, provoking early anxiety that it would be scrapped. However, as officials pointed out in private, many topics were not covered, but this should not be taken to indicate that RHI would not go ahead. What they could not detail, however, was the form that the final RHI might take.

There has been much discussion about this: which technologies

will it cover? What rates will it pay for each? Will it, like the Feed in Tariff, be paid whatever the thermal performance of the building? Or would it only be available for buildings that had already been insulated to a reasonable standard? Some have argued that, as proposed in the recent consultation, the incentive will 'discourage investment in energy saving measures and encourage profligacy'.

Indeed, if we incentivise renewable heat before we address fabric efficiency, we are at odds with government's own proposals for new buildings, domestic or

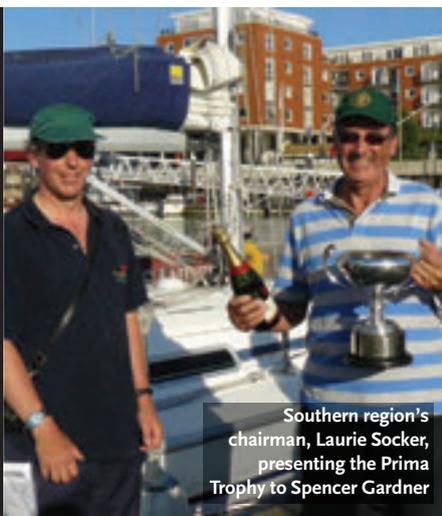
otherwise, which address fabric energy efficiency before considering renewable technologies.

Unfortunately, we still do not have clarity on these points – meanwhile various debates and exchanges are under way about whether air source heat pumps should be included, and so on.

The only clarity we do seem to have is that there will be some form of incentive scheme, and that we do not yet know what it will look like. As soon as this becomes clearer, CIBSE will be making members aware, and will provide information through the Knowledge Bank at www.cibse.org

Setting sail on a Star

Spencer Gardner and crew from Hoare Lea and Partners, Bristol, in *Swing on a Star*, won this year's Southern Regional Yacht Rally, which took place on 26 June. Runners up were Andrew Eastwell and a team from BSRIA in a Sunfast 37 and third place went to Graham Fisher in *Kalventus*.



Southern region's chairman, Laurie Socker, presenting the Prima Trophy to Spencer Gardner

Helping members in need

Members are being reminded to get in touch with the CIBSE Benevolent Fund if they require help or support during a personal crisis.

With some 20,000 members within the CIBSE family, it is inevitable that personal situations will arise due to bereavement or other domestic crises.

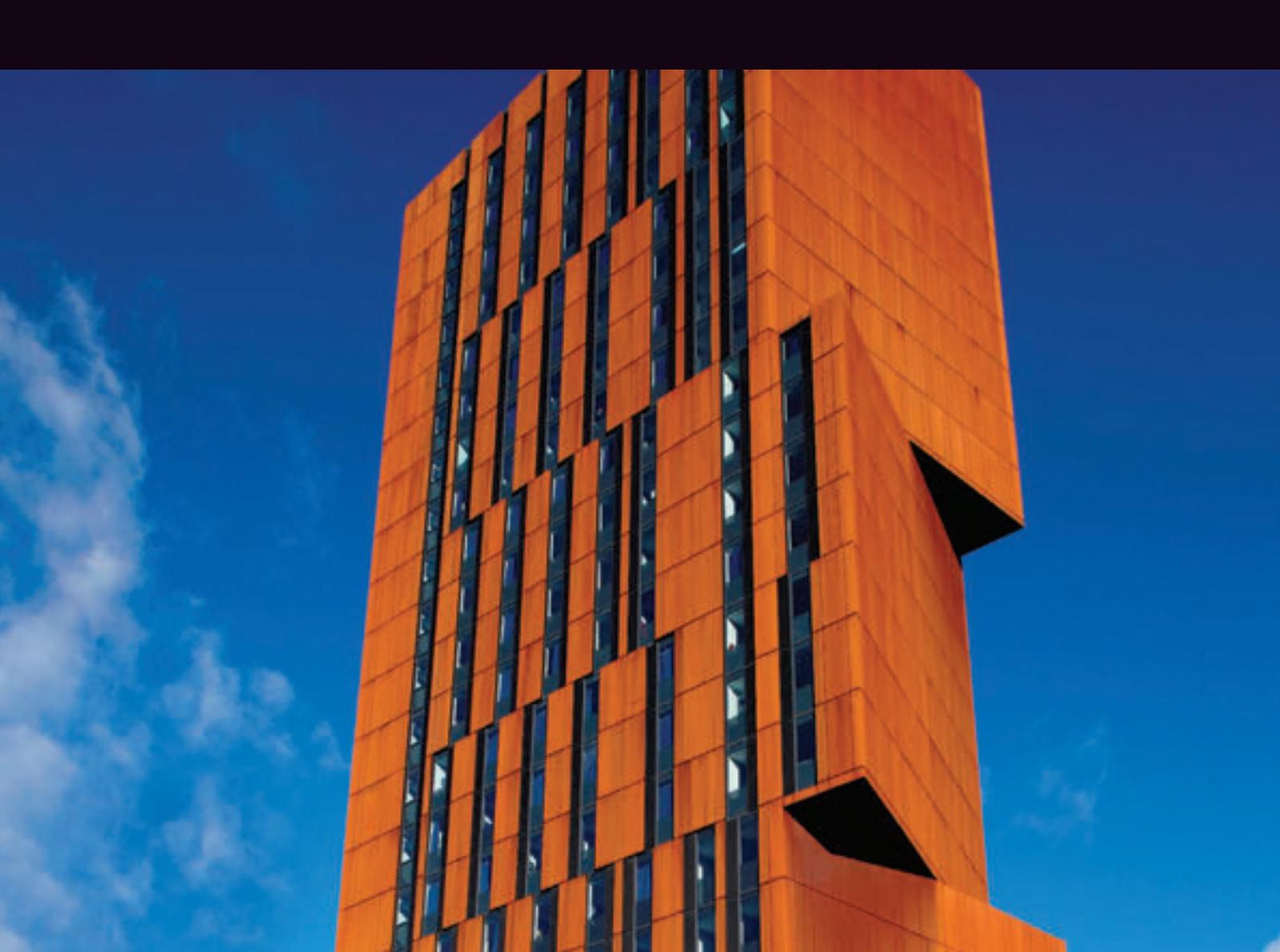
The fund, set up in 1933, helps those who may need a contribution towards funeral expenses, for example, or financial help during sickness, or simply someone to listen and share a problem.

Regional almoners provide this

support, visiting and keeping in touch with needy cases.

Should you be made aware of a member or dependent who is in need of the assistance available through the Benevolent Fund, contact your regional almoner, whose details are available from your regional secretary or from CIBSE.

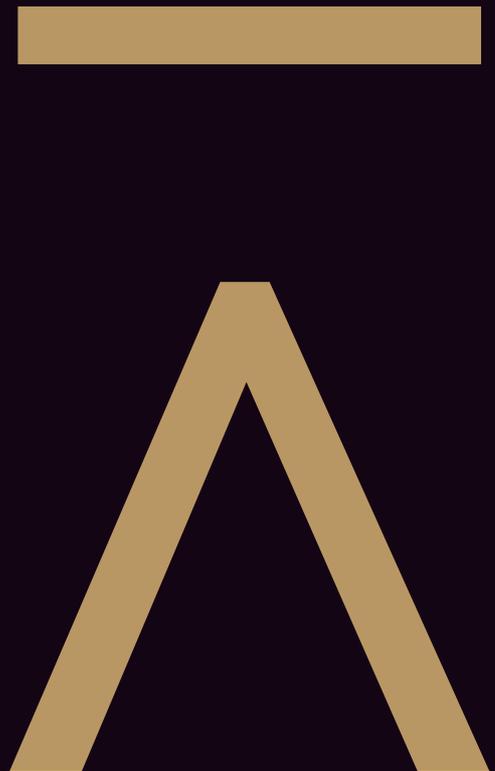
The fund is always in need of volunteers to help in its work, and should you feel able to offer some help towards the role of regional almoner, it would be most welcome.



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Letters

Biodiesel is far from outstanding for use in BREEAM ratings

Regarding your July issue article entitled “Outstanding” challenge’ (page 26), which discusses the details of how a standard office building in London has been adapted to achieve the ‘highest sustainability standard for offices’, it strikes me that there is something very wrong in the way this has been assessed.

The fabric of the building consists of standard full-height double glazing with (some) fixed external blinds that cover less than 20% of the glazing at peak solar gain. As a result, this building would fail to pass the standard building regulations Part L 2010. How, then, has this building been deemed to be so environmentally outstanding? For the large part, the answer is that the building relies heavily on the installation of diesel generators that are intended to run on biodiesel.

I have yet to meet any engineering colleagues who think that taking biodiesel away from road use and using it in a building (in a city that already has one of the worst air qualities in Europe) is a good idea. Why is BRE encouraging the use of this valuable, limited resource in a building? We should not be encouraging its use in buildings – it is simply not sustainable.

PricewaterhouseCoopers should be applauded for aiming for a high sustainable standard in its new offices. But BRE should revise its policy on biodiesel as soon as possible to ensure that there are no more buildings employing this tactic to achieve high BREEAM ratings.

James Thonger PhD BSc CEng MIMechE

Major institutions should take the lead for engineering profession

The past 30 years have demonstrated to me that engineers hunger after public acknowledgement to an enormous extent. The most constant feature of my postbag over the years has been the accusation that the professional engineering institutions (PEIs) or the Engineering Council (usually both) are involved in a conspiracy to suppress statutory regulation of the profession and other forms of public recognition of engineers. Countless inquiries, reviews and reports have had professional recognition as a theme.

My personal view is that this will never change. Notwithstanding the views of my correspondents, the lack of acknowledgement is probably inevitable.

The first president of the Institution of Civil Engineers, Thomas Telford, wrote: ‘It is unnecessary to remark to you on the business of an Engineer; all admit the difficulties of it, and the indefinite character of it; and that by the want of definition its respectability is less than its due, that public confidence

Any lack of a coherent voice for engineering must be placed fairly and squarely on the leadership of the major institutions, the Royal Academy and the Engineering Council.

Andrew Ramsay,

Retiring chief executive, Engineering Council

Don't leave out chilled ceilings

I read with interest your article in the July issue on the topic of fan coils and chilled beams (‘When the fan fits’, page 46). I feel that at some point chilled ceilings should have been included as they offer benefits from both sides of the discussion. Chilled ceilings are manufactured with a copper element bonded into the rear of a metal ceiling tile, resulting in a flush finish and opportunity to reconfigure space providing flexible partitioning locations, appealing to both property developer and future tenant.

As with fan coils, building zones can be individually controlled, allowing unoccupied areas to be isolated and shut down. They also have the advantages of chilled beams as they are more energy efficient than fan coil units, are quieter as they have no moving parts, and require little maintenance.

In addition, and unlike fan coils, chilled ceilings can be installed within a 100mm ceiling void, which, for refurbishment projects, brings comfort cooling to properties with minimal floor to ceiling heights.

With the acknowledgement of chilled ceilings the line between advantages and disadvantages becomes somewhat blurred.

Malcolm Stamper

Marketing manager, SAS International



which is indispensable is much weakened by the presumption of unskilful and illiterate persons taking upon themselves the name.’

The number of PEIs has reinforced a view that the effectiveness of the profession has been hindered by the existence of multiple bodies with overlapping claims to expertise and influence.

The Engineering Council currently licenses 36 PEIs. Engineering will generate further new societies as new technologies and economic engines emerge. Our current structure of 30 plus licensed bodies, 20 professional affiliate societies, and, probably, 30 more aspiring societies seems fairly stable and allows for growth and redistribution of emphasis as time goes by.

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

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

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Crunch time?

Engineers are rightly focused on creating low carbon solutions. But, says **Chris Jones**, they may also be neglecting a potentially more urgent crisis – the sudden arrival of ‘peak oil’



The latest climate science indicates a stark choice: make extreme reductions in carbon emissions, or generate extreme climatic impacts on our world. The UK policy focus has been on long-term carbon reductions, but is energy supply another global predicament – and is it being underestimated by many in the engineering professions?

Certainly, CIBSE’s national conference earlier this year did cover UK energy security, but the prospect of an oil crunch was not on the agenda. Oil is woven into every aspect of the economy: food, materials, medicine, transport and complex financial instruments; and many observers suggest that very soon there will indeed be a ‘crunch’, whereby oil shortages lead to soaring prices, potentially resulting in social unrest.

Despite the long-established trends where new oilfields have become smaller and volumes of oil being discovered have declined, the confident view still says that the resources are there and oil price volatility is constraining the huge investment needed to replace capacity. Environmentalists point to the disastrous Gulf of Mexico oil leak as just one example of how oil is increasingly difficult, risky and expensive to produce. Certainly there’s a consensus that the age of easy oil is fading.

The International Energy Agency warns that a shortfall in oil supply can’t be ruled out by 2014-15. Last October the UK Energy Research Council reported a ‘significant risk’ of global oil production peaking before 2020. The previous UK government said, at last, that there would be an advisory panel on oil depletion.

We at Peak Oil Consulting predict that demand for oil will exceed supply by 2014-15, because depletion of existing fields will outpace new production capacity. After 2015, we expect global oil production – including unconventional oil such as tar sands – to fall. In April this year, the US Joint Forces Command stated: ‘By 2012, surplus oil production capacity could entirely disappear, and as early as 2015, the shortfall in output could reach nearly 10m barrels per day.’

Less optimistic observers forecast that this oil crunch signals the arrival of ‘peak oil’ – the point where production reaches its final limit and settles into irreversible decline, year on year. Peak oil does not mean running out of oil, but it does mean the end of cheap oil, forever.

Hitting peak oil by 2015 would be far earlier than policymakers across the globe said they expected; it is also very early in establishing low carbon economies. Without decades of planning, preparation and transition, the abrupt resource constraint, the speculation and the competition would combine to be socially, economically, environmentally and administratively disruptive.

To better understand the supply situation, some have pressed for a global audit to establish productivity trends. That audit could be relatively fast, but it needs global co-operation. Seeking a more orderly global transition, the Post Carbon Institute in the US has proposed an ‘oil depletion protocol’, under which countries would commit themselves to reducing their oil consumption year on year, to match depletion in capacity. The challenge now is to get nations to begin signing up to this (visit www.oildepletionprotocol.org).

This century, oil is likely to be just one among a number of depleting and increasingly costly resources. The question, with an ever-growing population, is whether technological advances and substitution can outrun so many concurrent limits on resources?

Moreover, should not engineering professionals, and institutions such as CIBSE, be pushing these concerns harder than they are at present? We cannot just cut carbon, we also need planned reductions in oil, gas and coal dependency. Otherwise, any crisis ensuing after the ‘crunch’ could easily overshadow the low carbon agenda. ●

Chris Jones is principal mechanical engineer at URS Corp.

We cannot just cut carbon, we also need planned reductions in oil dependency

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Common law?

The European Commission has published a Green Paper outlining various options for changing contract law to encourage cross-border trading, writes Hywel Davies



The European Commission is consulting on potentially far-reaching contract law reform in Europe. It claims that this is needed to stimulate cross-border trading, particularly involving small businesses. Although it is primarily focusing on cross-border trading, the proposals include options for a European Regulation on contract law.

Announcing the consultation, the Commission says that only 8% of consumers buy online from another member state. And 61% of cross-border sales are rejected because traders refuse to serve the consumer's country. This is largely due to regulatory barriers and legal uncertainty about the applicable rules.

'I want a Polish, German or Spanish consumer to feel as safe when doing business with an Italian, Finnish or French company online as when they are at home,' said Justice Commissioner Viviane Reding.

'I want Europe's small and medium-sized companies to offer their products and services to consumers in other countries without having to become experts in the national contract law systems of all EU countries.

'This is certainly a time of crisis for Europe's economy. But it is also a time where we have an historic opportunity to drive economic growth by easing the cost of cross-border transactions. It is therefore now the time to make a quantum leap towards a more European contract law.'

Has anyone asked a plumber in Pontefract, or an electrician in Eccles, whether they have any interest in rewiring a chateau in the Dordogne, or replacing a boiler in Bamburgh? I suspect not: they may feel its risky enough working in England under a legal system of which they have some knowledge.

But it seems that, in the interests of cross-border trade, the Commission wants to rewrite contract law for them anyway. This may be thought to stimulate greater competition in consumer markets, but how does

it help business-to-business transactions in the current economic circumstances?

The Commission Green Paper seeks opinions on seven proposed reform options, ranging from publishing suggested model contracts to an EU-wide law replacing all national contract laws. The options are:

- non-binding model contracts;
- a 'toolbox' for national legislators to improve consistency when passing national contract laws;
- a non-binding request to member states to incorporate a 'European contract law' into their law;
- creation of an optional '28th system' of EU contract law

in parallel to the 27 member state's legal systems;

- partial harmonisation of contract law through an EU directive;
- full harmonisation of contract law through a Regulation; and
- an EU civil code on contracts which would replace national contract law.

It would be unwise to dismiss this as another wacky idea from Brussels

The Green Paper was prepared by an expert group, including three academics from the UK, to provide a 'common frame of reference' on which discussions could be based. It is the culmination of many years of study and effort by several cohorts of European academics.

It resulted in a previous attempt, in 2001, to introduce major contract law reforms, so it represents a significant investment of academic time and EU taxpayers money, with all the attachment that creates amongst its advocates.

It would therefore be unwise to dismiss it as another wacky idea from Brussels. Rather, we should be taking careful note, and responding to the consultation process, which runs until 31st January 2011. Depending on the outcome of the consultation, the Commission could propose further action by 2012. ●

Hywel Davies is technical director of CIBSE.

DOWNLOAD

The Green Paper from the European Commission on policy options for progress towards a European Contract Law for consumers and businesses can be downloaded at http://ec.europa.eu/justice_home/news/consulting_public/news_consulting_0052_en.htm

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Tilting canvases

Looking to design a high-performance single-skin façade, engineers turned to the classic bay window for inspiration. And the successful results underlined the importance of early-stage collaboration, writes **Dr Mikkel Kragh**

My firm belief is that façade engineering (FE) is an essential component of integrated design. By looking at two new-build projects where FE was applied, I hope to show how bringing FE in at the early stages of the process can help deliver ambitious designs and high performance.

Ropemaker Place is a commercial development near Moorgate in the City of London, developed by British Land and designed by Arup Associates. The façade plan was set up with input from specialists in Arup Façade Engineering as a repeat of a successful formula adopted in connection with the Plantation Place project a few years earlier. The concept was developed in close collaboration across the disciplines – covering architecture, environmental strategy, façade detailing, buildability, building physics, and procurement including costing.

The Ropemaker design team, however, was not in a position to adopt the advanced façade concepts developed for the same client's Plantation Place project a few years earlier. The challenge for the team was to deliver high performance and appealing architecture to suit Ropemaker's more limited budget, while also meeting the sustainability targets.

Plantation Place

The Plantation Place development features a series of advanced façade solutions. The lower levels are 'sealed' (no openable windows) with stone fins, to fit into the urban fabric of the City of London. The massing of the buildings is informed by planning policies, including rights to views of St Paul's Cathedral. The result is that the buildings step back and the floorplates of the top levels are less deep. The façade to the upper floors is a double-skin system, with openable windows in the inner façade and an automated solar shading device in the cavity between the two skins.

The fully-glazed outer skin is shingled, which means that the glass panels are tilted slightly with open joints between them. The inner curtain wall façade is not highly glazed by London standards, but the outer skin gives the top storeys of the building a highly glazed look and feel, with reflection of the sky bringing to the big elevations a certain 'lightness' when seen from the streets below.

The outer skin also serves to shield the shading device from the wind. Without the outer screen the automated external venetian blinds would have been exposed to the wind, and there would have been situations where they could not be deployed when needed. The double skin arrangement solves this problem and the control system is fairly sophisticated with zoning according to solar exposure and shadowing (see Figure 1).

The double skin also serves to shield the openable windows from the wind and deals with the problem of natural ventilation at height. The openable windows have been built in as a future proofing-measure or an optional environmental feature. The building is currently fully air conditioned but can be operated in mixed mode.

Ropemaker Place

The Ropemaker façade design is an exemplar of the integration of architectural treatment with environmental performance.

The design team created a bespoke tilting façade system, which reduces energy for cooling by up to 27% compared with a reference flat façade. The subtly changing colour and rhythmic expression of the façade present a dynamic canvas of reflectivity and tone, while the projecting arrays also provide the integrated solar shading as the windows 'turn their backs' to the sun and thereby significantly reduce solar gain and consequent cooling loads.

The building is composed of six large-scale >



For Ropemaker Place, the design team created a bespoke tilting façade system, which reduces energy by up to 27% compared with a flat façade

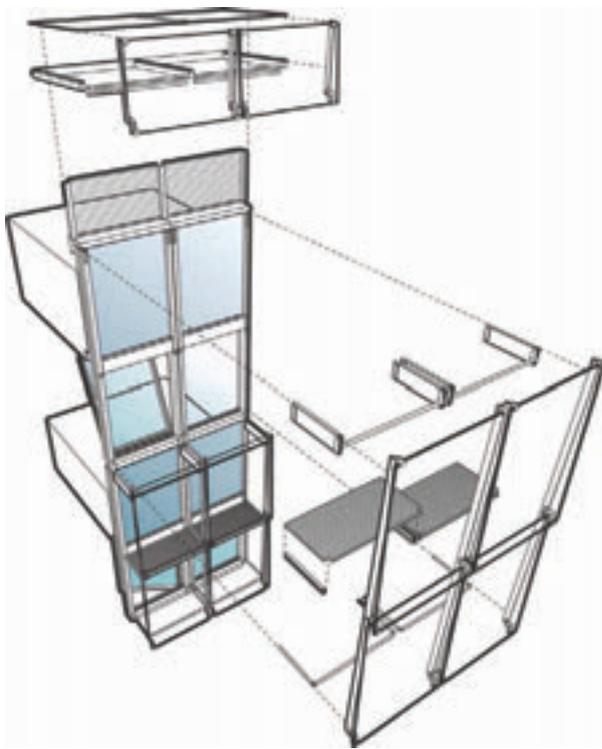


Figure 1: Plantation Place, double-skin façade

> interlocking cubic forms, rising up as a series of garden terraces. These roof terraces are both a remarkable natural amenity for the people who occupy the building and a biodiverse habitat of flora, fauna, insects and birds.

The façade concept for the Ropemaker Place project takes inspiration from the classic bay window. While the concept is informed by and expresses the solar control strategy, the design was enabled through early stage façade engineering and appropriate building physics analysis, combined with multi-scenario, multi-criteria building energy simulation.

The budget did not allow for a complex multilayered façade and the design team responded by letting the geometry of a ‘single skin’ façade respond to the solar exposure of the different elevations. The façade is not excessively glazed and the windows are rotated away from the sun – east and west facing windows are rotated towards the north around a vertical axis, while the south facing windows are rotated around a horizontal axis, leaning forward (see Figure 2).

The rotation means that an element of self-shading is achieved, similar to what would have been attainable by means of fins and overhangs. A second order effect

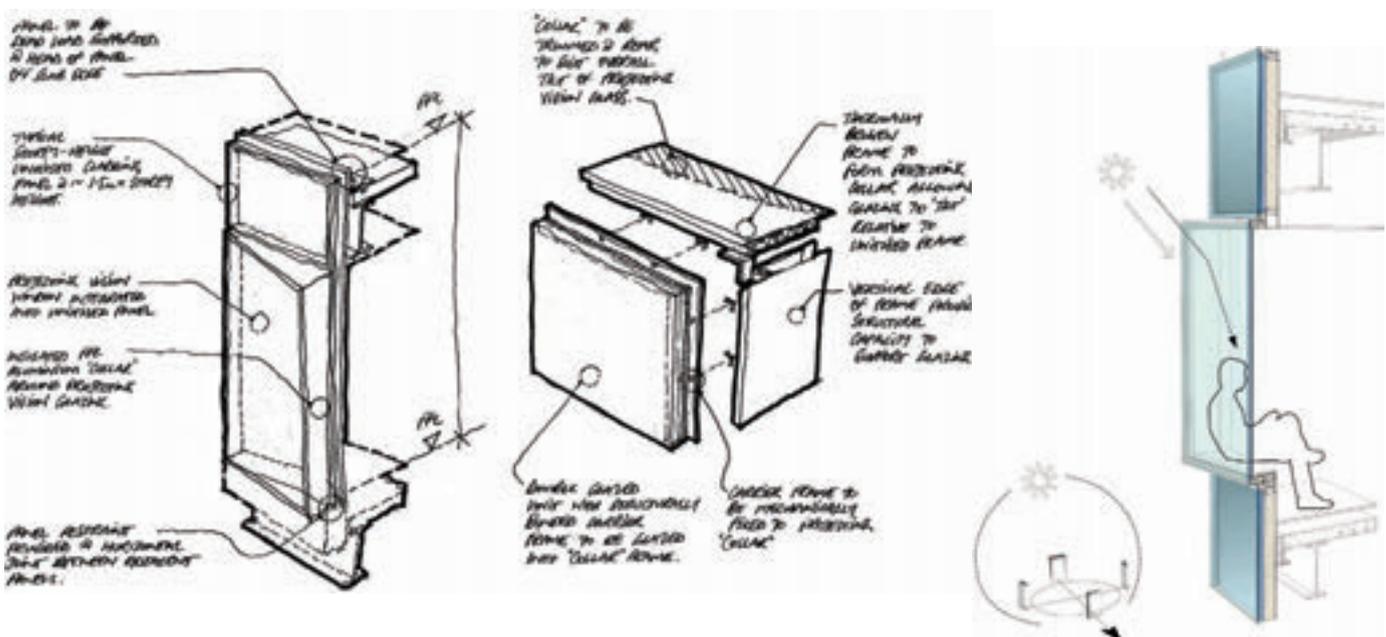


Figure 2: Conceptual sketch and schematic showing the ‘rotation’ of the window

is the reduction in solar transmission of the glazing for extended periods of time due to the resulting increase in solar angle of incidence.

The bay window design inevitably leads to an increase in thermal transmittance due to the greater developed transmission area and, more importantly, the bay window ('collar') framing leading to some degree of linear and point thermal losses. Previous research has shown that relatively minor changes to the thermal transmission of the building envelope may not be critical for a commercial building with relatively high internal gains.

The design team carried out a series of studies to assess the overall energy performance, taking into account the expected increase in thermal transmittance and gauging the combined effect in heating and cooling mode.

Early-stage FE

The façade engineering input during the concept stages for both projects was crucial in terms of testing the feasibility of the proposed design, and exploring ideas in informed dialogue with selected specialist cladding contractors. The initial idea, which was based on considerations of solar shading and reduction of solar gains, was quickly interpreted and presented as a series of conceptual hand sketches in an effort to gauge the complexity and the viability of the concept (see Figures 3 and 4).

The conceptual studies were linked with building physics input – initially as general considerations and gradually as more specific estimates of required and achievable thermal and solar performance. Clearly the single biggest impact on solar gains is given by factors

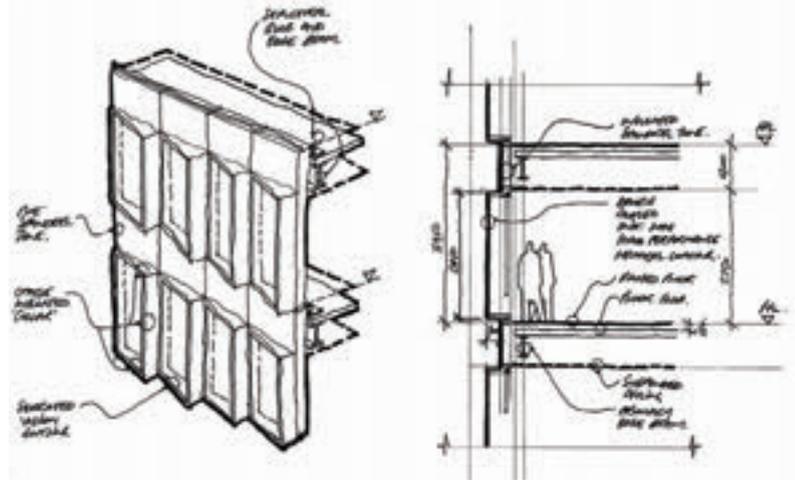


Figure 3: Ropemaker Place, east/west façade concept

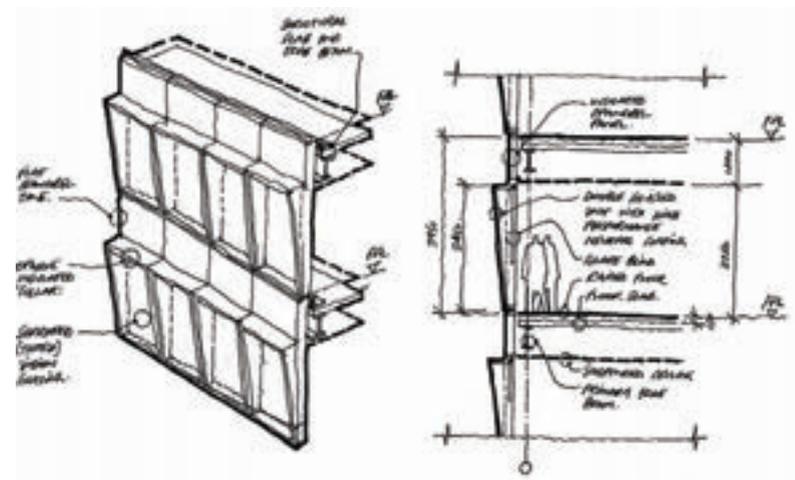


Figure 4: Ropemaker Place, south façade concept



While the lower levels on the windows of Plantation Place are sealed (left), Ropemaker has a tilting design for its façade, which reduces the energy used for cooling

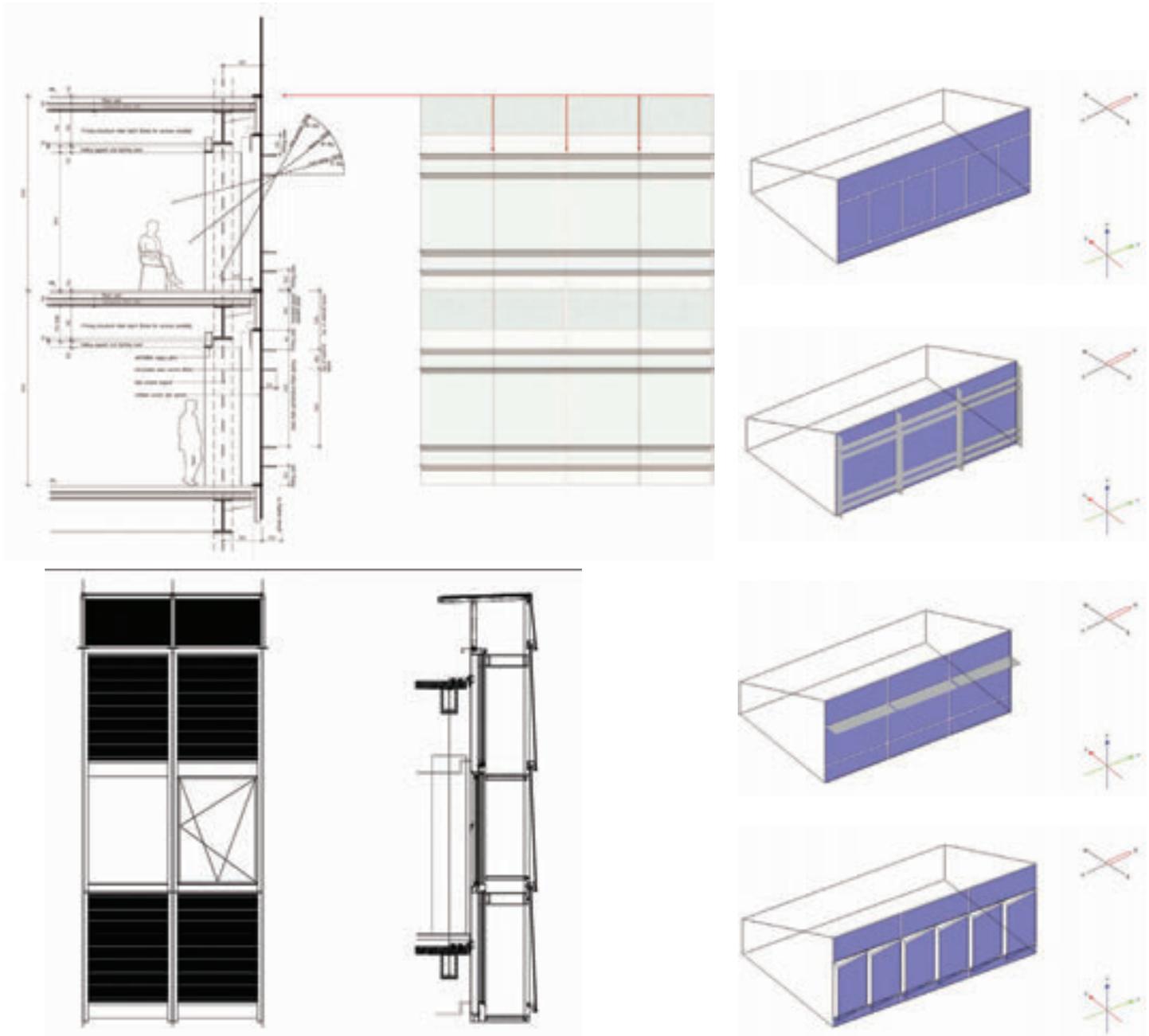


Figure 5: Benchmarking façade types

> such as window size and orientation, and this is where the specialist input blended in with the architecture.

The involvement of façade engineers resulted in a series of constructive meetings where ‘pros and cons’ were tabled and discussed openly. The work that went into the conceptual studies gave sufficient confidence to move into detailed design. This is significant as the achievable thermal and solar performance of the façade was pivotal in terms of the overall energy (and sustainability) strategy of the development.

Contractor buy-in

From the early design stages, the design team collaborated with specialist sub-contractors, who were invited to discuss the proposed design concept. Engaging in such buy-in sessions is an important way of checking technical feasibility and budget pricing before the design is progressed in detail. It is also a way of gauging the willingness of the market players to work to achieve the desired result.

In the case of Ropemaker Place, the design team met

with a selected specialist contractor who committed resources to assessing buildability and carrying out detailed thermal analysis on a number of key details. These studies in turn fed into the broader energy assessment exercises carried out by the design team.

Evidence-based design

A series of studies was undertaken to evaluate the performance of the proposed concept. Detailed dynamic thermal simulations were carried out for the different orientations of the building, while the façade concept was benchmarked against three different façade types and three different occupancy scenarios. Sensitivity studies were carried out to determine the effect of the total solar energy transmittance (g-value) of the glazing.

The project is an example of evidence-based design in that different concepts are tested for different scenarios as an intrinsic part of the decision-making process. The proposed design was referred to as the serrated façade and it was benchmarked against (a) a >



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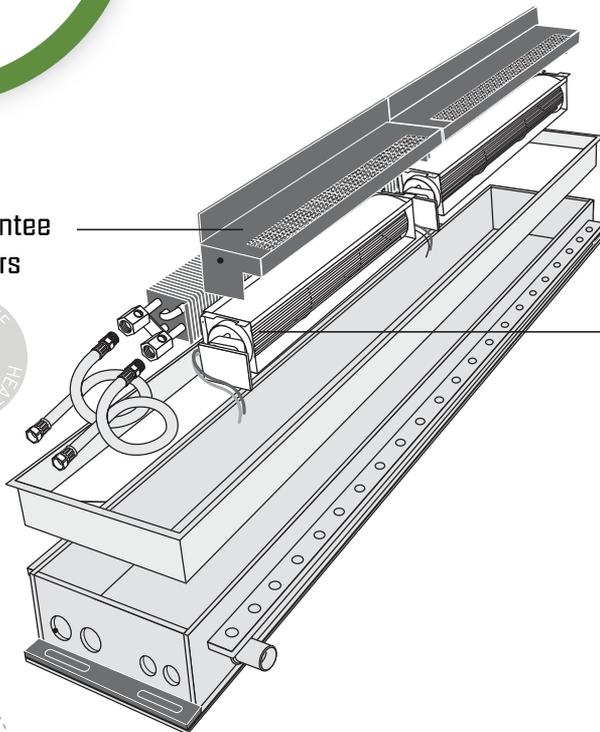
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The membership is international and the Society is experiencing significant growth in the regions – notably the Middle East where the SFE was launched in early 2009.

There are a number of benefits of SFE membership, including recognised professional status (Associate; Member - MSFE; or Fellow - FSFE); enhanced career opportunities; professional networking; technical events; and magazine.

Subscription is free to all existing members of CIBSE, whereas non-CIBSE members get affiliate CIBSE membership when joining the SFE and get the benefits of CIBSE membership, including free online access to publications.

Members are actively encouraged to contribute information to the *Elevation* magazine of the SFE and take part in the activities coordinated through the SFE Steering Committee.

The SFE is supported by the Institution of Structural Engineers and the Royal Institute of British Architects. For more information, visit: www.acadeengineeringsociety.org

> flat (or flush) façade of similar build-up and layout, (b) the façade from the previous, abandoned scheme, and (c) the double skin façade from the Plantation Place project, representing the state-of-the-art façade (see Figure 5).

The performance of the façade was assessed in terms of the predicted annual energy consumption and the peak loads in the perimeter zone of the building. The modelled depth of the perimeter zone was varied in accordance with the different design scenarios. The effect of the rotation of the windows varies with orientation and scenarios, but the annual energy consumption for cooling is reduced in all cases. In Figures 6 and 7, examples of results are shown for illustration only.

Conclusion

The above shows our approach to façade design and the importance of early-stage integration. The commitment of the client and the design team to Ropemaker Place resulted in a scheme with high performance and low environmental impact.

The sustainability of the building was demonstrated through a BREEAM Excellent rating. The property also received LEED Platinum PreQualification for Core&Shell, a first outside of the US. ●

Dr Mikkel Kragh is an associate at Arup in Milan, Italy.

Cooling load benchmarking studies for different scenarios (illustration only)

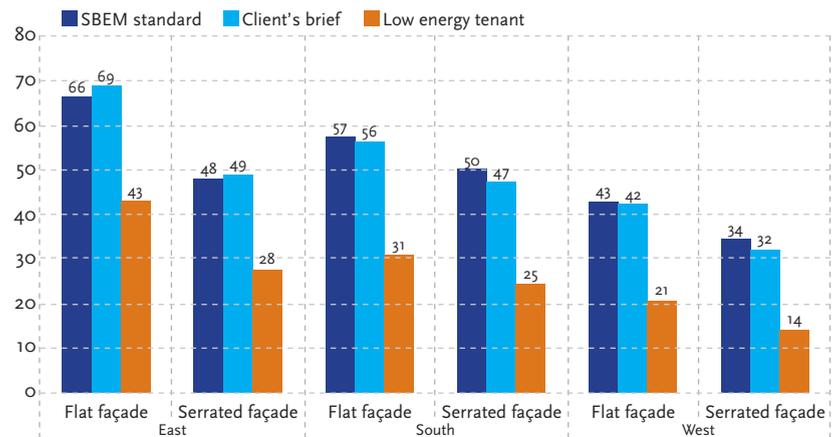
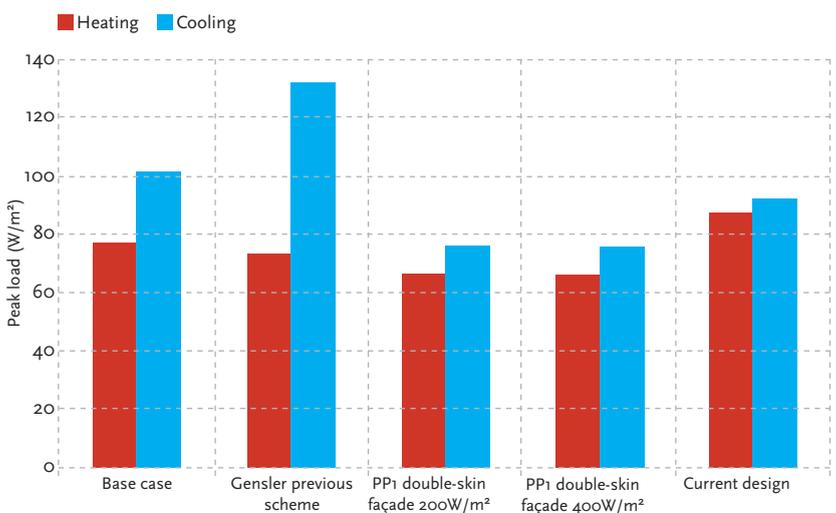


Figure 6: Illustrates in principle the effect of the window rotation for three design scenarios. The graph shows the cooling load for a flat façade compared with that of a serrated one. The thermal performance of the serrated façade has been adjusted to allow for both the increased transmission area and the linear losses caused by the comparatively complex geometry

Peak load (illustration only)



Annual heating/cooling energy consumption (illustration only)

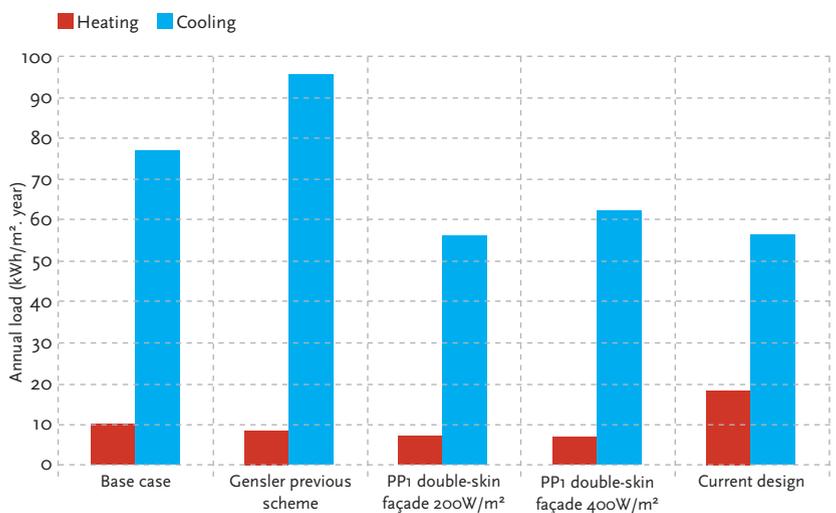


Figure 7: Illustrates in principle the peak loads and annual energy consumption for cooling (blue) and heating (red) and a comparison between different façade configurations. Notably, for the given assumptions, the performance of the serrated façade is comparable to that of a state-of-the-art doubleskin façade system



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Sustainability without the hot water?



Simon Weil www.simonweil.com

Combined heat and power solutions or heat pumps – which are the key to delivering low carbon services? A Cambridge professor and author of a book on ‘sustainability without the hot air’ has cast doubt on the efficacy of CHP. But, says **Huw Blackwell**, is this the whole story?

David MacKay’s book, *Sustainable Energy – Without the Hot Air*, is an internet phenomenon. This is partly on account of it being free to download in a particularly altruistic move by the author, a professor in the Department of Physics at Cambridge University.

MacKay uses simple maths and physics to demonstrate some fallacies often quoted by the press, and explores some of the challenges we face as fossil fuels become scarce and we seek to move to a low carbon economy.

One of MacKay’s assertions that may be of particular interest to building services engineers is that:

‘Heat pumps are superior in efficiency to condensing boilers, even if the heat pumps are powered by electricity from a power station burning natural gas ... I thus conclude that combined heat and power even though it sounds like a good idea, is probably not the best way to heat buildings and make electricity using natural gas, assuming that air-source or ground-source heat pumps can be installed in the buildings.’ (See page 151 of the online edition.)

This article explores this point and presents a counter-argument as to why heat pumps might not always be a suitable low or zero carbon system. It also looks at how to improve heat pump efficiency when >

Heat pump efficiencies

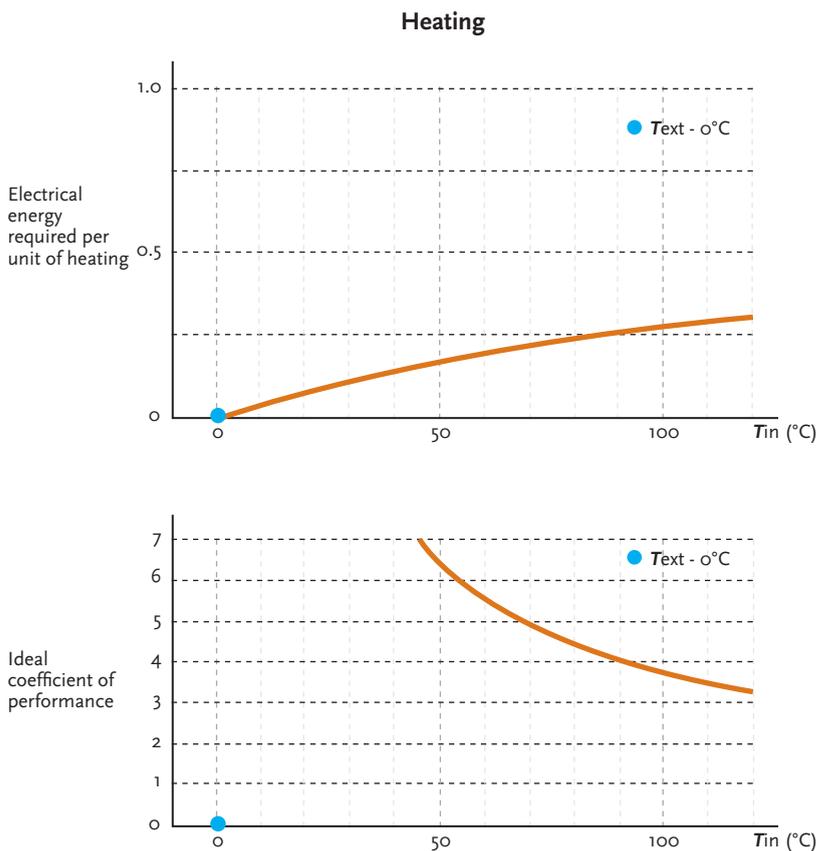


Figure 1: Top graph shows ideal electrical energy required to pump heat into a place at temperature T_{in} when the heat is being pumped from a place at temperature $T_{out} = 0^{\circ}\text{C}$. Bottom graph: the efficiency is conventionally expressed as a coefficient of performance – the heat pumped per unit of electrical energy

Source: *Sustainable Energy – Without the Hot Air*. ©David MacKay

- > this technology does form part of a building services design, and why gas-fired combined heat and power (CHP) should still be considered in dense urban sites.

Heat pumps

A heat pump undoubtedly can be a useful heat source. It increases the efficiency of electrical heating by transferring heat from one source to another using a refrigerant cycle. Typically this is from outside, the ground or the air, to inside. MacKay's book considers the theoretical limits of coefficient of performance (COP) of heat pumps and analyses some of the implications of these. There are also some practical considerations that should be taken into account when using this equipment.

CIBSE Guide F: Energy Efficiency in Buildings states that: 'A drop in condensing temperature [heat supply] of 1°C reduces energy use by around 3%... A rise in the evaporator temperature [heat source] of 1°C reduces energy use by approximately 3%.' (See section 8.3.1.)

This principle is demonstrated in two graphs in MacKay's book (see Figure 1) detailing the ideal efficiency of a refrigeration cycle. It can be summarised succinctly as: the closer the inside temperature is to the

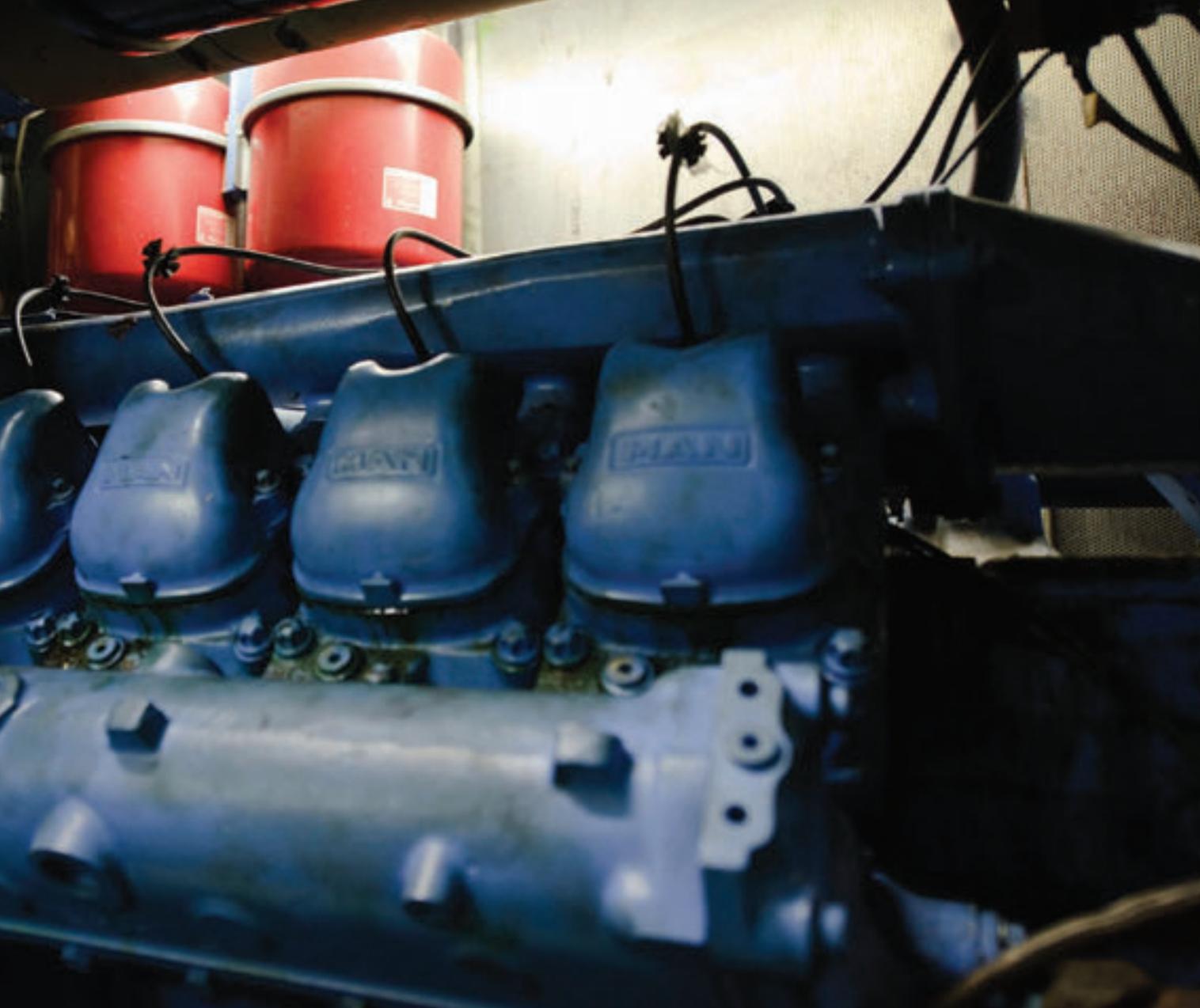
outside temperature, the better for refrigeration cycle efficiency (see page 301 of the book for the details).

This means that the further the outside conditions are from the inside requirements, the less efficient the heat pump. Therefore good engineering practice is to incorporate low-temperature heating systems within a building (such as underfloor heating systems) and warm temperature heat sources (the ground) to maximise efficiency.

However, the situation changes when domestic hot water (DHW) loads are considered. As the building fabric insulation efficiency of new (in particular) or existing residential building stock is increased, the dominating thermal load becomes DHW. This is required to be heated and stored at 55°C to 60°C in the UK to prevent bacterial growth. The alternative is to instantaneously heat water, though this is only suitable for low flow rates and a heat pump is not normally able to provide this.

Hot water demand can be reduced using techniques such as aeration and flow limiters, but there is still a requirement to raise water temperature from 10°C to approximately 60°C , whichever system is selected. Figure 1 shows that heating something to 60°C using an external source at 0°C has an ideal efficiency (COP)





Simon Wei/ www.simonwei.com

of approximately 5.0. This is an *ideal* efficiency – it can be approached, but never achieved because of losses in the refrigeration cycle.

If the temperature source reduces further below 0°C, the COP reduces further, by roughly 3% per each 1°C reduction in heat source temperature in line with the principle quoted earlier. The decrease in efficiency for an air-source heat pump is actually worse at these air temperatures. This is because as the receiving coil temperature reduces below 0°C, ice forms on the coil from water in the air, preventing thermal transfer to the refrigerant. This then requires a reversal in the cycle or an electric heater to defrost using more energy, and further reducing efficiency and therefore moving away from the simple 3% principle quoted.

This is a particular problem in the UK, which is a maritime climate, where the relative humidity of the air is close to saturation and water, and therefore ice can form with relative small changes in temperature.

Together, these effects can reduce actual air-source COPs substantially. In some cases, equipment at these higher temperatures operates at actual COPs of 2 to 2.5. This means we are not even approaching the lines shown in Figure 1.

An engineer can manage this by moving to a source

with a more constant temperature: the ground, or possibly a water supply (sea/lake/river). This is why these systems tend to have a higher COP in comparison with air systems. However, there is also a greater capital cost for the ground loop.

To achieve the best heat pump efficiencies, a hybrid heat pump system is required. This draws energy from the ground in winter and from the air in the summer, switching systems from the higher temperature source as the season changes to minimise the temperature difference and maximise efficiency. These systems also provide an opportunity for ground temperatures to recover over the summer season.

Combined heat and power

Professor MacKay uses a graph (see Figure 2) to show that current combined cycle gas turbine generation with heat pumps operating at COPs of 3 and 4 are better than CHP. In this graph, CHP is better than a heat pump if the CHP points are to the right of the green line which represents the heat pump efficiency.

MacKay states: ‘The main thing to notice in this diagram is that the electrical efficiencies of the CHP systems are significantly smaller than the 49% efficiency delivered by single-minded electricity-only >

A heat pump increases the efficiency of electrical heating by transferring heat from one source to another using a refrigerant cycle

Current combined cycle gas turbine generation with heat pumps operating at COPs of 3 and 4

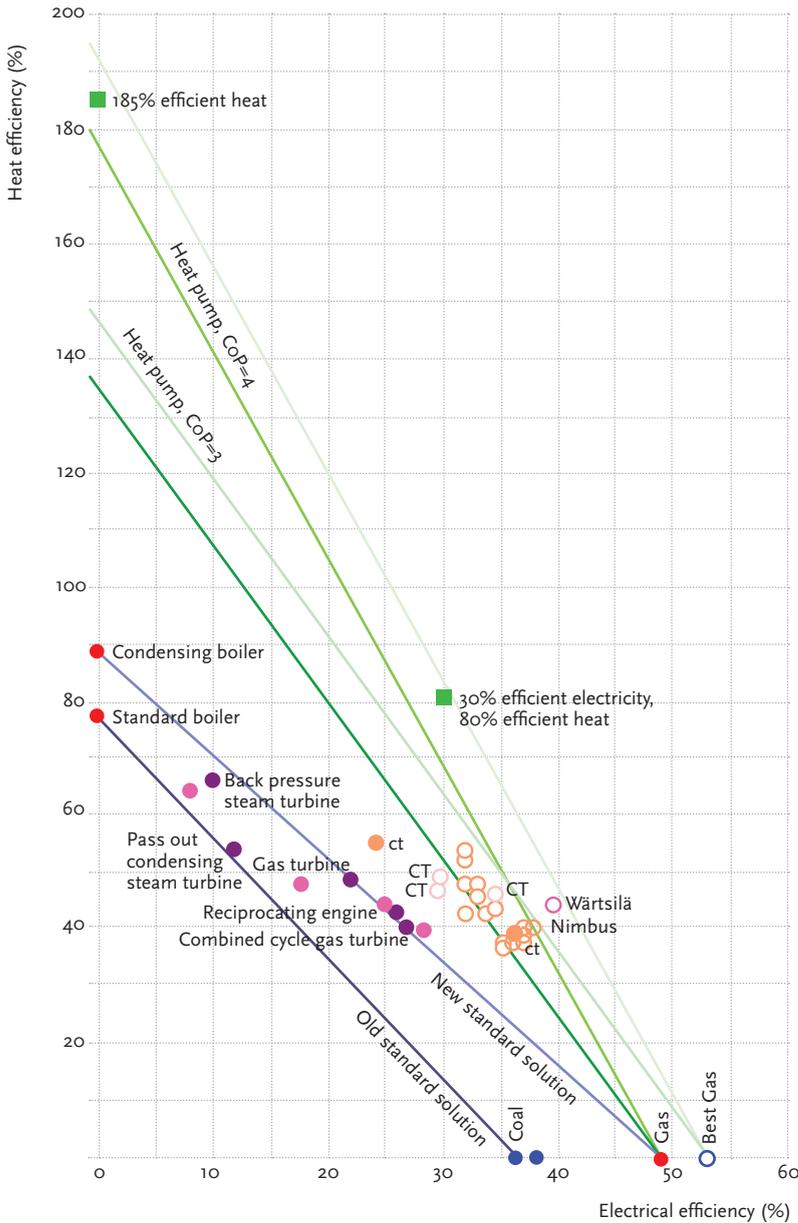


Figure 2: Each of the filled dots shows actual performance of CHP systems in the UK, grouped by type. The hollow dots marked 'CT' show the performances of ideal CHP systems quoted by the Carbon Trust; the hollow dots marked 'Nimbus' are from a manufacturer's product specifications. The dots marked 'ct' are the performances quoted by the Carbon Trust for two real systems (at Freeman Hospital and Elizabeth House). The steep green lines show the combinations of electricity and heat that you can obtain, assuming that heat pumps have a coefficient of performance of 3 or 4, assuming that the extra electricity for the heat pumps is generated by an average gas power station or by a top-of-the-line gas power station, and allowing for 8% loss in the national electricity network between the power station and the building where the heat pumps pump heat. The top-of-the-line gas power station's efficiency is 53%, assuming it's running optimally

Source: Sustainable Energy – Without the Hot Air
©David MacKay

■ District heating is one of the ideal scenarios for CHP ■

(multi-MW) plant on site. Perhaps a comparison should therefore be made against combined cycle CHP. What happens if a large CCGT is brought into the city and the heat normally dumped from the cooling towers used in a district heating network?

A quick comparison is included in the Sankey diagrams (Figure 3). The first shows a 'best case' CCGT (53% electrical efficiency) with part of the electrical output supplied to a heat pump. This is comparable to an example used by MacKay: '...the "best gas" power station, feeding electricity to heat pumps can deliver a combination of 30% efficient electricity and 80% efficient heat, a "total efficiency" of 110%.' (Page 151.)

This works because the heat pump moves heat energy from another source, therefore we have not 'created' any energy. Moving this station into the city means it can become a CHP system. As pointed out by MacKay, there may be a slight loss in electrical efficiency for the CCGT relating to higher condensing temperatures in the steam cycle; but the efficiency of the gas turbine (first cycle) is not affected. However, there is also potentially a reduction in electrical transmission losses as the power station is now embedded in the city, where there is the greatest electrical demand.

In the second Sankey example (Figure 3) it is assumed there is a 4% loss in electrical efficiency (net 49% electrical efficiency), from reclaiming the >

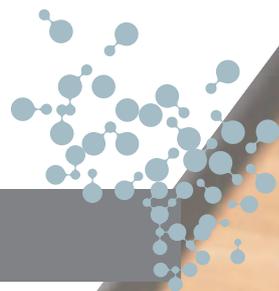
> gas power stations.' (Page 149.) The comparison between CHP and combined cycle gas turbine (CCGT) is not perhaps a fair one. The fundamental feature of the CCGT system is that it has a second process of energy recovery, which increases the overall efficiency. This leads to a large part of the difference between the two systems.

As MacKay states: 'The fact is, electrical energy is more valuable than heat...' The critical parameter in CHP implementation is electrical efficiency. This can be enhanced through using or combining different thermodynamic cycles. An example might be large reciprocating CHP with an Organic Rankine Cycle, or looking to the future, possibly fuel cells.

However, building services engineers are only using small CHP systems because they cannot build a large

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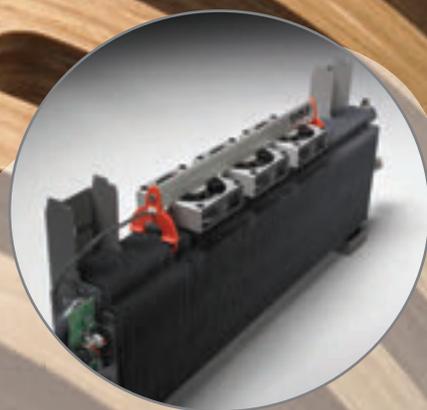
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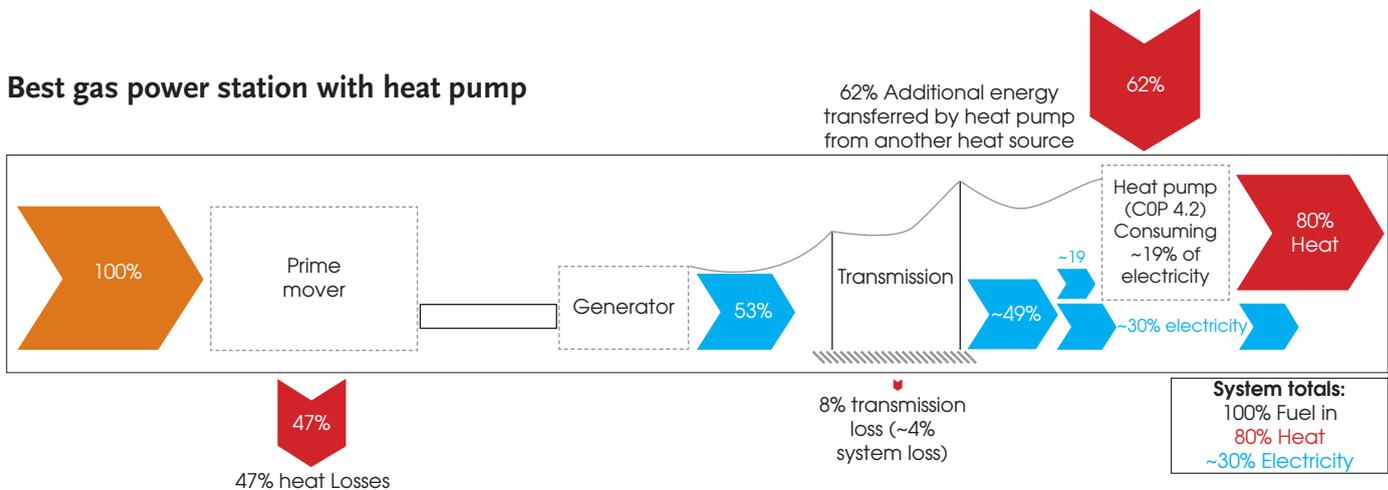
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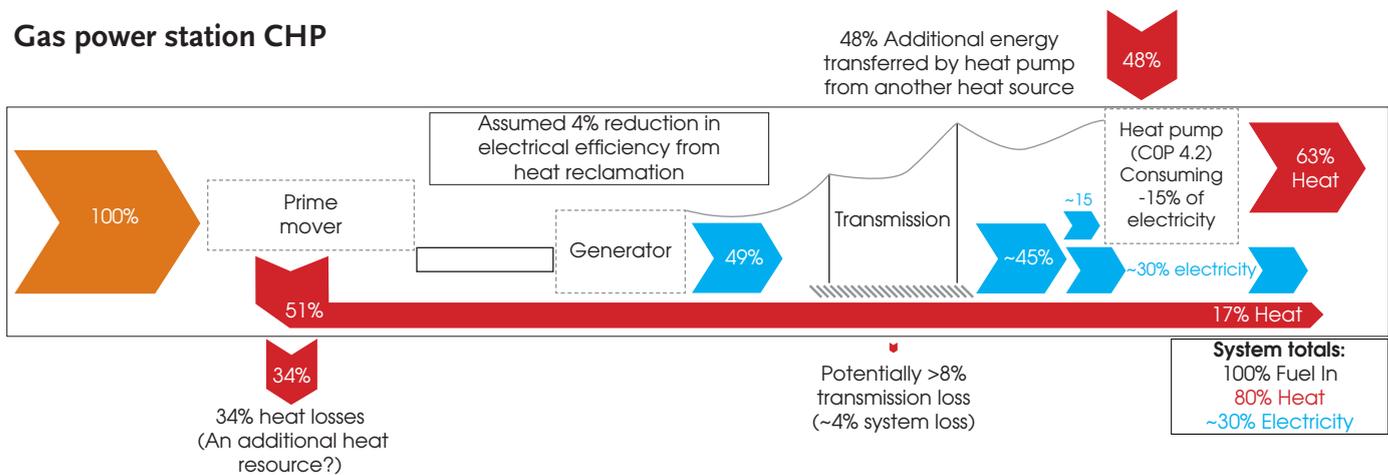


Figure 3: Two Sankey diagrams showing, top, a 'best case' CCGT; and, bottom, assuming a 4% reduction in electrical efficiency from reclaiming the heat

Source: Huw Blackwell/
Hoare Lea

> heat. The same transmission loss is assumed for comparison's sake, and 30% of the energy output is still supplied as electricity, with any electrical output higher than this used in a heat pump. Only 17% of the original system energy (about a third of the heat) needs to be reclaimed to equal the outputs given in the first example.

In this simple thought exercise, the CHP system has been able to match the performance of the 'best gas power station and heat pump' scenario. What is more, if more than 17% of the system heat is reclaimed, we can improve on the 'System totals' in these examples and perform better than the 'best gas power station and heat pump' scenario.

To summarise another of the concerns that Professor MacKay raises in his book, if everyone had a ground-source heat pump in a dense suburban environment, potentially the quantity of heat required to heat all the homes in winter could not be drawn through the ground. He states: 'I therefore suggest air-source heat pumps are the best heating choice for most people.' (Page 305.)

In this case it can be argued that district heating with CHP is a better solution. This is one of the ideal scenarios for CHP because of the diversified heating

and hot water load. A CHP can then operate efficiently at full load constantly, and supply high-quality thermal energy (80°C to 120°C is usual) to all properties as required.

Conclusion

This article has attempted to show that there are a number of practical reasons why a heat pump, particularly an air-source one, may not operate at a COP of 3 or 4. The main cause is where the temperature of the receiver is substantially different from the source. This is a particular problem wherever there is a requirement to produce large quantities of hot water at high temperatures; heat pumps should always be used carefully where this is the case.

It should also be possible for CHP to compete with the best gas-fired power stations, generating electricity, where a proportion of that electricity is then used in a heat pump for heating (in place of gas boilers). CHP systems, therefore, should not necessarily be discounted in a dense urban environment. ●

Huw Blackwell is a senior sustainability consultant at Hoare Lea. David MacKay's book can be downloaded at: www.withouthotair.com



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Gaining ground

Heat pump products continue to be launched into the marketplace as they promise to become more affordable. So, asks **Ian Vallely**, how do manufacturers see this technology taking over from more traditional services?

The UK heat pumps marketplace has been bubbling over with new products in recent years, as more manufacturers have launched versions of the technology. The expected arrival of the Renewable Heat Incentive (RHI) in the UK will boost the heat pump sector by making this technology more affordable – although at the time of writing the industry is still waiting to hear the fate of the RHI, which hasn't been finally confirmed by ministers.

Communal heat pump systems for multi-dwelling developments could become more common

Vent-Axia, the maker of extractor fans and other ventilation systems, is an example of a company that has gone outside its traditional market and become a provider of heat pumps as it seeks to offer a range of low carbon solutions for social housing and other sectors. According to Richard Paine, product marketing manager for heat pumps at Vent-Axia: 'Putting a heat pump in now will result in massive rewards in the future. That, I think, is the real point that is being missed [by some specifiers].'

Heat pumps are flexible in terms of the applications for which they can be used. Nonetheless, for Paine, a focus on which type of heat pump works best in which situation can miss the point. For him, the preparation of the building is far more important: 'As you insulate a building and make it more airtight, its heat loss drops. Heat pumps work at a lower temperature than boilers – the lower the temperature that you can get them to operate at, the less hard you drive them and the more efficient they are.'

Thermal drivers

Lee Marshall of renewables group ENER-G agrees that a consideration of certain types of heat pumps for particular applications is shooting at the wrong target. He says: 'What tends to happen is that people think from the heat pump forward rather than the building back.'

'It doesn't matter if it's a hospital, a school, a retail building, or whatever – the building will simply have a requirement for heating and/or cooling. So the basis of design is about how much heating or cooling a building needs. Then it is about selecting appropriate technology.'

'This is driven by legislation and the thermal performance of buildings by keeping the heat losses down, reducing the energy consumption of the plant and fundamentally the reduction of CO₂ that is emitted



Dimplex



Courtesy of ENER-C

from buildings.’ Chris Davis, business development manager for renewables at heating company Dimplex says: ‘Heat pumps can be very flexible in terms of the types of buildings they can provide heating and cooling for, but it is crucial that they are designed correctly to fit the building.’

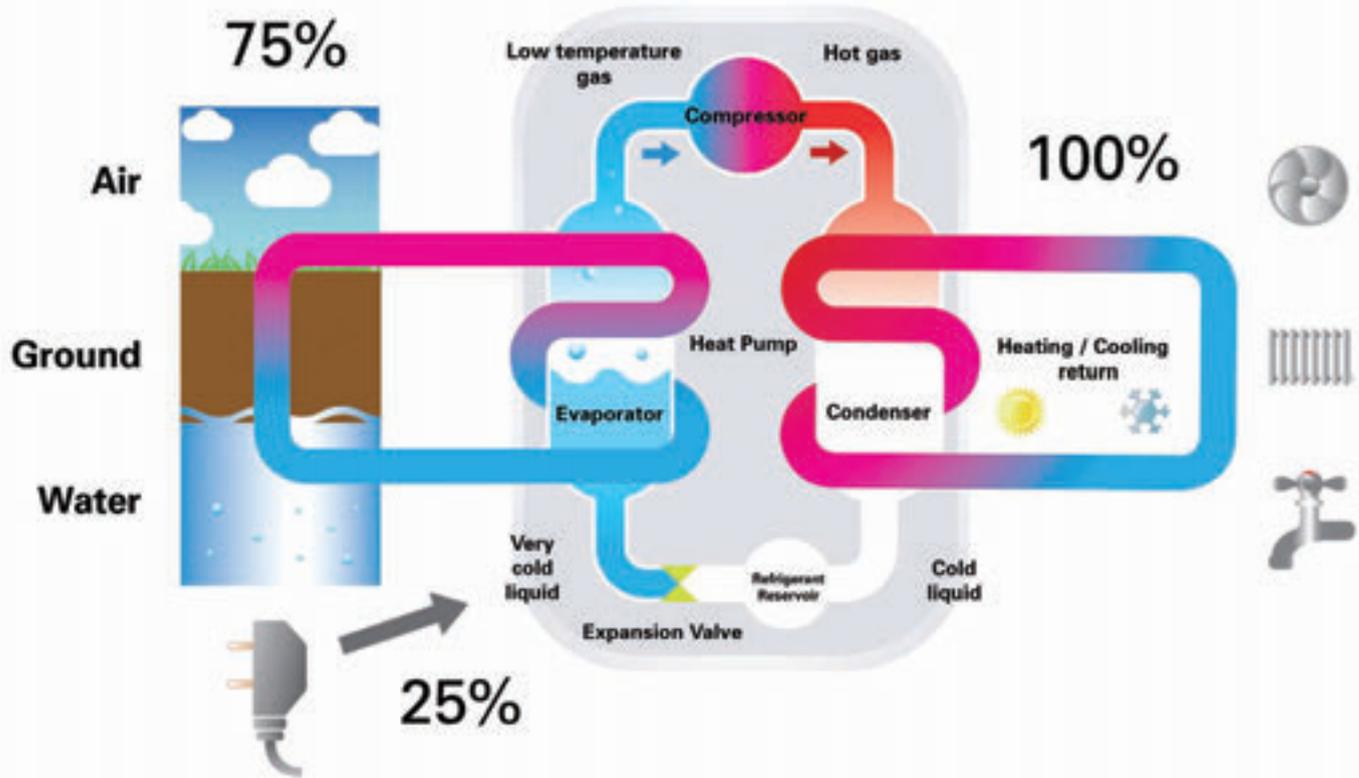
The higher you have to heat the water for the heating system, the lower the COP of the heat pump. Davis offers the example of an underfloor heating system: ‘We see specifications come out from consultants who say they want to use a ground- or air-source heat pump and yet they specify the underfloor heating to work at

50C, which is just crazy. Why not design the system to work at 40C? Then you get the best out of the heat pump. I think there is an education process to be gone through with some consultants.’

Specification

Marshall says the biggest problem he faces is when heat pumps haven’t been sufficiently incorporated into the heating or cooling design specification for a project. How pumps should be controlled is also something that isn’t thought through by design consultants, he says.

Depiction of a CHP and ground-source heat pump system to supply underfloor heating and hot water



The principles of heat pump technology using ground, air or water sources (provided by ENER-G)

‘When I’m running through a specification or set of drawings, this pops up time and time again. We then advise that there needs to be a technical change to the system to allow it to operate effectively. To me, the fundamentals need to be better understood by designers.’

Nonetheless, he says, heat pumps are less scary than they are often perceived to be: ‘When I work through the design process with designers, the unknowns become very clear in terms of how they should design their heating systems – operating requirements, flow rates, temperature drops, how they should control the heat pumps, and so on – and they start asking what all the fuss was about.’

‘The heat pump simply delivers heating or cooling into the building. If it is a refurbishment, it is likely that the thermal properties of the building will be improved by better glazing and better insulation which brings the heating requirements of the building down.’

‘As a result, if there are available soft areas in which boreholes or horizontal trenches can be incorporated, then ground-source heat pump systems become more viable. If not, there is the air-source option.’

Ground or air?

Heat pumps have started to make significant inroads into the heat-generation sector, according to Terry Seward, commercial manager of trade organisation FETA, which includes the Heat Pump Association among its members. ‘The domestic market is growing rapidly and will be predominantly either air-to-water or ground-to-water,’ Seward says. ‘Market research

suggests that air-to-water will be dominant and that is what we are seeing today.’

The choice between a ground-source heat pump (GSHP) and an air-source heat pump (ASHP) will be made on capital cost, running cost and practicability grounds, says Tony Barnes, sales director at Calorex. GSHP installations are more expensive because of the need for the ground heat collector. However, they are more efficient than ASHPs. As provision

“ The fundamentals of heat pumps need to be better understood by designers ” – Lee Marshall

for heat collectors can be made at the initial design and construction stage, it is often easier to install GSHPs in new buildings than it is to retrofit them to existing buildings.

‘With existing buildings, an ASHP will often be installed in conjunction with an existing fossil fuel boiler and be sized to supply maybe 85% of the total heat demand. Most of the running cost and carbon savings can be realised for a relatively low capital cost, and the existing boiler will help meet the heating demand in exceptionally cold conditions or when a rapid increase in temperature is required.’

Dimplex has witnessed large air-source heat pumps (particularly 30-40kW plus) becoming popular in the commercial sector. Davis says: ‘Large air-source units are now available that can be just as efficient as >

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> ground-source, so air-source shouldn't be discounted as a technology.

'With capacities of up to 60kW available, giving COPs of up to 4.4 (based on air temperature of 7C, and flow temperature of 35C), these units can meet large commercial needs as efficiently as ground-source models. They have fewer space constraints and lower installation costs and have been used in a wide variety of installations such as schools and communal systems. They are also effective when used to pre-heat domestic hot water, helping to increase overall system efficiencies.'

Davis is seeing a lot of interest in air-source heat pumps from specifiers, especially for refurbishment projects: 'They can be retrofitted far more easily than a ground-source system. The one barrier to [greater uptake of ASHPs] is probably planning. For example, the London Toolkit [offering advice on renewables] specifically prescribes against air-source heat pumps. That is just ignorance and lack of understanding. There is a lot of work for the industry to do to overcome [these sorts of] misconceptions.'

For those companies that are making and promoting heat pumps, this technology is viewed as a potentially superior solution to other more traditional sources, such as gas boilers or oil heating. Manufacturers are clearly keen to be able to offer specifiers a range of solutions, however, and the payback on investment

■ **Air-source heat pumps can be retrofitted more easily than ground-source ones** ■ – Chris Davis

afforded by heat pumps is likely to be boosted with the introduction of the RHI. Even without the RHI, heat pumps are being taken up by social housing providers as they refurbish domestic properties, because the technology can mean lower fuel bills for tenants (see box). This may explain why heating product providers increasingly see heat pumps as the future – and this is one bandwagon that they increasingly seem to prefer to be on, rather than risk being left behind. ●

Case study Heat pumps come to fore as homes go off the gas grid

Cottsway housing association in west Oxfordshire, UK, chose to install an air-source heat pump on a three-bedroom mid-terrace house in August 2008. The 1960s traditional brick building had already undergone a series of insulation works a few years earlier – including filling the 50mm cavity wall with rock, placing 300mm insulation in the loft, and replacing the windows and doors with double glazing and new front and rear doors.

Next, the old heating systems – storage heaters in all rooms, and a storage convector and solid fuel open fire in the lounge – were ripped out and replaced with an air-source heat pump. The property was off the gas grid.

Cottsway decided against simply connecting the house to the gas grid partly because of cost; a gas connection to the grid can cost anything from £750 to £3,500. Add on the costs of a gas boiler, tanks, pumps, pipes and radiators and he says that could increase by another £4,000.

In contrast, the air-source heat pump and its set-up, with tank, radiators and so on, costs on average £5,300 – but, with up to £3,300 funding from the Low Carbon Building programme, the heat pump was an attractive option.

During the year-long trial, the heat pump used 4,156kwh of electricity to supply all the heating and hot water, at a cost of £384,



The Pearce family say their heating and hot water bills have been cut by half after an air-source heat pump replaced electric storage heating

with the total cost of electricity consumed being £810. This is down from a total electrical consumption of 15,563kwh a year – at a cost of £1,137 in bills. Subsequently, the household's CO₂ emissions have been reduced from 9 tonnes a year to just 3.2 tonnes.

Energy generation at the property is now also being supplemented with solar thermal energy, which could generate up to 80 per

cent of the tenants' hot water in the height of summer, according to Cottsway.

The housing association also hopes that the heat pump will generate more savings when the Renewable Heat Incentive scheme takes effect.

The full version of this article can be found in the CIBSE Journal Social Housing Supplement, published with the June 2010 Journal. Visit www.cibsejournal.com

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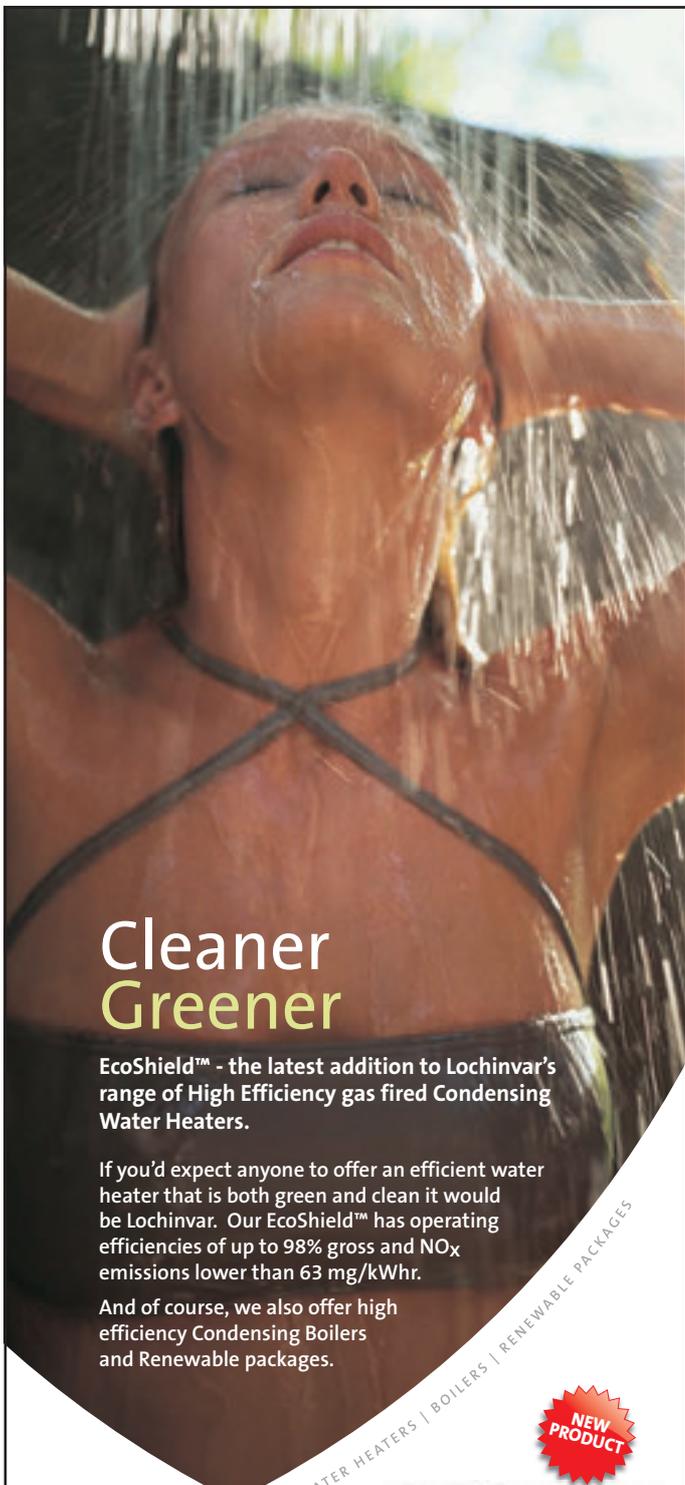


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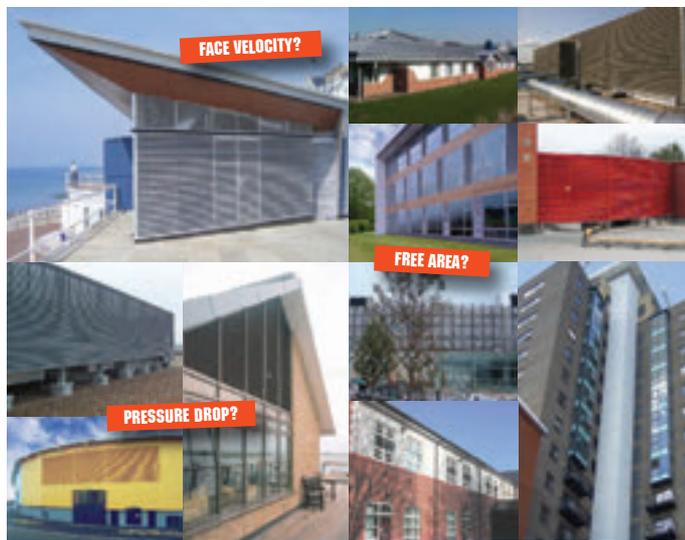


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Hot topic



Masterclass

Professor Doug King

In his second masterclass, Professor **Doug King** looks at how the natural thermal response of buildings can influence the design and control of HVAC systems

We think we know what thermal mass is all about. After all, we use it to night-cool low-energy buildings. But how many of us stop to consider how a building's thermal response will impact on the building services systems that we subsequently design?

If we don't consider the thermal response as part of our system design, then we may get into trouble. The natural response of the building fabric can have a fundamental effect on the operation of HVAC systems, especially when these are close coupled to the mass, such as in underfloor heating or TermoDeck ventilation.

An easy way to understand the periodic thermal response of a building is to consider an electronic analogy: a simple circuit with a resistor and capacitor (RC) in series (see Figure 1) behaves in the same way as the thermal mass of materials in a building. In the analogy, the resistance to thermal conduction in a material is represented by the resistor and its heat capacity by the capacitor.

A step change to the input voltage (switch) causes current to flow through the resistor, building up charge on the capacitor. Thus, the voltage across the capacitor rises over time until it reaches the input voltage, whilst the current reduces as the inverse. Exactly the same can be observed if we change the temperature at the surface of a material. Initially, heat flows into the material and its temperature rises until it reaches equilibrium with the source.

Now, by adjusting the values of resistance and capacitance, we can tune the response, or time constant, of the RC circuit relative to the periodicity of the change in input (Figure 2). As we increase the



Doug King

time constant, the output waveform tends towards a saw-tooth, smoothing out the transients and delaying the occurrence of peak amplitude. The circuit is now acting as an integrator: its output is approximately proportional to the time since the last change in input, whilst its peak value is the amplitude of the input change.

Eventually, when the time constant is long enough, the capacitor does not become fully charged before starting to discharge again and the output becomes attenuated in amplitude. At this point the circuit is acting as a low pass filter, attenuating transients whose frequency is less than the response frequency of the >

An experiment to classify the thermal response of a TermoDeck slab being conducted at the University of Bath

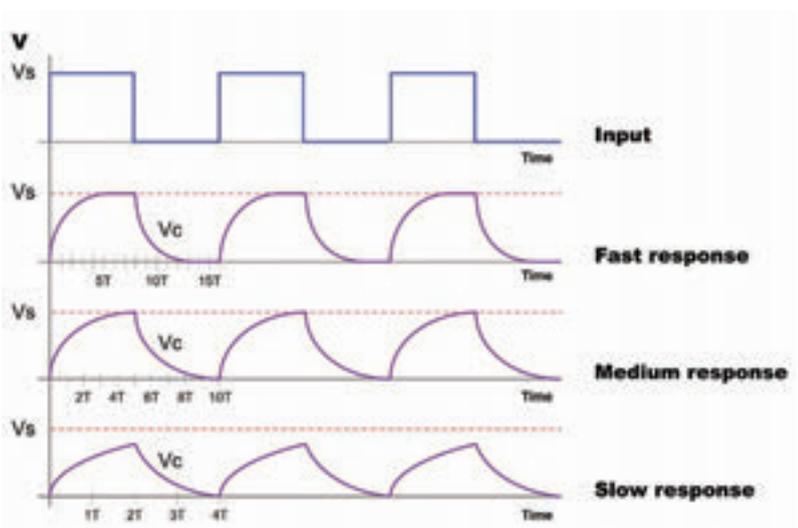


Figure 1: The simple RC circuit can be used as an analogy to thermal response in a building. When the switch is closed, current flows through the resistor to charge the capacitor. The Time Constant $T = RC$ is the time for V_c to rise to $(1-e^{-1})V_s$

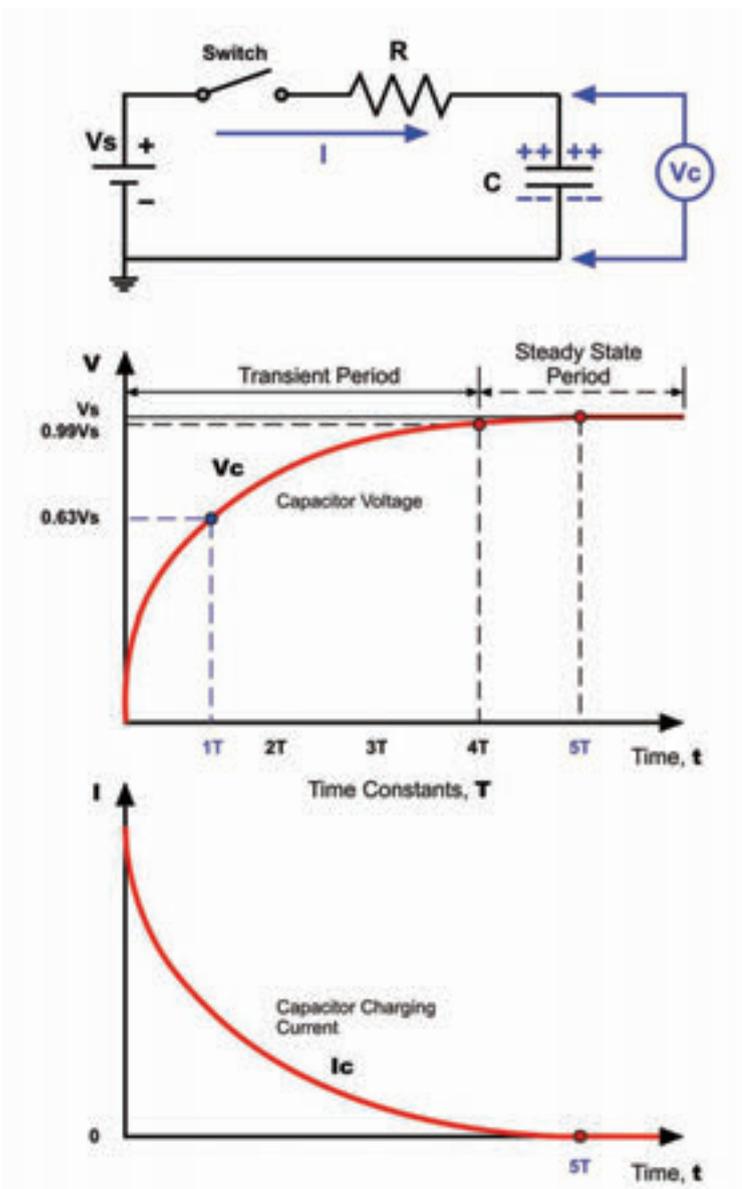


Figure 2: As the time constant (T) of the system increases the response to the input signal becomes slower. The system acts initially as an integrator and then as a low pass filter, attenuating signals of less than $5T$ duration

> circuit. At extreme the output voltage will become the time average of the input, a property that is used to smooth out ripples on DC power supplies.

We see exactly the same behaviour in buildings when we increase the thermal mass as we do by increasing the capacitance in the RC circuit. The natural response of the building begins to act as an integrator, delaying the rise in temperature. Should we be able to incorporate sufficient thermal mass, then we can not only reduce the peak temperature, but also delay the occurrence of the peak until the end of daily occupancy, thus further reducing the temperature rise experienced by occupants.

Ultimately, as we continue to increase thermal mass, the temperature of the building structure would tend towards the diurnal average of the space temperature as it filters out short-term changes.

Now, few things in nature produce square waves; furthermore, we may need to consider complex

composite waveforms when multiple periods are involved, such as diurnal and seasonal variations in temperature. The effect of thermal mass on these analogue waveforms is essentially the same, but the analysis is more complicated and we'll come back to this subject in the future. For now I want to stick with simple step change inputs, such as the start and end of daily occupancy gains or switching cycles of HVAC plant.

The crux of the matter when it comes to designing HVAC systems is: if the natural response of the system is of the same order as the period of the change in the heating or cooling input, then the inertia of the thermal mass will act as an integrator. An integrator is a fundamental part of most HVAC controls but, if

■ We must ensure that we understand the natural response of the building fabric when designing any heating or cooling system ■

we don't allow for the natural integral effect of thermal mass, the combination can lead to the accumulation of very large errors and the loss of control.

This can manifest itself in many ways, from large temperature overshoots in underfloor heating systems, to the increase in overheating over a period of days with TermoDeck-like systems.

Some of the most difficult issues to identify often occur when refrigeration plant is coupled to high thermal mass systems, such as in ground-source heat pumps (GSHP) or embedded slab cooling systems. I am often asked to diagnose apparently intractable problems with the operation of chillers and heat pumps. GSHPs in particular are now sold almost routinely as plug-and-play devices.

However, the step control nature of most refrigeration machines can cause great problems if the hydraulic systems are not designed to account for the transients caused by the delay in heat transfer into the ground or into the slab.

In an underfloor heating system the primary heating circuit is highly tolerant to varying return water temperatures that result from the slow response of the thermal mass to a change in flow temperature. Refrigeration machines, on the other hand, are not at all tolerant to the spikes in return temperature that occur before the thermal mass has time to soak up the change.

If the natural response of the building significantly exceeds the periodicity of the control changes, then it will act as a low pass filter and we may not be able to control the temperature at all. This is not common, but can occur in extremely heavy buildings like churches, or where the heating or cooling system is actively coupled to the thermal mass as in TermoDeck or embedded slab heating or cooling.



In an underfloor heating system the primary heating circuit is highly tolerant to varying return water temperatures

Such systems may have response times in excess of the daily occupancy period and so cannot be operated on a conventional daily on-off cycle. The thermal mass needs to be charged up to stabilise at close to the operating temperature before it will start to respond to control changes. To operate the heating or cooling on a simple occupancy cycle would result in the thermal mass filtering out such short term changes and instead tending to follow longer term swings in the ambient temperature. This may lead to a building becoming uncomfortable a few days into a hot spell, with no means of respite.

So, thermal mass is not just significant for night cooling in naturally ventilated buildings. We must ensure that we understand the natural response of the building fabric when designing any heating or cooling system. But we must also ensure that the controls design and the subsequent operation of the building also take account of the thermal response.

These issues will become ever-more important as we seek increasingly low energy solutions for buildings. We must ensure that we communicate our design intentions throughout the supply chain and inform the end users of our buildings how the natural response will impact on their experience of the buildings, and how to operate them to maintain low energy consumption.

If we do not do so, we risk installing systems which, while nominally of the correct capacity, may not actually be able to control the building to a comfortable temperature, or may result in excessive energy consumption to do so. ●

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Doug King is principal of King Shaw Associates and visiting professor of building physics at Bath University. He was author of the Royal Academy of Engineering report, *Engineering a Low Carbon Built Environment*.

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Mini combined heat and power applications

Building regulations, planning consent requirements, and legislation in the UK and Europe are providing building operators and designers with more opportunities to consider and adopt low and zero carbon solutions

A low carbon solution does not necessarily mean renewable technologies, as the requirement to provide power, heating and cooling for a building may exceed any realistically available local renewable resources; or there may be no appropriately oriented or available roof space. Combined heat and power (CHP) products have been applied and operated successfully as one of the solutions to reducing greenhouse gas emissions through displacing boiler fuel and grid-supplied electricity.

Over the last five years the uptake of mini-CHP units has increased in the UK, as the concept is scaled by manufacturers to products with electrical outputs of less than 10kWe (peak kW electrical output). This has broadened the range of residential and commercial projects that could benefit from the potential economic and environmental benefits offered by CHP.

This CPD module outlines the application of mini-CHP products, which we define as those with an electrical output of between

5kWe and 30kWe – representing the integrated modularised units that have come to the marketplace within the last five years. The traditional definition of mini-CHP goes up to several hundred kW.

Combined heat and power technology

CHP can be an efficient way of producing usable heat and generating electricity simultaneously at the point of use from a single fuel. By generating heat and electricity from a single source, CHP can deliver overall fuel efficiencies well in excess of 75%. When compared with electricity generated from a centralised power station, and the use of heat only boilers, CHP can reduce primary energy needs by up to 30%. Depending on relative fuel prices this can reduce energy costs as well as reduce harmful greenhouse gas emissions such as carbon dioxide (CO₂).

CHP can offer energy cost savings by reducing the amount of electricity imported from the local supply company, and by displacing fuel used by other heating and

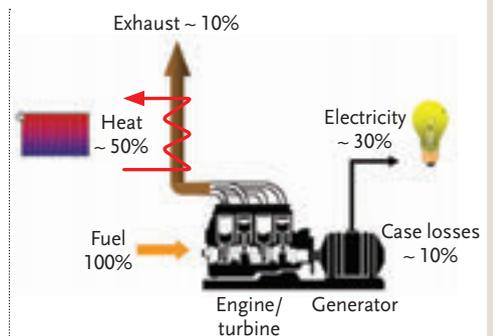


Figure 1: Basic operating principle of mini-CHP system

hot water-generating appliances on the site. For every unit of electricity generated by the CHP plant, around two units of potentially usable heat are produced through the use of internal heat exchangers, or external heat recovery equipment. This heat can be used to help satisfy space-heating needs, to support the production of domestic hot water, or for process needs.

At the heart of mini-CHP units (such as that shown in Figure 1) is likely to be a gas-fuelled reciprocating engine; or, for very >

> small units, a Stirling engine. (See <http://chp.defra.gov.uk/cms/gas-engines> for an excellent overview of gas engines.)

Considerations for CHP applications

The primary consideration should be whether the application requires the simultaneous need for electricity and heat over extended operating periods, typically between 5,000 and 6,000 hours a year. The longer the operating hours, the greater the economic and environmental benefit delivered to the end user. For larger CHP installations, typical applications would naturally include sizeable consumers of hot water and power such as hospitals, universities, large chemical plants and paper mills. However, social housing developments and smaller properties such as hotels, leisure centres, nursing homes, and sheltered accommodation can all provide suitable applications for mini-CHP.



Figure 2: 5.5 kWe mini-CHP Unit installed in plant room of sheltered housing scheme

The mini-CHP unit would normally be selected to match the base heating load of the site (as shown in Figure 3) to maximise the running hours. The success of all forms of CHP depend on the integration with the building's heating system – particularly with engine-based technologies. Matching the CHP unit to the base thermal load must be the priority (that is, the system should be sized on a heat-led basis and not primarily on the electrical load). The CHP unit must be installed as the lead heating appliance, with existing or new boiler plant providing additional capacity to satisfy peak demand.

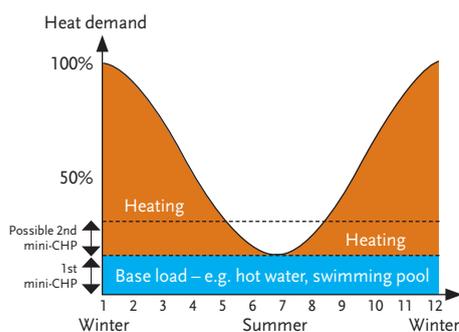


Figure 3: Sizing CHP for base thermal load

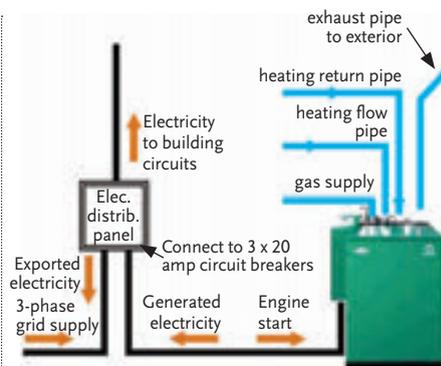


Figure 4: Electrical integration of mini-CHP units

Electrical integration

From an electricity generating perspective, the CHP unit should be selected to meet the site's base load. This avoids or minimises the 'spilling' or exporting of electricity to the grid network, which at present on many sites would not offer a financially viable proposition. The key to maximising the economic benefit of the CHP scheme is to utilise all the electricity generated on site.

When operating in parallel with the local supply network, any electricity required above the output of the CHP unit would be imported from the grid network. For mini-CHP units that generate less than 16A per phase, connection and parallel operation with the electricity supply infrastructure should be carried out in accordance with Engineering Recommendation G.83/1 [1], which is more 'fit-and-inform', rather than a formal connection agreement with the local Distribution Network Operator (DNO). For those CHP products generating more than 16A, a formal connection agreement between the DNO and the end user is required under the requirements of Engineering Recommendation G.59/1 [2].

Depending on the electrical output and the current produced, most mini-CHP units will generate 3-phase electricity. For example, a commercially available unit has an electrical output of 5.5kWe, at 415V, 3-phase, 50Hz. This equates to approximately 9A per phase, and as such is below the threshold of G.83/1. This unit generates electricity equally across the 3-phases. It is therefore important to ensure that the electrical load that is to be supported by the mini-CHP unit is also relatively well balanced across the three phases. Otherwise, in the event of an under-loaded phase (with the load say less than 9A in the case of this unit), electricity will be erratically 'spilled' on the grid with loss of benefit to the end user. This is true of both new-build and refurbishment markets, but potentially is more of an issue with the latter.

If there is a 3-phase supply and distribution

board in the plant room in which the CHP unit is installed, then electrical integration can be made locally rather than connecting at the main electrical incoming supply point, which may be some distance from the plant room.

Hydraulic integration

The installation of a mini-CHP unit should be no more complex than a conventional heating boiler. The plant room should be ventilated, taking into consideration the combined outputs of the mini-CHP unit and all other heating appliances present.

To maximise the annual operating hours, the CHP unit should be hydraulically integrated and controlled as the lead heating appliance. Care must be taken when considering the point of integration of the CHP unit flow and return connections.

If the water flow through the CHP unit is relatively low compared to the overall water volume in the system, then the CHP unit can be connected to pre-heat the return circuit water prior to entry into the main boiler plant. This results in the primary heating appliances not firing and their consuming less fuel to lift the water-flow temperature to the desired design set-point.

If the water flow through the CHP unit is relatively high compared to the system volume, then if connected as a pre-heat to the heating plant, there is a strong likelihood that the connection of the CHP will have an adverse effect on boiler efficiency, particularly if they are of the condensing type. Here reducing carbon emissions through the use of CHP would be negating carbon savings elsewhere in the heating system.

In both Figure 5 and Figure 6 the CHP unit has 'access' to both the heating and hot water loads via the low loss header. The ability of the CHP unit to serve both the heating and hot water loads is necessary to maximise the annual operating hours.

Depending on the base thermal load of the building, it may be prudent to install a buffer tank between the CHP unit(s) and the heating/hot water circuits. This is to prevent frequent cycling of the CHP unit during periods of low thermal load, which could lead to premature engine failure.

For larger buildings, multiple mini-CHP units can be installed, as in Figure 7, on the premise that there are sufficient thermal and electrical base loads to support the combined outputs. The installation of multiple units versus a single larger CHP product is supported by an increase in operational flexibility, provides redundancy and improves load matching.

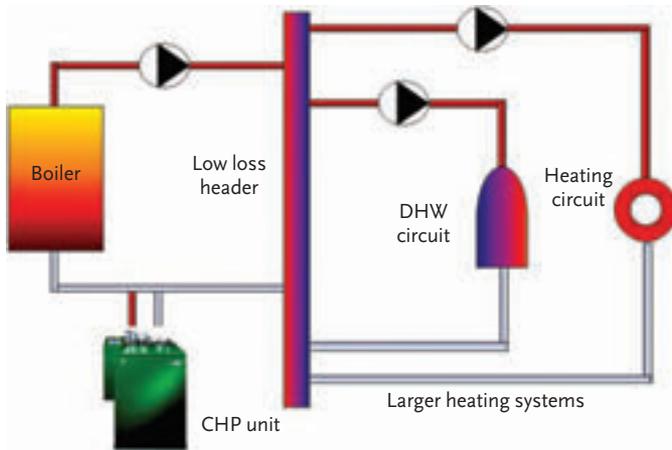


Figure 5: Mini-CHP hydraulic integration with larger heating systems

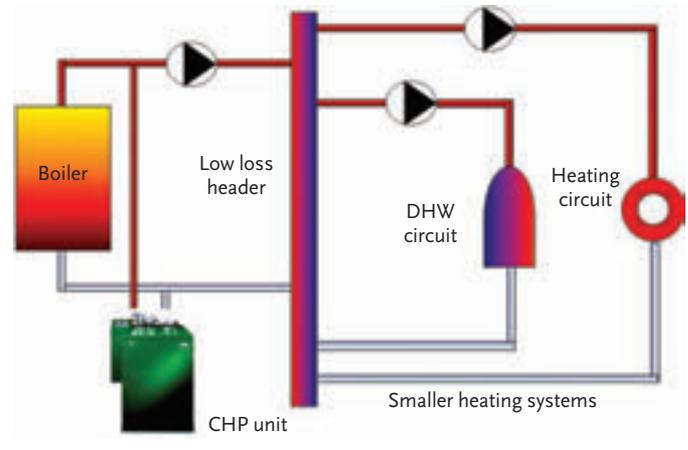


Figure 6: Mini-CHP hydraulic integration with smaller heating systems



Figure 7: Three mini-CHP units installed in commercial plant room

Environmental and economic case for CHP

The environmental case for CHP is based around the displacement of primary heating appliance fuel and grid supplied electricity. The CO₂ reductions offered by CHP are a function of the emission factors for natural gas or LPG, and grid-supplied electricity depending on the generation mix being operated in the UK. These are [3]:

Grid-supplied electricity -	0.529 kgCO ₂ /kWh (displaced electricity)
Natural gas -	0.198 kgCO ₂ /kWh

Hence, a 5.5kW output commercially available mini-CHP unit would save around 8,700 kg CO₂ per a year. This is on the basis of annual operational hours for the unit of around 5,600 (or 17 hours a day, 365 days a year, with a 90% availability), and displacing heat from the main boiler plant with an efficiency of around 80%.

The economic case for CHP is driven by what is often referred to as the ‘spark gap’. This is the ratio of the tariff for the imported grid-supplied electricity being displaced by the CHP unit and the cost of the fuel input. When considering CHP, the term ‘tri-generation’ or ‘CCHP’ is used to include cooling (using absorption refrigeration) as a means of extending the benefit of the heat produced by a CHP unit. However, this would not normally be economic for small or mini-CHP systems.

A standardised method to compare the effectiveness of CHP systems is to determine the quality index (QI) and power efficiency as defined by the DECC CHPQA programme [4]. This provides the principal evidence required for determining eligibility of CHP Schemes for Climate Change Levy (CCL) exemption and Enhanced Capital Allowances (which provide businesses with 100% first-year tax relief on qualifying capital expenditure).

For gas powered mini-CHP, the quality index can be determined from

$$QI = 249 \times \eta_{\text{power}} + 115 \times \eta_{\text{heat}}$$

where:
 Power Efficiency (η_{power}) = Total Power Output (MWe) / Total Fuel Input (MWh)
 Heat Efficiency (η_{heat}) = Qualifying Heat Output (MWhth) / Total Fuel Input (MWh)

The constants 249 and 115 are related to the alternative electricity supply and alternative heat supply options that are being displaced by the CHP unit – and vary for different applications of CHP [4]. Total Power Output is the total annual power generation from a CHP scheme as measured at the generator terminals. Qualifying heat output is the amount of useful heat supplied annually from a scheme that can be directly shown to displace heat that would otherwise be supplied from other sources. The total fuel input is the annual fuel input to a CHP Scheme.

A QI of 100 is the basic benchmark, and QI should be at least 105 with a minimum power efficiency of 20% in order to help qualify for government incentives, enhanced capital allowances and CCL exemption. The fuel consumption to the CHP unit will require a dedicated gas meter, and the heat and electricity output will need metering.

Conclusion

In a time when there seems to be huge industry focus on renewable technologies, whether such solutions are generating electricity or

heat, CHP can play its part as a low carbon solution in achieving the increasingly stringent emission reduction targets, whatever the driver.

By the nature of its lower electrical and thermal outputs, mini-CHP now presents the benefits offered by CHP to a much wider range of buildings.

© Yan Evans and Tim Dwyer

Further reading

These publications provide comprehensive background information on CHP but tend to focus on larger systems than the mini-CHP as defined by this article.

1. Building Applications Guide BG 2/2007 CHP for existing buildings. Guidance on design and installation, BSRIA 2007
2. Applications Manual AM12 – Small-scale combined heat and power for buildings, CIBSE 1999
3. Technical Guide to the Connection of Generation to the Distribution Network, DTI, 2003

References

1. *Engineering Recommendation G.83/1-1, Recommendations for the connection of small-scale embedded generators (up to 16A per phase) in parallel with public low-voltage distribution networks.* Ofgem, 2008
2. *Engineering Recommendation G.59/1, Recommendations for the Connection of Embedded Generating Plant to the Regional Electricity Companies' Distribution Systems.* Ofgem, 1995
3. *The Government's Standard Assessment Procedure for Energy Rating of Dwellings.* Building Research Establishment, 2010
4. *CHP QA – Quality Assurance for Combined Heat and Power.* www.chpqa.com

Module 19

August 2010

1) By generating heat and electricity using well designed and operated CHP what overall efficiencies are possible?

- A Up to 25%
- B 25% to 40%
- C 40% to 60%
- D 60% to 75%
- E 75% and over

2) For successful CHP operation, what is the suggested minimum number of operating hours per year?

- A Approx 1,000 hours
- B Approx 2,000 hours
- C Approx 3,000 hours
- D Approx 4,000 hours
- E Approx 5,000 hours

3) For successful operation of a mini CHP system it is likely that all except one of the following will be required. Which one?

- A The system should be sized on a heat led basis
- B The CHP system should be installed as the lead heating device
- C They should generate less than 16A per phase
- D The system should be sized to meet the base heating load
- E Utilise the maximum amount of electricity on site

4) When considering multiple mini-CHP units in place of a single larger CHP unit, which of the following is unlikely to be true?

- A increase operational flexibility
- B provide redundancy
- C reduce capital cost
- D improve load matching
- E suitable for larger buildings

5) What QI value is required as part of the qualification requirement for government fiscal benefits?

- A 20
- B 100
- C 105
- D 115
- E 249



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In today's construction environment does Flameshield have an equal?

Flameshield's non-coated range of fire resistant ductwork has been successfully tested and available in the marketplace since 2003. Ever increasing demands are being made to ensure that all parties concerned in the construction industry, be they developers, designers, regulatory/enforcing authorities or contractors, achieve the highest standards in quality, safety and the protection of the environment. As a fire duct product which has successfully achieved the highest standards technically without the need for any coating material, Flameshield's fire resistant ductwork offers environmental benefits that other, coated, fire duct products just cannot achieve.

Flameshield has received LPCB (Loss Prevention Certification Board) certification for the product itself ensuring full compliance with the requirements of BS476 Part 24 and LPCB ISO 9001:2008 certification for the manufacture of its fire rated ductwork and is the only non-coated product being listed in the "Red Book" Volume 1: List of Approved Fire and Security Products and Services. Flameshield has been assessed by BRE Global as being suitable for use as a smoke extract system for a period of up to 2 hours. In addition Flameshield have carried out a low temperature plate test under the auspices of BRE Global utilising the temperature classifications described in BS 7346 Part 2 (BRE Test No. 259742B) and can offer its non-coated fire duct system for smoke extract applications rated at 300 deg. C with no external insulation being required. All of these standards have been reached without the need for any additional coatings.

While coated products might reach the standards required to meet statutory fire regulations, can they be considered "Equal" in comparison to Flameshield? Is there any other fire duct product which can offer these benefits while at the same time significantly reducing its impact on the environment?

The environmental benefit of non-coated fire rated ductwork

By using the Flameshield non-coated system, a minimum of six stages are eliminated. Also, due to the unique CGF (Continuous Girth Flange) system used by Flameshield, there is a reduction in the manufacturing process as fewer ancillary duct components are required i.e. no separate flange system to be manufactured, transported, cut, fitted and sealed.

Flameshield's non-coated system is also easily recyclable whereas other, coated, products have to be disposed of in a more controlled manner. Coating products are made from mined materials, require energy and water for application and cleaning, heat for drying and produce waste by-products which have to be disposed of. All of these have a negative impact on the environment. The estimated carbon reduction by using Flameshield is, therefore, very significant when compared to other, coated, fire-rated ductwork systems. Flameshield's non-coated system requires none of the above which greatly reduces its impact on the environment both now and in the future.

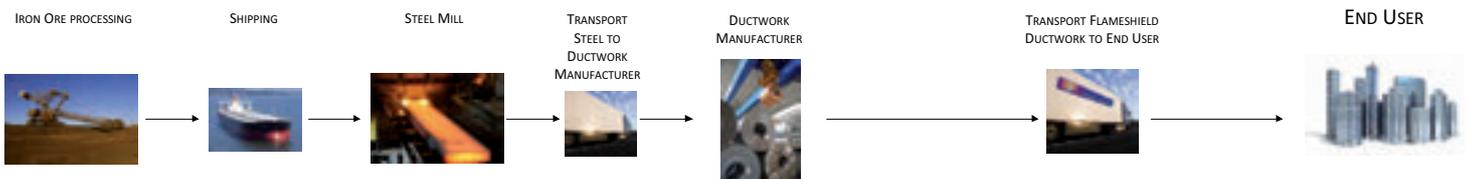
"Equal or Approved?"

In conclusion, Flameshield fire rated ductwork is a product for the 21st century. Its capabilities come from the use of the latest design and manufacturing technology. There is no requirement for the use of spray-on coatings which use energy in their production, transportation, curing and disposal of associated waste products.

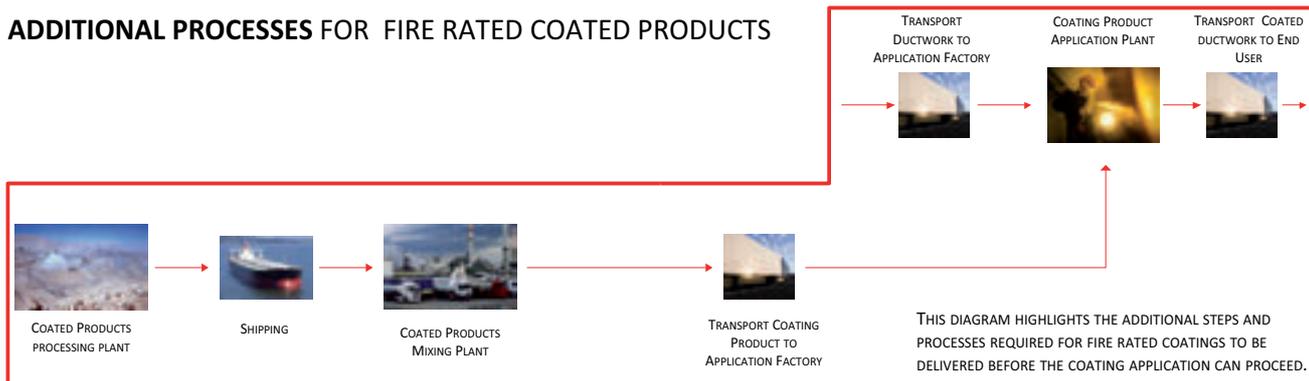
All of your fire rated ductwork needs can be met with a cost-competitive, modern, clean, environmentally friendly product which has no susceptibility to coating damage whilst being transported or installed. The product requires no on-going maintenance once installed, is aesthetically pleasing and has good turnaround times all year round.

With the aforementioned in mind, if a coated product isn't equal in all aspects, should you approve it?

FLAMESHIELD NON-COATED FIRE RATED DUCTWORK ENVIRONMENTAL PROCESS



ADDITIONAL PROCESSES FOR FIRE RATED COATED PRODUCTS



For further information please visit our website at www.flameshield.org

Cathedral effect helps save energy

Mechanical and electrical contracting engineers, J & B Hopkins has used its headquarters in Fareham to demonstrate a highly energy efficient way of controlling the temperature within almost any building, using low temperature heating and high temperature cooling.

Where managing director Paul Hopkins and his team have been truly innovative is in installing underfloor heating on both



floors, as well as including ceiling panels with embedded pipe work to allow for cooling or heating via the ceiling.

This combination radiates heat from both the floor and the ceiling during the heating season, or in the summer cooling season, creating an artificial thermal mass that Hopkins calls the 'cathedral effect' where heat from the occupants and electrical equipment is absorbed by the cooler ceiling and floor. This is typically kept at between 16-19 deg C.

This means that cooling can be provided at much higher temperatures or heating at lower temperatures, saving overall energy by reducing the high and low temperature requirements needed with traditional heating and cooling methods.

The company is able to use a flow temperature of only 30 deg C in heating mode, and in cooling the traditional need for temperatures of 10 deg C or less is a thing of the past. The overall effect is one of comfort in a steady condition.

● For more information email Paul.Hopkins@jbhopkins.co.uk or call 01489 584706

MHS Boilers at heart of new urban village



MHS Boilers has supplied four 1,400kW Monomax gas-fired, fully modulating, pressure jet boilers powered by Ecoflam burners and two Ultramax R3601 condensing boilers to one of London's newest 'urban quarters' – High Point Village, Hayes.

Developed by the Ballymore Group and designed by Rolfe Judd architects, High Point Village is a major regeneration scheme of 570 residential units, a hotel and a retail development. The apartments have been created to a high specification.

● For more information visit www.mhsboilers.com

UK's first online task management system

Mechanical and Electrical (M&E) companies across the UK look set to benefit from next week's launch of TaskAdviser – the UK's first online Task Management System. Owned by MMB Software Ltd, TaskAdviser enables M&E companies to automate the production of job sheets and invoicing. Maintaining such control over the business is vital for the success of any enterprising M&E firm.

● For more information visit www.taskadviser.com or email Kevin.shipp@taskadviser.com



Menlo³ – Freedom to create with the power to comply

In anticipation of forthcoming changes to lighting industry standards, Thorn has launched a new range of modular fluorescent luminaires: Menlo³.

The dual component design, with market-leading light output, achieves efficacies of up to 62 luminaire lumens/circuit Watt, far exceeding the target value of Part L of the Building Regulations. It also delivers excellent levels of cylindrical illuminance and facial modelling, as recommended by the awaited update to EN 12464-1 (Lighting Indoor Workplaces).

● For more information visit www.thornlighting.com



Natural ventilation in schools

It is well known that when CO₂ levels rise in school classrooms, concentration levels drop. As 'air conditioning' is becoming unacceptable in most cases, due to the heavy use of energy, natural ventilation solutions are rapidly becoming standard in our new and refurbished schools. SE Controls has launched a brochure titled 'Natural Ventilation in Education Buildings', guiding the specifier through the current legislation and the systems that can be specified.

● For more information visit www.secontrols.com or call 01543 443060

Rehau cable management in £86m college project

Rehau has supplied the cable management solution for the Cat 6a wiring installation at the newly opened £86m MidKent College campus in Gillingham, Kent. The company's PROFILA data cable management system has been installed throughout the three buildings and two huge glass pavilions that make up the new campus. Rehau was chosen for the project by M&E contractors, Balfour Engineering Services, working on behalf of main contractors Kier.

● For more information email Jo.Price@rehau.com or call 01989 762600



Products & Services

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Weatherite provides hot water system for John Lewis



An energy efficient hot water storage system is the latest successful project completed by Weatherite Building Services for the John Lewis Partnership.

The system, designed and installed for the retailer's Aberdeen store, includes direct-fired Andrews water heaters, which require minimal water storage and have resulted in significant savings in running costs.

Weatherite managed the entire project, carrying out the work to a tight deadline that involved minimum disruption to the normal operation of the store.

● For more information call 0121 665 2266

Real World Energy Solutions handles complete office refurb

Property improvement specialist, SEHBAC Commercial, brings experience and innovation to clients' projects and can provide a complete construction package suited to any development.

The full scale and benefits of this co-operative and co-ordinated approach are being made apparent in an on-going project in Ipswich at the Claydon Court office complex, the transformation and modernisation of which is being managed by Real World Energy Solutions (RWES), part of SEHBAC Commercial.

● For more information visit www.sehbaccommercial.co.uk



Thinking Buildings Universe – your information centre



Knowing where we can go to access information quickly and easily is something that can save us incalculable amounts of valuable time. The Thinking Buildings Universe from Grundfos now offers building services professionals a centralised information point that is a one-stop shop for commercial buildings services' pump applications.

This site has been designed to work as an aide during planning and specification, as well as when selections have been made.

● For more information email uk-sales@grundfos.com or call 01525 850000



Classroom ventilation units

Aircraft Air Handling's 260mm-high classroom ventilation units: silenced to nr25; plate recuperator 60% efficient; air volume 0-500 litres. Heating: LPHW/ ELECTRIC. Cooling: CW/DX. Larger air volumes and bespoke units are available.

● For more info visit www.aircraftairhandling.com

DANLERS energy-saving time lag switches

DANLERS design and manufacture a range of indoor and outdoor electronic time lag switches for lighting or heating loads. They are ideal for saving energy and can be used in a variety of situations, such as; offices, factories, schools, colleges, warehouses, hospitals, stairwells, hallways and many other applications.

Pressing the button switches the load on, and it switches off automatically after the time lag has elapsed, thus saving energy by ensuring lighting or other loads are not left on unnecessarily. The time lag settings are adjustable and being electronic are consistent and reliable. They are easy to install, using the existing wiring in a building, which makes them suitable for both retrofitting and new builds. All DANLERS time lag switches are manufactured in the UK and come with a five-year warranty.



● For more information call 01249 443377, fax 01249 443388, email sales@danlers.co.uk or visit www.danlers.co.uk



Sandwell's new Q3 academy feature Oventrop valves for heating control

Oventrop valves were selected exclusively by Interserve Engineering Services for the heating services at the new £30m Q3 Academy in Sandwell, West Midlands, to simplify the purchasing procedure and facilitate any subsequent servicing.

Oventrop equipment was chosen for cost, quality and fitness for purpose. Q3 Academy was built by BAM, which received a gold award from the Considerate Constructors Scheme for its work, and was the firm behind the opening venue for the FIFA World Cup in June.

● For more information about Oventrop call 01256 330441 or visit sales@oventrop.co.uk

Products & Services

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Victaulic introduces new pipe preparation tool



Victaulic, the world's leading manufacturer of mechanical pipe-joining systems, has a tool available to prepare pipe for efficient and reliable flame-free joining.

The VE460 shop fabrication roll grooving tool is designed for use with pipes from 100-1,500 mm/4-60 inches in diameter, depending on pipe material. It is suitable for preparing pipes to be joined with Original Groove System (OGS) couplings for 100-300 mm/4-12 inches sizes or the Advanced Groove System (AGS) ranging from 350-1,500 mm, or 14-60 inches.

● For more information visit www.victaulic.com

TITAN Products expands energy efficient BACnet range

TITAN Products announces the release of two new BACnet enabled control products operating to ANSI/ASHRAE Standard 135. The CCI-2X485 is a Modbus to BACnet gateway with a 128 Modbus object mapping capability and designed to interface third party Modbus control products onto a BACnet system. The CCI-2242 BACnet controller is a multi-purpose product with inputs and outputs that can be used to monitor and control building services plant or configured to customer specific applications.

● For more information visit www.titanproducts.com or call +44 (0)161 406 6480



Easy as ABC with new Sontay sensor



Enabling teaching staff to easily monitor and maintain ventilation levels and indoor air quality, Sontay has launched the GS-CO2 product range of carbon dioxide, temperature and humidity and monitoring devices. Offering full Building Schools for the Future Building Bulletin 1 compliance, the sensor series combines ease of operation with real-time monitoring and the ability to swiftly adjust ppm CO2 levels. The range delivers instant and accurate control over air quality through a simple control interface.

● For more information email sales@sontay.com

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Events & Training

NATIONAL EVENTS/ CONFERENCES

- **18 Sep 2010** **The YEN Summer Ball** Cambridge
Young Engineers Network event.
www.cibse.org/yen
- **22-24 Sep 2010** **National Housing Federation Annual Conference** Birmingham
Affordable housing event.
www.housing.org.uk
- **01 Oct 2010** **CIBSE Intelligent Buildings Seminar** London
Saving costs and delivering sustainability. www.cibse.org/ibg
- **01-02 Oct 2010** **AECB Anniversary Conference** Powys
Talks, workshops, demonstrations and more. www.aecb.net
- **06-07 Oct 2010** **Bioenergy 2010** Warwickshire
Latest developments/legislation.
sjffreni@r-e-a.net
- **12 Oct 2010** **Hinton Lecture and Dinner** London
Speaker Dr Lyn Evans.
Helen.berrington@raeng.org.uk
- **12-14 Oct 2010** **Energy in Transition** London
Meeting future energy demands.
events@energyinst.org
- **17-18 Oct 2010** **ACE GCC 2010 Conference** Abu Dhabi
Risk management and more.
nbari@acenet.co.uk
- **19 Oct 2010** **What's New About Part L 2010?** London
Updates for the building services sector. www.cibsetraining.co.uk

SOCIETY OF LIGHT AND LIGHTING

- Visit the SLL pages via www.cibse.org
- **07 Oct 2010** **SLL Masterclass – The Low Carbon Challenge** Birmingham
Julie.Kane@sll@cibse.org
 - **19 Oct 2010** **Energy in Lighting** London
Carbon Reduction Commitment and design. sll@cibse.org
 - **28 Oct 2010** **SLL Masterclass – The Low Carbon Challenge** Leeds
Julie.Kane@sll@cibse.org

CIBSE REGIONS

- **12 Aug 2010** **North east region annual golf day – the CIBSE Trophy** Stableford
Guests welcome.

carr-john@sky.com

- **17 Aug 2010** **Zero carbon buildings workshop** Chelmsford
Half-day workshops with lunch. Robert Diamond
01206 224270
- **15 Sep 2010** **The benefits of stainless steel in above- and below-ground drainage applications** Manchester
Speakers: Frank Nethenwood and Simon Vautrety (Blucher UK).
doug@dpconsultants.co.uk
- **16 Sep 2010** **Update on changes to Building Regulations Part L 2010** Chichester
An overview of the likely changes.
Malcolm Atherton 0161 872 4811
- **17 Sep 2010** **Southern Region Golf Challenge** Chichester
A fun golfing day out.
doug@dpconsultants.co.uk
- **21 Sep 2010** **UPS and IT Data Centres** Northampton
Further details to be advised.
denseldavy@ntlworld.com
- **17 Nov 2010** **Energy Efficiency Opportunities from Zip Heaters** Manchester
Speaker: Adrian Hippert.
Malcolm Atherton 0161 872 4811 or
m.atherton@dssr.co.uk

CIBSE/OTHER TRAINING

- **07 Sep 2010** **Air conditioning inspection training** London
How to undertake inspections and become accredited by CIBSE.
www.cibsetraining.co.uk
- **21-22 Sep 2010** **LCC/EPC training course** Birmingham
Becoming Low Carbon Consultants and Low Carbon Energy Assessors.
www.cibsetraining.co.uk

CPD TRAINING

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

BUILDING REGULATIONS

- **08 Sep 2010** **Part L Building Regulations 2010** London
- **14 Sep 2010** **Part L Building Regulations 2010** Manchester
- **22 Sep 2010** **The Carbon Reduction Commitment (CRC)** London
- **23 Sep 2010** **Energy Strategy Reports** London
- **28 Sep 2010** **Part L Building Regulations 2010** Birmingham
- **07 Oct 2010** **Part L Building**

CIBSE to host HEVAR training session



With much debate on the future of the building services agenda in the UK, CIBSE will host a dedicated session on *The Law, the Money and You* at London HEVAR on 23 September.

The educational event will see a number of topics covered, courtesy of CIBSE, including an update on Part L 2010 of the Building Regulations; buildings post occupancy and their users' needs; and air conditioning issues.

Speakers include: Richard Hipkiss of energy specialist, i-Prophets; and Darren Jones of Low Carbon UK.

Jacqueline Balian, managing

director, CIBSE Services, said: 'The timing of this year's London HEVAR will enable CIBSE to help you implement austerity measures and keep on the right side of the law, with this session focusing on the law, the money and you.'

London HEVAR is a two-day show for the UK's heating and ventilating industry.

It starts on 22 September at the Royal Horticultural Halls, London.

For free registration to the exhibition and seminar programme, and for further information on the event, visit www.hevar.co.uk

Regulations 2010 Liverpool ENERGY EFFICIENCY

- **21 Sep 2010** **Introduction to Energy Efficiency** London
- **22 Sep 2010** **The Carbon Reduction Commitment (CRC)** London
- **22 Sep 2010** **Energy Strategy Reports** London
- **06 Oct 2010** **Low carbon buildings and energy infrastructure for local authorities** London
- **MECHANICAL SERVICES**
- **15 Sep 2010** **Mechanical services explained** Birmingham
- **15 Sep 2010** **Design of heating and chilled water pipe systems** London
- **16 Sep 2010** **Design of ductwork systems** London
- **12 Oct 2010** **Introduction to Building Services** London
- **PUBLIC HEALTH AND WATER**
- **09 Sep 2010** **Sanitary and**

rainwater design using BSEN 12056:2000
London

FIRE SAFETY

- **23 Sep 2010** **Control of door release arrangements (half-day course)** London
- **05 Oct 2010** **Part B (Fire Safety) of the Building Regulations** London
- **ELECTRICAL SERVICES**
- **28 Sep 2010** **Electrical services explained (three-day course)** Birmingham
- **14 Oct 2010** **Introduction to BS 7671:2008 requirements for electrical installations** London
- **PERSONAL DEVELOPMENT**
- **16 Sep 2010** **Presentation Skills for Engineers** London
- **06 Oct 2010** **Practical Project Management** London

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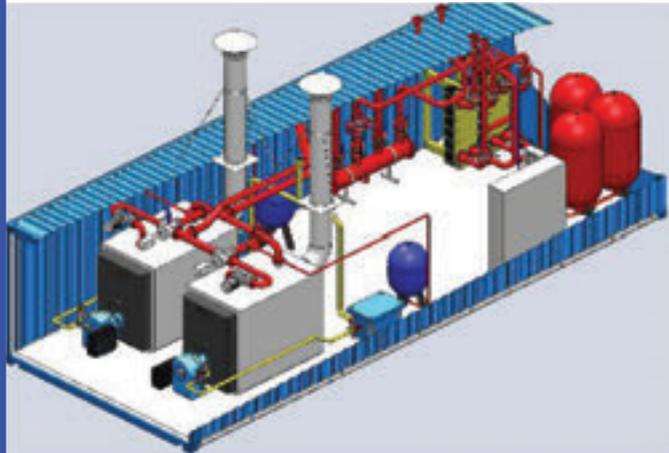
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Ref: BAR441/JA

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Ref: BAR406/CB

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Ref: BAR439/PA

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Engineering's 100mph lifestyle

Living life in the fast lane comes with the territory in the Middle East, explains Hoare Lea's **Andrew Morris**

Working in the Middle East is like nothing else on earth, enthuses Andrew Morris, director and general manager of Hoare Lea's office in Abu Dhabi.

Morris has been co-ordinating activities for the consulting engineers in the Middle East now for two years, overseeing a number of schemes. 'The sheer scale and speed of most projects is simply staggering,' explains Morris, 'and being part of that is extremely exciting. And after work, where else in the world can you snow board in the morning, sail in the afternoon and then drive off-road into the desert to enjoy a BBQ under the stars? It is, without doubt, a 100-mile-an-hour lifestyle, but never dull ...'

Initially, he was involved with the many details of company formation, local licenses and logistical essentials. But now his focus is business development. 'I now have the enjoyable role of co-ordinating our enthusiastic and talented engineers in delivering practical solutions. This week is particularly busy with Hoare Lea's Estidama team presenting at the Middle East Council for Offices launch event and running workshops on a new office development on Al Raha Beach.'

The 44-year-old describes communication as an essential – and very enjoyable – aspect of his role, but he confesses the best part of his job is the variety of work and the highs that go with the hard-earned successes on project wins: 'The melting pot created by the different cultures in the region is fascinating.'

Currently he is working on a number of projects, including a hospital in Al Ain and conducting energy studies on key buildings in Abu Dhabi City, as well as generating bid opportunities and making submissions: 'There is always something to be done, and it is always required rapidly.'

In fact, the work never seems to stop, muses Morris: 'I'm not sure



"The melting pot created by the different cultures in the region is fascinating"

you ever leave work when living in the Middle East. I am often busy in the evening communicating with the UK and socialising with fellow professionals and clients. The line between socialising and business is blurred – for example, last night at a social, I met a new client and agreed to meet next week to discuss opportunities.'

Morris admits to starting his career in building services completely by accident, applying for a trainee post in the Property Services Agency (PSA) without really having a clue what the PSA actually did: 'I always wanted to be an electrical engineer, but can't really remember why. So I joined BP's Merchant Navy Fleet at 16 as an officer cadet, but jumped ship in Italy when I realised it wasn't the job for me.'

Morris studied part-time for nine years to achieve his ONC and HNC, before gaining an honours degree in electrical and electronic engineering from London South Bank University. His aspiration now is to develop Hoare Lea's business base in the region.

Email people appointments/role profiles to cbailey@cibsejournal.com

Movers & Shakers



Just days after being awarded an MBE in the Queen's Birthday Honours, **Michelle**

McDowell has won the property category of the First Women Awards 2010. McDowell, who is chairman of civil and structural engineering at BDP, also became the first woman chairman of the Association for Consultancy and Engineering (ACE) at the beginning of the year. The awards celebrate trailblazing and pioneering businesswomen.

Roger Ridsdill Smith, a director at engineering consultancy Arup, has won a prestigious Royal Academy of Engineering Silver Medal for his outstanding personal contribution to British engineering. He received it for his contribution to the sector, including the design and delivery of London's Millennium Bridge, which opened 10 years ago.

Energy company, Self Energy UK, has appointed **Daniel Matson** as sustainable energy performance systems developer under a Knowledge Transfer Partnership agreement with London South Bank University. Matson will work with the self energy management team to reduce investment risk for the company, and to develop decision support tools and further improve cost and savings forecasts for its clients. Matson will be based in the UK but will also work internationally.



Building services provider SES has announced **Nick Cox** as its new operations manager.

He will be based in Bristol and will be responsible for all operational aspects of the Bristol office, as well as building a high quality, sustainable business in the south-west.



Rony Eappen, a qualified electrical and electronics engineer, has joined lift and escalator

consultancy D2E International,

a lift, escalator and facade access consultancy. Eappen will assist clients in ensuring that lift and escalator installations minimise their impact on the carbon footprint of buildings.



Matthew Kidner has joined energy management company, TEAM, as a KTP Associate,

working with London South Bank University. Kidner has moved from Clouds Environmental Consultancy where he was an energy consultant to join TEAM in the role of energy services implementation engineer, focusing on improving the utilisation and implementation of software and services.



Air conditioning and refrigeration specialist, Cool-Therm, has appointed **Steve Soffe** as

sales executive. Soffe, who previously worked on the *CIBSE Journal*, will join Cool-Therm's recently opened Reading branch.



The Royal Academy of Engineering has awarded one of its highest accolades to Mott

MacDonald engineer **Alan Powderham**. He received the Sustained Achievement Award at the academy's annual general meeting in London last month from president, Lord Browne of Madingley. Powderham has been in the engineering profession for more than 40 years, setting new industry benchmarks in foundation engineering.

Manufacturer and inventor, Enecsys Limited, has announced the appointment of **Paul Garrity** to head the continued development of its advanced solar photovoltaic micro-inverter. Garrity joins Enecsys after three years as vice president of engineering and advanced product development at FlexPower (a subsidiary of Flextronics International) in Dallas, Texas.

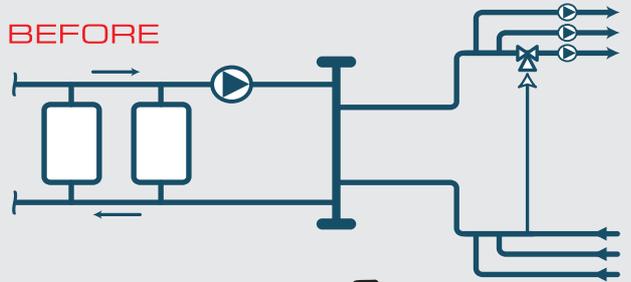
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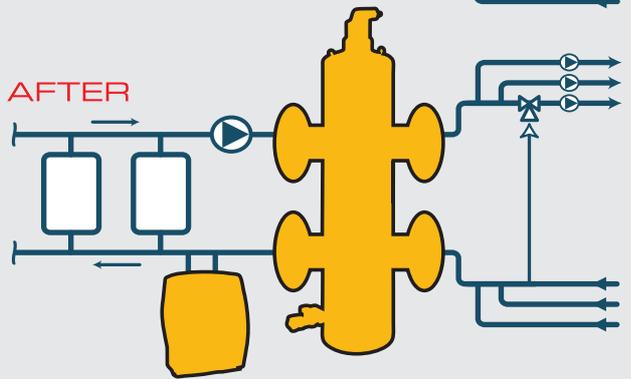
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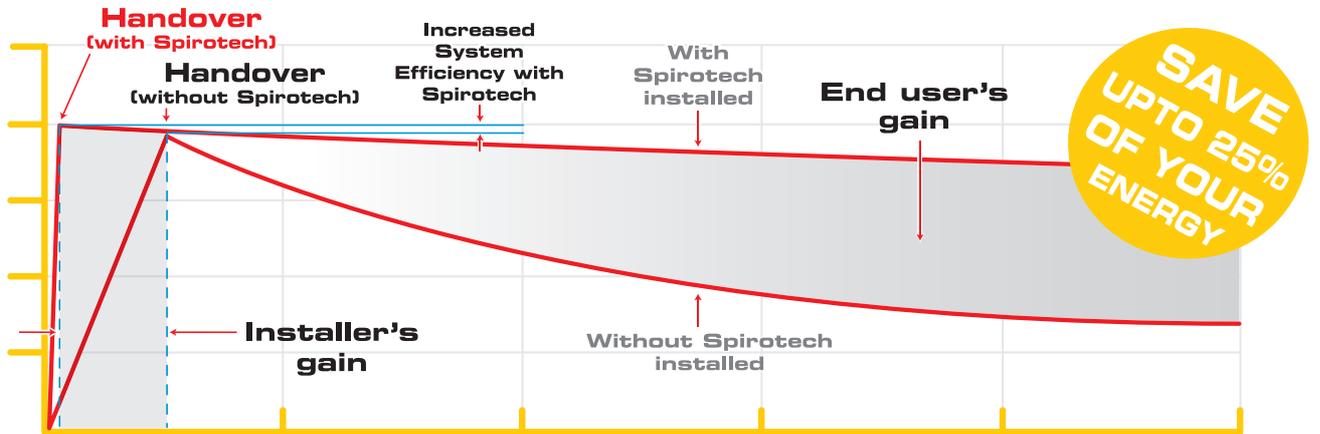
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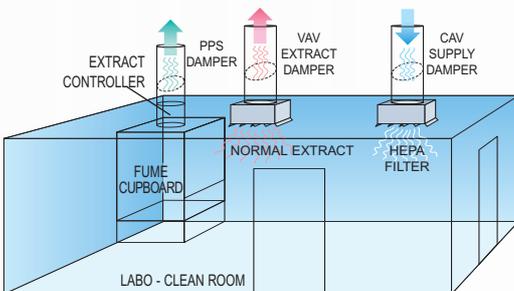


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