

CIBSE

JOURNAL



The official magazine of the Chartered Institution of Building Services Engineers

March 2013
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Keeping the lights on
How engineering can help
secure our energy future

Softly, softly
Clients discover benefits
of Soft Landings

A stylized architectural rendering of a modern building. The building features a prominent curved glass facade on the upper levels and a yellow-colored section on the lower levels. The ground in front of the building is a blue grid pattern with white lines, and several white silhouettes of people are walking. A white bird is also visible on the ground. The background is a mix of green and blue, suggesting a sky and ground.

ENGINEERING EXCELLENCE

CIBSE rewards Building Performance at 2013 awards

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Welcome

It is an exciting time to be working in the field of building performance. The age of Green Bling and undelivered aspirations is waning. The new focus is on engineering buildings that are proven to work first time to give an excellent internal environment, that have low environmental impact and when meters are read consume no more energy than they needed.

Improved performance brings economic benefits, not just to owners and operators but to the wider economy. Since buildings use nearly half our energy, this should be a matter of national priority. It's even more critical as this is an age of increasing uncertainty about the supply and security of energy.

The Building Performance Awards showcase the exemplar products, people and projects leading the way in innovation and engineering excellence. These projects show us what can be achieved and raise the bar of best practice for all of us in the industry.

It is crucial that the impact of these Awards goes far and wide. CIBSE will be showcasing the projects at Ecobuild and throughout the year in the *CIBSE Journal*. Feedback from innovation and excellence must be shared and promoted in order to raise standards. It is the life blood of the CIBSE Knowledge Portal now used in over 130 countries. Building performance is at the heart of everything that CIBSE does and these successes should be shouted from the rooftops.



David Fisk, CIBSE president

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2013 BUILDING PERFORMANCE AWARDS JUDGES



Paddy Conaghan, consultant, Hoare Lea



Hywel Davies, technical director, CIBSE



Susie Diamond, founding partner, Inking LLP



John Field, Energy services director, TEAM



Jeff House applications manager, Baxi Commercial Division



Kevin Kelly, president elect SLL and Dublin Institute of Technology



Graham Manly OBE, business development director, Gratie Bros



Foroutan Parand, head of building physics, URS



David Vincent, director, David Vincent & Associates

Thank you
 to this year's judging panel



Back to the

The UK faces the threat of rolling blackouts in just two years as our energy security fails, and it is engineers who have to provide the solution

“The UK’s power demand is falling, but our capacity is falling faster

.....
Alistair Buchanan

A global television audience of 108m looked on as the lights went out on one of the world’s highest profile sporting events last month. The 2013 Super Bowl was halted for more than 30 minutes in the New Orleans Superdome. Could that chastening experience be a taste of things to come?

At last year’s CIBSE Annual Lecture, the threat of power shortages in the UK was raised by Ofgem chief executive, Alistair Buchanan. He said the UK will have a safety margin of just 4% in available power by 2015, raising the likelihood of rolling blackouts during peak demand.

‘The UK’s power demand is falling, but our capacity is falling faster,’ he said.

A quarter of our current energy capacity is due to be decommissioned in the next seven years and we are well behind schedule to produce 30% of future power from renewables by 2020.

Uncertain future

And what of nuclear? The programme to build new capacity was already well behind schedule before Centrica’s recent announcement that it was pulling out of the Hinkley Point project.

Our energy future is uncertain, but one

thing we do know is that the cost of power will continue to rise. Average energy bills are predicted to increase by 30% in the next decade to match the increased investment required to modernise the National Grid. However, we will start running out of energy long before that project is complete.

The Energy Bill – currently making its troubled way through parliament – is looking for long-term solutions, but we need quick, low-cost solutions to stave off the looming crisis. That means dramatically reducing energy demand and that’s our job. This is not a task for government – politicians don’t understand the detail of energy management. How could they?

Former CIBSE ASHRAE Graduate of the Year Angela Malyrn put it eloquently: ‘I have a problem with people saying government should do this and do that.

‘The government can’t install anything. We are engineers and it is up to us to show them the answers and demonstrate how to deliver sustainable buildings.’

For clients, the building services industry is increasingly the ‘go to’ place for energy management solutions during continuing austerity and the need to reduce overheads.

Monitoring actual performance of buildings allows managers to compare results with best practice and industry benchmarks – then they can set about putting things right.

The CIBSE Building Performance Awards seek to reflect this new reality by rewarding



dark ages

excellence in all areas of building design, commissioning, construction, installation and operation. The awards focus on actual measured performance, not design intent or performance specifications.

The post-handover stage of a project starts long before construction begins – it's all in the planning – by looking at appropriate technology choices and approaching the design in a holistic way.

Lazy

Arup design specialist Becci Taylor says this means engineers not being 'lazy'.

'You can design a building that meets sustainable criteria simply by using a list of technologies, but is that building cheaper to run and better to be in... does it delight?'

She told a debate at South Bank University that passively designed buildings provide a better experience for occupants and that 'just because we have electricity we should not use it as an excuse to ignore opportunities to create pleasant spaces'.

Designing for occupancy is crucial and that means finding out what the occupant intends to do with their new building – we should also be designing for maintenance.

It is not enough to throw technologies at a building to tick as many planning boxes as possible. We are not about just doing enough to comply with legislation – the awards celebrate those who go far beyond.

Existing buildings are where the big challenge lies – and here we can still apply

the principle of the 'energy hierarchy' that you would apply to new structures. That starts with basic, low cost measures such as insulation and high quality glazing. Tackling thermal gain with passive additions will reduce need for air conditioning too.

At stage two, we can look at adding intelligent controls systems and sensors to installed building services systems.

Only once these basic measures are complete should building managers consider replacement technologies and, even then, they should first look at introducing new pumps or variable speed motors, which do not alter the set up of the system but can cut costs.

How our systems are operated is crucial and that means making behavioural change as easy as possible for occupants. Simplicity is crucial to give building occupants – most of whom are non-technical – a chance of maintaining systems at an energy efficient level in the long term.

The CIBSE Building Performance Awards are designed to highlight and reward engineering attempts to address these vital issues. Also, equally importantly, they seek to raise global awareness through the media of the growing importance of building services design and its influence on building operation and running costs.

Without reducing demand across the building stock, we are going to face an increasingly frantic battle to keep the lights on. 

Without reducing demand across the building stock, we are going to face an increasingly frantic battle to keep the lights on

Positioning for Growth

Imtech in the UK is part of Imtech NV, a Netherlands based technical services provider. Imtech NV is one of the leading providers of electrical, mechanical, ICT engineering and construction services. It has over 28,000 employees across Europe and an annual revenue in excess of five billion Euros.

Imtech was established in the UK in 2003 and we are now one of the UK and Ireland's largest technical services providers. We have an annual turnover of approximately £600 million and employ 2300 people. We provide our customers with measurable added-value by offering high-value technical solutions. We stand out from our competitors, through our multidisciplinary approach – a unique combination of electrical and mechanical engineering and ICT (information and communication technology) – from one contact point.

With a number of business streams including engineering contracting and technical facilities management, we cover the entire chain, from consultancy and design to implementation, maintenance and management. It is our ability to offer local delivery and commitment across the building, utilities and infrastructure sectors combined with the strength of a multi-million pound organisation that gives us an edge.

We have a number of different areas of business, including:

- Engineering Services
- Technical Facilities Management
- Water, Waste and Energy
- Infrastructure, including Airports
- Systems Integration
- International

Imtech has an ambitious and exciting growth plan in the UK. The company, which first entered the UK market 10 years ago with the acquisition of Meica Services and Meica Process, plans to continue to develop a broad-based technical services business in UK and Ireland, where it recognises it can add real value.

To improve delivery to clients and build on our reputation and position in the UK market, we are aligning our businesses more closely with the Imtech Group. This greater alignment will enable Imtech to position itself within new and existing markets, within the built environment, infrastructure and energy.





View from the north: the NRP Enterprise Centre, which will be built on the Norwich Research Park at the University of East Anglia (UEA). It will play host to a new Centre for the Built Environment and aims to achieve BREEAM Outstanding and Passivhaus certification. Soft Landings has been run on the project from the outset

INSET: View from the south

Prepare for Landing

The government is set to mandate Soft Landings for new central government buildings and major refurbishments by 2016. An imminent publication from BSRIA points the way forward. **Andrew Brister** reports

It is not unusual to see energy consumption some three to five times higher than the designers predicted

Roderic Bunn

Soft landings has come of age. Government policy requires soft landings for all new central government buildings as well as major refurbishments from 2016, with the first projects adopting the approach this year. It will be introduced alongside Building Information Modelling (BIM) under the Government Construction Strategy. The coalition hopes to see the capital cost of new public projects fall by 20%, with a similar reduction in energy and maintenance costs.

So what exactly is Government Soft

Landings (GSL), and what does it mean for the construction industry and for facilities managers? 'Soft Landings is designed to help clients and occupiers get the best out of their new or refurbished building,' explains Gary Clark, chairman of the BSRIA Soft Landings User Group and a project director and research associate at Heriot-Watt University, Edinburgh. 'It is designed to reduce the tensions and frustrations that so often occur during initial occupancy, and which can easily leave residual problems that can persist indefinitely. At its core is a greater involvement of designers and constructors with building users and operators before, during and after building handover. It emphasises the importance of improving operational readiness and performance in use.'

The Soft Landings framework was conceived in the late 1990s by architect Mark Way, and was further developed by Bill Bordass, of the Usable Buildings Trust, and David Adamson, of Cambridge University. BSRIA then took up the baton, supporting the publication of the *Soft Landings Framework* in 2009.

'Soft Landings extends the duties of the team before handover, in the weeks



immediately after handover, for the first year of occupation, and for the second and third years,' says Clark. The framework covers five main stages: Inception and Briefing; Design Development and Review; Pre-Handover; Initial Aftercare and Aftercare for Years one to three.

'The procedures are designed to augment standard professional scopes of service, not to replace them,' says Clark. 'Soft Landings is effectively a palette of activities that improves the performance outcomes of buildings because designers and contractors remain involved with buildings after practical completion. They help fine-tune the systems and ensure that occupants understand how to operate their buildings.'

There is an increasing body of evidence that shows the disconnect between design intent and building performance, from the PROBE studies published in the *Building Services Journal* in the 1990s, through to the results of the Technology Strategy Board (TSB) Building Performance Evaluation (BPE) programme currently being reported.

'It is not unusual to see energy consumption some three to five times higher than the designers predicted,' says

Roderic Bunn, a building performance analyst at BSRIA, and part of the TSB reporting team. 'Soft Landings will close that performance gap,' claims Bunn. 'Well, it will if you do it from the very beginning of a project.'

The government is sufficiently convinced that Soft Landings is worth the investment. It is adopting its own version of the BSRIA framework called Government Soft Landings (GSL). A policy document is currently informing an implementation plan and in-house guidance. 'It will follow the core values of the soft landing's approach,' explains Roy Evans of the Department for Business, Innovation and Skills (BIS) BIM Core Team.

'Soft Landings and post-occupancy evaluation (POE) together give the services profession the chance to learn about projects that are in use and to get a real understanding of what the end-users' needs are. This will inform their designs in the future,' adds Evans. Some public sector clients are already heading down this road; both Essex and Hampshire County Councils are busy trialling Soft Landings.

BSRIA is about to release its latest publication on the subject: *How to*

Time critical

Tamsin Tweddell, of Max Fordham, says there are five critical factors for a successful Soft Landings project:

- The Soft Landings approach must be initiated early in the project to influence the briefing and conceptual design
- The client must be actively involved in the Soft Landings approach
- The project team must actively engage with building users and managers
- The Soft Landings approach must be embedded in the contract documents and embraced by the main contractor and relevant sub-contractors
- The commissioning must be well planned and carried out thoroughly, both before completion and post occupancy



Consultant Max Fordham put a two-year aftercare service in place at The Hayward Gallery (see box, below). The lessons learned are now feeding into future Soft Landings projects

6 GSL will give the services profession the chance to learn about projects that are in use and to get a real understanding of what the end-users needs are

.....
Roy Evans

► *procure Soft Landings.* 'This is a guide for clients and main contractors who want to include Soft Landings in their "Employers' Requirements", in a way that the supply chain can respond to and in a consistent manner,' explains Bunn. The guide includes sample requirements for clients appointing consultants, clients appointing main contractors and main contractors appointing subcontractors. 'This is a big change because clients don't know how to go about procuring Soft Landings at the moment,' adds Bunn.

Morgan Sindall is one main contractor that is already putting Soft Landings into practice. Senior design manager Stuart

Thompson is enthusiastic about the rewards that the approach can bring.

'To be able to run Soft Landings from the outset is unique and that's what we've done at the NRP Enterprise Centre,' says Thompson. The new Enterprise Centre – to be built on the Norwich Research Park at the University of East Anglia (UEA) – will host a new Centre for the Built Environment and aims to achieve BREEAM Outstanding and Passivhaus certification.

'We've finished stage one of the Soft Landings framework, the briefing, and now we are in stage two: design development. We've found the workshops have proved a really great way of engaging with the

The art of Soft Landings

Max Fordham has provided a two-year aftercare service, overseeing the optimisation of the environmental controls at a recent plant refurbishment at the Hayward Gallery, part of London's Southbank Centre.

To comply with the Government Indemnity Scheme for art loans, the gallery needed to deliver very stable environmental control. 'Max Fordham has worked closely with the facilities manager and controls specialist to monitor performance, fine-tune the controls and tailor the Building Management System user interface to suit how people work, balancing simplicity with visibility and meaningful data,' says Tamsin Tweddell, senior engineer at Max Fordham.

Providing two years of aftercare has taught the firm many things, which will feed into future projects. 'Aftercare can be considered to have two phases,' says Tweddell. 'The first involves debugging the systems – it could be argued that this is fixing problems that should have been picked up at the commissioning stage, such as control valves that are not closing fully. Only once plant and controls are set up as specified can the systems be fine-tuned.'

'To attempt fine-tuning while there are still defects present is counterproductive. This is why aftercare typically needs a minimum of two years.'

In this case, aftercare was a stand-alone

contract. It was clear that it would have been effective more quickly had it been more integrated into the construction contract. For example, the specialist who set up the controls was not engaged to remain involved after practical completion to fine-tune the controls.

'Designing the Building Management System to facilitate troubleshooting is different to simply designing to control the building and assuming everything will work. For example, it is helpful to make some internally calculated values more transparent,' says Tweddell.

'Most importantly, aftercare is as much about people and communication as about technology.'



stakeholders, the client team and end-user groups, and it's beginning to shape how the performance of the building is going to come together.

Morgan Sindall has written Soft Landings into the contract right from the beginning, and paid for three years of POE to be carried out. 'The client will get a better building as a result,' says Thompson. 'As an industry, we don't think about handover early enough; we need to be thinking about these things right at the outset.'

Clearly, the firm is convinced of the merits of Soft Landings; Morgan Sindall has now introduced a nationwide Soft Landings forum to instigate a unified approach across the group.

Lessons are also being learnt at consultant Max Fordham, where experience of a two-year aftercare service for the Hayward Gallery (see box, page 10) is feeding into future Soft Landings projects. 'The client can now see the benefit of Soft Landings, and we will be including it in ongoing work at the East Wing of the Southbank Centre,' says Tamsin Tweddell, senior engineer at Max Fordham.

'User involvement has been lacking in building design and this approach tests the design as you go along.' There is, of course, a cost to all of this and, with the industry slow to recover from one of the worst recessions on record, is this the time to be adding to client overheads?

'It's more a case of "can you afford *not* to do it",' says Bunn. 'The improvements on energy performance alone will allow

clients to justify every penny.'

BSRIA estimates that the additional costs of incorporating Soft Landings is between 0.1% for buildings between £10m to £30m, and 1% for buildings below £10m construction cost. This includes a fee of £8,000 to £15,000 for an independent POE. There are many published examples where the energy savings achieved as a result of POE will far exceed the costs of Soft Landings, but Gary Clark admits the user group does need to develop case studies that provide a compelling business case for potential clients.

Clearly, this is an initiative whose time has come. Soft Landings are a key part of the BIM Task Group's Digital Plan of Work, due to be announced shortly. They will also be referenced in the updated Royal Institute of British Architects (RIBA) Plan of Work, due to be released in April 2013. The BIM Task Group has also made it clear that they expect public sector projects to undertake Soft Landings on all future projects, in order to enable the expected performance of the buildings to be delivered, in practice. This adoption by government is certain to drive interest in the Soft Landings approach.

Indeed, Clark has plans underway for a regional user group in Scotland, as well as a research project into the cost of facilities management and how Soft Landings can help to reduce that. With more and more consultants and contractors seeking to differentiate their services by offering the approach to clients, isn't it time your business prepared for a soft landing? 

TM22 and Soft Landings

To measure the energy used in a building the BIM Task Group propose to use the CIBSE TM22 tool. This is a simple spreadsheet-based tool for recording energy use and identifying areas where it may be excessive. A version of TM22 is also due to be published later this year.

As an industry, we don't think about handover early enough; we need to be thinking about these things right at the outset

Stuart Thompson

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Carbon Champion of the Year



BRITISH LAND

This property giant proved it is the one to watch by scooping two accolades at the 2013 CIBSE Building Performance Awards



British Land has spent about £1m since 2009 cutting energy costs for its tenants, saving them £1.6m.

Other investments, such as in replacement lighting programmes, have also been made, achieving further efficiencies. This activity, coupled with

the work the firm does with office occupiers to support their individual energy reduction schemes, is why it was deemed a worthy Carbon Champion, with almost 90% of its office occupiers affirming that British Land's sustainable initiatives added value to their operations.

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Client Energy Management Award

The challenge

The challenge for British Land was to improve its own performance – in particular, by meeting the 2012 target of a 20% reduction in landlord-influenced energy use. The property giant also works to improve industry understanding of energy issues, together with its peers and partners in the industry.

The response

Although energy reductions have saved occupiers £3.3m and cut carbon emissions by 24,500 tonnes over the last three years, the company is always looking at new ways of improving energy performance. It has recently invested £1.5m to fund projects and technologies aimed at securing further reductions.

It was the first company in Europe

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to make use of a dynamic monitoring and management system, supplied by EP&T, which measures energy use every 15 minutes and can isolate consumption from different systems in the building. This helps building management teams to identify and optimise energy consumption and secure reductions.

British Land has contributed to, or developed, a range of initiatives aimed at improving understanding of energy performance. These have included: landlord display energy certificate prototypes at 18 multi-let office buildings; working through the Better Building Partnership to help create an landlord energy rating scheme; contributing to the Technology Strategy Board study on design versus operational energy; and taking part in consultations on the Carbon Reduction Commitment Energy Efficiency Scheme, the Green Deal and with the Energy Efficiency Deployment Office on its energy reduction strategy for the UK.

British Land has also worked to increase the transparency of its own data. Its *Full Data Report 2012* was made available online, and it has published building data for its largest 33 properties.

The results

Through a forward-thinking approach to energy management, British Land has achieved a 27% reduction in landlord-influenced energy use (based on a 2009 baseline and improving on a 15% reduction in 2011).

Having exceeded British Land's reduction of 20% target over three years



from 2009 to 2012, the company has set itself a new challenge of reducing landlord-influenced energy use by 40% for 2015, alongside a 30% reduction in landlord-influenced energy use for major new buildings within five years.

The firm's approach has been recognized by organisations such as the Carbon Disclosure Project Leadership 2012, in which British Land improved its year-on-year score to 96%. It also achieved the Carbon Trust Standard for achievements in reducing carbon emissions from energy use across its managed portfolio. 

Our commitment to energy management is stronger than ever, and we believe that green buildings do add value and reduce the obsolescence of our assets in the longer term

Justin Snoxall, head of the business group, British Land

Measured energy reductions

	FY2012 kWh	FY2011 kWh	FY2010 kWh	FY2009 kWh	Savings	kWh	£	Tonnes CO ₂ e
Offices: Common parts	11,544,708	13,063,777	12,733,659	13,209,174	-13%	2,285,379	£214,311	2,173
Offices: Shared services	29,304,256	36,139,088	37,889,189	42,091,693	-30%	22,975,769	£1,350,712	9,952
Offices: Occupied by British Land	925,615	1,063,795	1,069,065	1,249,416	-26%	857,907	£63,427	410
Shopping centres: Common parts	14,959,394	16,727,772	16,834,716	21,575,683	-31%	16,205,168	£1,186,737	8,986
Retail parks: Common parts	6,220,191	6,675,226	7,121,480	8,482,957	-27%	5,078,430	£446,242	2,968
Total	62,954,163	73,669,658	75,648,109	86,608,923	-27%	47,402,652	£3,261,430	24,489

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Building Operation Award



MOTT MACDONALD

2 St Paul's Place, Sheffield, England



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The challenge

To upgrade 2 St Paul's Place in Sheffield to the occupants' required standards Mott Macdonald had to convert the basement car park into a data centre, install PV and solar panels and overhaul the building services systems.

The building was built as a speculative office shell in February 2009 and bought by the Department for Education (DfE) from developers CTP St James.

The DfE appointed its own project team – comprising Mott MacDonal, Swanke Hayden Connell Architects, Drivers Jonas and contractors Morgan Lovell – to carry out the fit-out, which had a 10,483 m² gross internal area.

The response

One of the major elements of the project was the conversion of a basement car park to accommodate a 180 m² national data centre. The upper floors were refurbished to facilitate the creation of high-grade offices and meeting rooms to best practice Office of Government Commerce and sustainability standards.

The development reused much of the existing base-build services,

repositioning and rezoning four pipe comfort cooling fan coils to suit new office plan layouts, converting lighting controls to include column-mounted occupant override switches and retrofitting daylight and passive infrared (PIR) sensing automatic controls.

Following the removal of less-efficient, run-around coils, thermal wheels were fitted to air handling units. The building features rainwater collection for WC cisterns to reduce water consumption. A 20 kW-output 126 PV array was fitted, as well as solar thermal panels.

The results

After two years of occupancy, the energy upgrades have resulted in an improvement in the building's Display Energy Certificate from Band G (at 216 in September 2012 – a figure corrected by Mott MacDonal to Band F at 127) to an improved Band D (at 89).

Mott MacDonal has continued to make improvements in post-occupancy. In Year 2, energy use was reduced by 31%. It is estimated that 75% of the saving was due to the rollout of the first phase of an IT server virtualisation to reduce floor power loadings.

The awards are about delivering quality buildings that actually work for clients. That's why this award win is so special

Edward Murphy, technical director, Mott MacDonal



Quick stats

Actual supplied (kWhrs/m ² /a)	2011	2012
Electricity	183	111
Thermal	66	61
Data centre separables	75	150
Total less separables kWhr/m ² /a	249	172

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The challenge

Hoare Lea is an independent partnership and the largest mechanical, electrical and public health engineering (MEP) consultancy of its kind in the UK, with more than 600 people across the UK and abroad. In its 150th year, its work spans all sectors and includes some of the most aspirational and sustainable projects in the industry.

Responsible for both the offices in which it works and the environmental impacts arising from the operation of buildings it helps to design, Hoare Lea challenges itself to develop best practice in sustainable solutions that address issues of energy use, water, waste management, materials, transportation, health and well-being.

The response

Hoare Lea has taken a leading role in addressing the issues of climate change and the broader environment agenda through its research and development

group, which acts as a business incubator and test bed for new concepts and technologies.

The company is firmly committed to the development of its talent base, with the recruitment or promotion of more than 100 employees across all offices in 2011/12. The company's learning and knowledge strategy provides a framework of activities to ingrain good practices, with a focus on sustainability.

The results

Hoare Lea continues to employ cutting-edge techniques to promote the effective use of low and zero carbon technologies. Examples include a range of energy demand control features in bedrooms at the South Place Hotel in London, an aquifer coupling system at Westminster Magistrates' Court, and a first-of-its-kind carbon capture pilot plant integrated into a combined heat and power system, in collaboration with a technology provider. 

Practicing what they preach

- Hoare Lea's activities are managed within a framework of procedures governed by ISO 14001:2004 and health and safety management is registered to BS OHSAS 18001:2007
- It has cut workplace CO₂ emissions by 30% since 1999, and a low carbon programme in its London office has resulted in reduced emissions of 60% below sector norms
- Offices have environmental management representatives who monitor performance
- The King's Cross office aims to achieve a 'Gold' Ska fit-out assessment

“ This award gives an enormous vote of confidence to our designers and support teams
*Ian Durbin, partner,
Hoare Lea* ”

In numbers

600 people in **13** offices across the UK and abroad
In operation for **150** years

Projects: South Place Hotel; Grosvenor Hill offices; University of Greenwich, Stockwell Street Development; and Westminster Magistrates' Court, London



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LAND SECURITIES

Low Carbon Fit-Out Guide for Retail 2012



“We hope the guide will be a catalyst for driving improved environmental performance within the retail property sector

Neil Pennell, head of sustainability and engineering, Land Securities

The challenge

Land Securities wanted to produce a guide to help retailers and their designers to understand how to achieve energy and carbon savings through efficient design and operation of their shop fit-outs.

In the majority of cases, Land Securities is not responsible or able to influence the fit-out design of

properties, limiting its ability to improve the energy performance of buildings. Nevertheless, it works with retailers to help them achieve higher standards of sustainability and provide guidance on sustainability issues.

The response

The 2012 edition of the *Low Carbon Fit Out Guide for Retail* clearly sets out

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the drivers for low carbon fit-out and the multiple benefits of adopting the approach.

It is specifically targeted at decision makers, with the aim of convincing them that a new low carbon approach is needed and providing the necessary budget and time to achieve it.

The results

The 2012 guide includes information on cutting-edge lighting technologies, sustainable design and advice on changes to relevant legislation and national policy.

It also incorporates a green building guide, which provides help on how to achieve the best possible BREEAM rating by improving the environmental performance of the retail fit-out design.

The guide is available for download and was distributed extensively to retailers. It has received good feedback with one major retailer commenting that it is ‘perhaps the most comprehensive and useful low carbon guide for retailers I have seen’.

Land Securities' 10 commitments

Key environmental commitments relevant to retail properties include:

- All new developments to achieve BREEAM (2011) Very Good rating with an aspiration for Excellent where reasonably practicable
- All new residential developments to achieve Code for Sustainable Homes Level 4
- All new major developments to achieve FSC project specific certification
- Achieve a diversion from landfill rate of 90% (by weight) of operational waste, with a minimum of 70% recycled (by weight) by March 2015
- Developments in 2012/13 to achieve CO₂ emissions 20% below those in Part L of the Building Regulations
- Develop an ‘ultra-low carbon building’ by 2018, with CO₂ emissions equivalent to a 50% reduction beyond Building Regulations Part L 2010
- Ensure all buildings that are available for lease have an Energy Performance Certificate rating of E, or better, by March 2017
- Reduce water consumption by 10% by March 2016
- Record zero environmental incidents
- To apply Planet Positive Building Certification as a pilot study to the proposed Crawley development commencing on site in autumn 2012 to ascertain the benefits when used in support of BREEAM Certification

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Refurbishment Project



GREENTOMATOENERGY

20 Lena Gardens, London, England



The challenge

A Passivhaus retrofit was planned for a Victorian mid-terrace house, acting as a case study for the development of high-performance urban refurbishment, focused on the challenges of working in conservation areas and solid-walled buildings.

Number 20 Lena Gardens, which was built in around 1870 in West London, was in need of a full refurbishment. With solid brick walls, it had a leaky structure, single glazing and signs of rot in the structural timber; internal finishes were in poor condition.

As a pilot project for sustainable retrofit techniques, the decision was made to set clear goals for the project from the outset, with the chief focus on energy efficiency. The goals were to: maximise the use of natural resources with the site's limited footprint; ensure high levels of internal comfort; use Passivhaus design principles and

certification; use recycled and low impact materials wherever possible; and commission, monitoring and post-occupancy evaluation.

Because the project was situated within a West London conservation area, the outside of the building was to remain unchanged (with the exception of permitted developments).

The response

A design approach was adopted, focusing on fabric energy consumption, tight project management and the integration of highly efficient services. The on-site building team was trained in Passivhaus principles and fully engaged in the build process.

Super-insulation of the building was achieved using a double-skin insulation strategy to provide U-values of 0.1 WmK on external walls and 0.3 W/mK on party walls. An unbroken airtight layer was achieved throughout the house by the

The building's outstanding performance demonstrates that great things are possible if there is good design and workmanship
Akta Raja, director

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► separation of the services layer in the internal skin of insulation, helping to deliver an airtightness of 0.5ach@50Pa.

There was no product on the market at the time permissible to conservation authorities that could have provided highly efficient, airtight window replacements. Accordingly, the design team and lead contractor developed a bid proposal and were awarded grant funding by the Technology Strategy Board to develop triple-glazed, highly efficient, sealed, sash-type windows that are almost indistinguishable from the original windows in the neighbouring houses.

Sixty per cent of hot water requirements are provided by solar thermal panels, and a 1.2 kWp solar PV system was installed. A green roof improved biodiversity and insulation, and rainwater capture helped to reduce runoff and to replace potable water for irrigation.

The house was fitted with a full ventilation system with heat recovery, designed to be used in conjunction with natural ventilation in summer. All space heating and hot water top-up are

provided by an exhaust-air heat pump. A ground-to-air heat exchange concept was developed and installed above the slab of the basement, providing significant heating gains in winter and free cooling in summer. This unique design opens up the potential for the urban use of these heat exchangers, previously limited to detached buildings with significant surrounding space.

The results

Based on the final as-built condition, the house was awarded Passivhaus certification. Initial results show a measured 89.8% reduction in full-year energy consumption, as compared to metered consumption over a full year prior to the retrofit.

Occupant comfort levels are consistently reported as very high, describing the house as a 'fabulous living environment... exceptionally comfortable'.

There has been a commitment to learning from the project and sharing results. The project has been shown on TV and widely published in newspapers, as well as an academic paper at the CIBSE Technical Symposium. The learning from this project has been applied at different levels on more than 50 projects by the greentomatoenergy team, and has benefited designers who have been influenced by these principles in other projects. [▶](#)

Special features

- Ground-to-air heat exchanger below existing basement floor
- Integrated solar thermal system for hot water, backed up by air-source heat pump
- Exhaust-air heat pump inside ventilation system for all space heating
- Green roof
- Specially designed triple-glazed sash imitation windows for conservation area
- Thermal bridges cut off by extensive detailing and rehangs of floors

Energy data

Period	Gas consumption (kWh)	Electricity consumption (kWh)	Total energy consumption (kWh)
Jan 2007 – Jan 2008	43,094	6,172	49,266
Sept 2011 – Sept 2012	468	4,544	5,012

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Passive (Energy Related) Product of the Year

BURO HAPPOLD AND BRUNEL UNIVERSITY IN COLLABORATION WITH FRASER BROWN MACKENNA ARCHITECTS, NUAIRE, XTRALITRE AND PERMAROCK PRODUCTS *Aerogel Solar Collector*

The challenge

Technology experts were challenged to devise new energy saving solutions, as part of the £17m Retrofit for the Future programme aimed at kick-starting retrofitting in social housing stock.

The response

Developed by Dr Mark Dowson, an engineering doctorate researcher sponsored by Brunel University, and by Buro Happold engineers, the Aerogel Solar Collector is the UK's first flat plate solar air heater incorporating translucent granular aerogel insulation in the cover. It effectively blocks heat

transfer by convection, conduction and long-wave thermal radiation. A prototype was installed on a 1960s end-terrace house. The cover thickness was selected to achieve a Passivhaus U-value below 0.8 W/m²K.

The results

Prototype testing has registered peak outlet temperatures of up to 45°C during cold, sunny conditions. This allowed preheating of the house's fresh air supply up to 30°C, in turn providing internal temperatures of 21°C to 22°C without auxiliary heating. Payback is predicted to be as low as 4.5 years.

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“We are really excited to have won this CIBSE award and are especially grateful for the judges' comments regarding the quality of research and novelty of the idea”
*Mark Dawson,
Buro Happold*

Energy-Using Product Award



REDWOOD SYSTEMS *Lighting Platform*

The challenge

Around 17% of all electricity consumed in the UK is consumed by commercial buildings. Of this, approximately 25% is used for lighting systems. The potential exists to make cost savings and reduce carbon footprints through the introduction of more sustainable lighting systems.

The response

Redwood Systems has developed a low voltage intelligent lighting control that powers and controls the lights through a single category cable. This means a single integrated system replaces three separate systems to power, control and measure lighting output, making use of sensors at every fixture to collect data.

The centralised power system, known as the Redwood Engine, is the 'brains' of the platform, converting alternating current (AC) power to safe, efficient direct current (DC) power via a low voltage network cable.

The results

Clients average 75% energy savings through an efficient power system. The lighting control enables energy saving techniques, such as tailored occupancy, per-fixture daylight harvesting and 'follow me' lighting.

Benefits include reduced installation costs and an integrated building intelligence system that allows heating and cooling to be turned down or off when people are not around.

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Sustainability credits

Redwood Systems innovative building-performance lighting platform contributes to sustainability credits for LEED through:

- Optimised energy performance
- Enhanced commissioning
- Enhanced measurement and verification
- Controllability of systems – lighting, thermal comfort verification, and innovation in design

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Oval Flow Probe for Silencer



Venturi Duct Volume Station

The Veloprobes are the most used duct velocity sensors and work in conjunction with all CMR P- V- VP-Sensors and DPM Velocity Transmitter. To install the Veloprobes, drill 4 holes into the existing duct work and fix them with flanges and turn them to suit the flow, connect the red and blue PVC tube. Enter duct dimensions, density and m-factor into the transmitter and the air volume is measured and displayed.

Oval Flow Probes for Silencers are used substantially in Air Handling Unit Applications. The Probes are supplied individually and each silencer air passage way can be fitted with a probe either from external or internal. The probes are made to measure and all brackets are supplied. The Oval Flow Probes are better in performance than a flow grid as the airflow is already straightened by the pods and produces an air volume measurement in m³/s, m³/s or l/s.

The CMR Venturi air volume measurement stations are manufactured in standard duct sizes from 100mm to 500mmØ and are all pre-calibrated at the factory. Each size has a published m-factor and any CMR Transmitter can convert the velocity pressure directly into an accurate linear volume flow. The duct venturis are used in small or large scale industrial and commercial applications.



Flow Grids

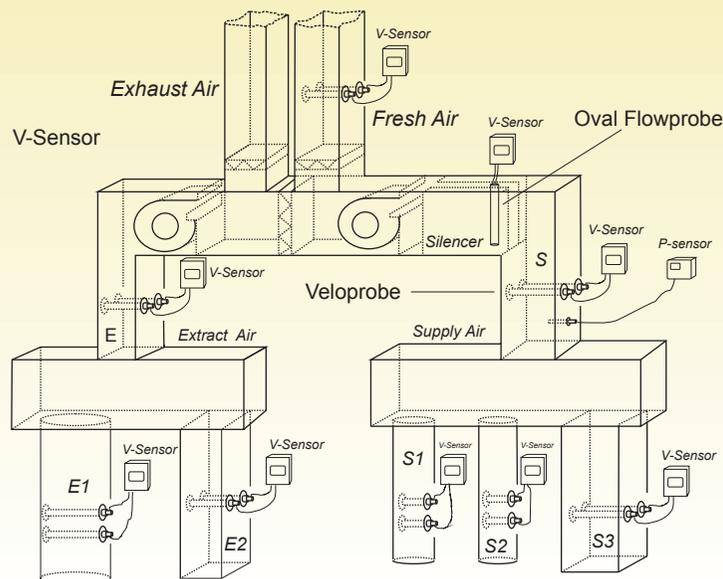


Round Flow Probe



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WHITBREAD HOTELS AND RESTAURANTS

Premier Inn, Gatwick Airport



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The challenge

Whitbread, whose brands include Premier Inn, Beefeater, Table Table, Brewers Fayre, Taybarns and Costa Coffee, launched its first set of public carbon targets in 2009, seeking to reduce CO₂ by 26% relative to sales (using 2008/09 as a baseline).

In 2011/12, the company reduced absolute CO₂ emissions by just under 1% while building 3,640 new Premier Inn bedrooms and 11 new restaurants.

As a result, Whitbread has set itself even more challenging targets, including a 25% reduction in relative emissions by 2015, rising to 50% by 2020, and a 10% reduction in its supply chain.

The response

In recognition of its in-house energy management processes, Whitbread achieved its first ISO50001-accredited management system in late 2011, after holding the BSEN16001 standard for a year.

Whitbread's achievements are based on a strategy to build and refurbish hotels to high sustainable standards. This approach has been typified by the development of the Premier Inn hotel and Brewers Fayre pub

restaurant in Barry, South Wales – a £7.5m development that opened in October 2012.

Achieving high standards of sustainability was a condition of the planning permission granted by the Vale of Glamorgan Council, and one of the reasons why Whitbread was selected to develop the site following a competitive tender.

The hotel and restaurant feature a variety of innovative technologies to facilitate high sustainability performance. Bedrooms in the hotel are ventilated using high efficiency heat recovery ventilation units, in conjunction with non-openable windows, while restaurant ventilation also incorporates heat-recovery technology.

Low-energy light fittings and lamps have been fitted throughout. Grey water recycling, which is a standard model across Whitbread developments, collects drainage water from hand basins and showers and reuses it to flush toilets.

The results

The Barry hotel and restaurant was awarded a BREEAM excellent rating, making it one of the greenest and most energy efficient projects of its kind in South Wales.

They are taking a broad view of the energy performance and provided ample evidence of real improvements made to hotels and restaurants

The Judges

Quick wins

Where Whitbread identified waste:

Behaviour

- Induction oven left on overnight
- Fridge/freezer doors propped open
- Friers turned on too early

Lighting

- LEDs replaced with halogen in bar
- Outside lighting only off between 05:00 and 06:00
- Restaurant 'front of house' lighting timing issue



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Collaborative Working Award



ATKINS

London 2012 Olympic and Paralympic Games



The challenge

Once in a lifetime, engineers may have the chance to work on a project that excites a nation and attracts worldwide attention. For Atkins, the London 2012 Olympic and Paralympic Games was that project. As an official engineering design services provider over the past seven years, the company was at the heart of the delivery, not only of the physical infrastructure needed to host the Games in London, but also of the operational management of the event.

The response

More than 1,000 Atkins professionals worked to plan, design and enable the Games. Working closely with the utility industry, Atkins coordinated existing infrastructure and new connection requirements, developing the London Organising Committee of the Olympic and Paralympic Games (LOCOG) policy on 'utility versus temporary', which became the strategy for budget and procurement of these services.

Atkins worked collaboratively, initially with architects on a shared IT platform to deliver the temporary facilities (known as 'overlay') that brought London 2012 to life.

The results

The work that Atkins undertook will have a lasting impact on the way temporary events are approached in future. Most people don't think about utilities or building services unless something goes wrong. With the Games, there was no room for error. Atkins is proud that its engineering achievement is being talked about after – not during – the event.

Mike McNicholas, Atkins' London 2012 project director, said: 'The award is testament to the hard work, commitment, innovation and expertise of the team.'

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The award is a testament to the hard work, commitment, innovation and expertise of the team
Mike McNicholas,
Atkins' London 2012
project director

Procurement process

Due to the sheer scale of the London 2012 project, procurement of the correct supplies with the right capacity was key. Atkins produced tender documentation for all building services elements required, the larger packages being temporary power, water and waste and HVAC.

The level of detailed information provided was way above that normally provided for procurement of commodities from the events industry. This resulted in competitive tendering and contract award

based on a design scope close to the final requirement, thus reducing scope 'creep' and challenges to the forecast budget.

Atkins provided LOCOG with forecast consumption data for electricity, gas, water and diesel, which were used for procurement of supply. For electricity, Atkins worked actively with the supplier to establish consumption load profiles to enable efficient purchasing of electricity at the required 80/20 low carbon/renewable mix.



Ventilation Solutions

by Fläkt Woods Limited

the green agenda

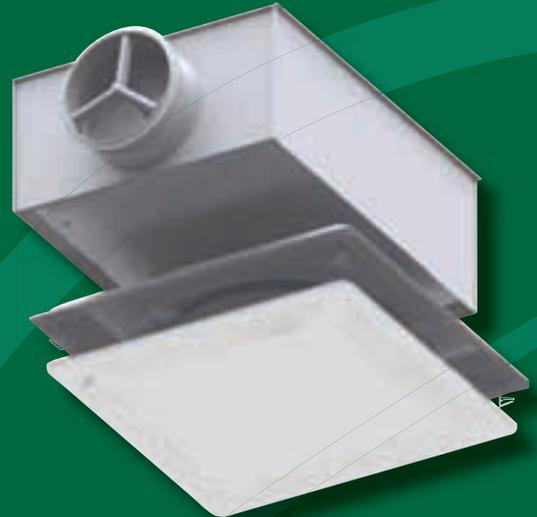
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New Build of the Year (Value up to £5m)



ARCHITYPE AND E3 CONSULTING ENGINEERS

Bushbury Hill Primary School, Wolverhampton



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The challenge

The brief for Bushbury Hill Primary School in Wolverhampton was for a one-form entry primary school for 210 children, built to the Passivhaus standard. The build included a 30-place nursery and facilities for a multi-agency support team.

The response

Based on a timber-frame construction, the building uses locally sourced brick cladding, linoleum and recycled tyre barrier matting floor finishes, and non-toxic paints and stains.

There is a mechanical ventilation heat recovery system for winter operation, with a simplified heating system, run off one domestic boiler, to supply heat when necessary to radiators.

In winter, occupied spaces are ventilated using a thermal ventilation heat recovery system, with efficiency of 80%. In summer, openable windows provide natural ventilation.

Building orientation and south-facing

glazing has been optimised to take advantage of natural light, reducing the need for artificial lighting. *Brise soleil* sun shading and roof overhangs protect the building from overheating and east and west-facing glazing is kept to a minimum. Daylight and occupancy sensors are used to automatically dim and turn off lights.

The results

Bushbury Hill Primary School has achieved the Passivhaus standard within budget and with no additional funds for low-carbon and energy efficiency measures.

The building has an air pressure reading of 0.53 ach@50pa (building regulations require a maximum air pressure of 10 ach@50pa). Its heating and cooling demand of 15Wh/(m²a) meets the Passivhaus target.

The design has helped to dramatically reduce energy bills – approximately 80% less than that required in UK Building Regulations.

It is great to gain recognition for reducing energy consumption by design, rather than offsetting carbon with ecobling!

Jonathan Hines,
director, Architype

Measured performance

Energy use based on winter monitoring:

- Thermal energy: 15kWh/(m²a) – gas
- Hot water: 12 kWh/(m²a) – gas
- Lighting: 14 kWh/(m²a) – electric
- Combined power and plant: 14 kWh/(m²a) – electric
- Kitchen: 7 kWh/(m²a) – electric
- Sprinklers: 17 kWh/(m²a) – electric
- Heating and cooling demand: 15kWh/(m²a)

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Contractor of the Year



NORLAND MANAGED SERVICES

Everything Everywhere Darlington Campus



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“We see this as testimony to Norland’s design, build and operate model, which goes a long way to closing gaps between predicted and actual performance
Rob Giles, head of projects, Norland”

The challenge

Norland Managed Services maintains Everything Everywhere’s (EE, formerly T-Mobile and Orange) buildings services across its UK corporate buildings. Heating, ventilation and air conditioning (HVAC) failures had been experienced at two of the buildings on the EE Darlington Campus. In addition, the HVAC systems in use contained R22 coolant, which is being phased out for environmental reasons.

Used as offices and a call centre by more than 1,000 EE employees, the two buildings are spread over five floors and 8,500 m². Norland was commissioned to carry out a £1.5m project that involved the extraction of the existing HVAC system and the installation of a new solution, an upgrade of the lighting system, the replacement of ceilings, the replacement of passenger and goods lifts, the creation of a new audio visual/conferencing suite, and the decoration of the buildings.

The response

Norland designed and procured the phased implementation of the project within three months. A detailed programme was devised involving the rotation of more than 1,000 staff over 15 weeks.

The existing HVAC system was replaced with the industry-leading VRF Daikin solution – removing R22 in the process – and a heat recovery system was introduced to reduce costs.

A soft landings approach was employed by Norland so that a member of the project team was available during the first months of operation to fine-tune and de-bug systems.

The results

This complex project was completed on time and on budget, meeting all the expectations of the client. Norland continues to work with EE post-occupancy to make adjustments and improvements where necessary. 

Question everything

Norland’s Energy Matters Training aims to increase energy awareness among its engineers, enabling them to look at other equipment and ask: why is it on? What do I have to do to turn it off? What can I do to turn it down? This process can result in simple ‘no cost’ actions that are capable of providing immediate savings, as well as identifying the more significant and complex efficiency steps.

It's time for BIM...



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"BIM is evolving very quickly and it affects you! Amtech's products will help you take advantage..."

Mark Tindall,
CEO Amtech Group



Amtech has more in store for 2013...

Amtech's software and information services have been the first choice for Building Services companies for many years. With the advent of BIM and the requirement for interoperable systems Amtech is releasing XG, it's neXt Generation of software and services providing BIM compliant data solutions. More importantly, XG will offer huge improvements in operational efficiency no matter what stage of design, implementation or maintenance your company is providing.



New Build of the Year (Value Above £5m)



MAX FORDHAM

The Hive, Worcester, England



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The challenge

A private finance initiative (PFI) competition was opened in 2007 to create the UK's first fully integrated public and university library, part of a groundbreaking partnership between Worcestershire County Council and the University of Worcester.

The design brief required a 50% reduction in carbon emissions on the 2006 Part L Building Regulations, and stipulated natural ventilation be used in as much of the building as possible. In addition, the archive store needed to meet the strict requirements of BS5454 to obtain National Archives Certification.

The response

To help meet environmental criteria, a passive design approach was taken, which involved using daylight, natural ventilation and the building fabric for conditioning. This has helped reduce base loads, particularly electrical and lighting loads, as there was little opportunity for generating electricity on site.

Use of biomass heating and river cooling are an essential element of the overall building design. The heating load is met by a 550 kW biomass boiler fed from local

woodchip. Meanwhile, cooling is delivered to the majority of spaces from pipework embedded in the concrete. In addition, a rainwater harvesting tank collects water from the roof and serves both the WCs and archaeology department for washing archaeological finds. Materials were responsibly sourced wherever possible.

The acoustic strategy was developed to provide different learning environments across the building, and acoustic absorption was provided local to noise sources and around balustrades.

The results

The Hive officially opened in July 2012. It achieved a BREEAM 'Outstanding' rating of 86.4% at the final post construction review stage – the first building of this kind in the country to do so and the highest score ever for a public library. It achieved 100% of the available credits in management, water, waste and land use and ecology sections. The distinctive roof cones are not only reminiscent of the nearby Malvern Hills, but are also a key element of the building's operating strategy. They deliver daylight deep into the inside of the building and also help to extract warm air.

It is rewarding for the efforts of the whole team to be recognised for delivering such a challenging client brief

*Guy Nevill, senior partner,
Max Fordham*

Fast facts

EPC	A rating
Building Emissions Rate	17.4 kg CO ₂ /m ² /yr
Airtightness	4.3 m ³ /m ² façade at 50 Pa
Average daylight factor	3% (across the main library floor-plate)
Biomass boiler	One (550 kW)
Gas boiler	Three (250 kW)

SHORTLISTS FOR THE CIBSE BUILDING PERFORMANCE AWARDS 2013

NEW BUILD PROJECT OF THE YEAR (VALUE ABOVE £5M)

Sponsored by Amtech

- Titanic Belfast, Belfast, Northern Ireland – AECOM
- Gardens by the Bay, Singapore – Atelier Ten
- Hengrove Leisure Centre, Bristol, England – Hoare Lea
- The Hive, Worcester, England – Max Fordham – **WINNER**
- Royal Welsh College of Music and Drama, Cardiff, Wales – Mott MacDonald
- BMS Annex, University of St Andrews, Fife, Scotland – RSP Consulting Engineers LLP

NEW BUILD PROJECT OF THE YEAR (VALUE UP TO £5M)

Sponsored by Fläkt Woods

- Bushbury Hill Primary School, Wolverhampton, England – Architype – **WINNER**
- Colaiste Choilm, Tullamore, Ireland – BDP
- MacMillan Palliative Care Unit, Antrim Area Hospital, Northern Ireland – Beattie Flanagan
- Barnsley College, Barnsley, England – Jefferson Sheard Architects
- Michael Baker Boat House, Worcester, England – Leeds Environmental Design Associates
- Toffee Factory, Newcastle, England – Max Fordham

REFURBISHMENT PROJECT AWARD

Sponsored by Hitachi

- Wolvercote Road, Thamesmead Estate, London, England – Fraser Brown MacKenna Architects – **HIGHLY COMMENDED**
- Number 20 Lena Gardens, London, England – greentomatoenergy – **WINNER**
- Bristol Old Vic, Bristol, England – Hoare Lea
- Woolgate Exchange, London, England – Ove Arup & Partners
- The Co-operative Food Store Piccadilly Gardens, Manchester, England – The Co-operative Group
- Vaillant Group HQ, Belper, Derbyshire, England – Vaillant

BUILDING OPERATION AWARD

Sponsored by Gratte Brothers

- Whistler Athletes' Village, British Columbia, Canada – DEC Engineering
- Towards Sustainability – Dublin City University
- Hadlow College RRC, Hadlow, England – Eurobuild
- 2 St Paul's Place, Sheffield, England – Mott MacDonald – **WINNER**
- PFI schools in Central Bedfordshire, England – Sustain Limited

CLIENT ENERGY MANAGEMENT AWARD

Sponsored by Lochinvar

- British Land – **WINNER**
- Dublin City University
- Ofgem – 9 Milbank – **HIGHLY COMMENDED**
- Slaughter and May, One Bunhill Row – nominated by Waterman Building Services
- UBS – nominated by Norland Managed Services

CLIENT OF THE YEAR

Sponsored by Imtech

- Harrods
- IBM – nominated by Atkins
- Marks & Spencer – nominated by Troup Bywaters & Anders – **HIGHLY COMMENDED**
- The Co-operative Group
- Whitbread Hotels and Restaurants – **WINNER**

BUILDING SERVICES CONSULTANCY OF THE YEAR

Sponsored by Baxi Commercial Division

- AECOM
- Atelier Ten
- Cundall
- Grontmij
- Hilson Moran
- Hoare Lea – **WINNER**
- Max Fordham
- Mott MacDonald



CONTRACTOR OF THE YEAR

Sponsored by Elta Fans

- Interserve Engineering Services Ltd
- Kier Major Projects
- Norland Managed Services – **WINNER**

COLLABORATIVE WORKING AWARD

Sponsored by Mitsubishi Heavy Industries Ltd

- Atkins and London 2012 Olympic and Paralympic Games – **WINNER**
- Cundall and Durham University
- ebm-papst UK, Emerson Network Power and Norland Managed Services
- Harrods, Woods Hardwick, WSP, Riley Consultants and Lift Specialist
- Rediger, World Duty Free Group and Birmingham Airport

ENERGY-USING PRODUCT AWARD

Sponsored by Spirotech

- Belimo Energy Valve – BELIMO Automation UK Limited
- e3co-Crown – Fläkt Woods Limited
- Lighting Platform – Redwood Systems – **WINNER**

PASSIVE (ENERGY RELATED) PRODUCT OF THE YEAR

Sponsored by CMR

- Aerogel Solar Collector – Buro Happold and Brunel University in collaboration with Fraser Brown MacKenna Architects, Nuair, Xtralitre and Permarock Products – **WINNER**
- Bacticell Air Filter Cartridge – Nationwide Filter Company

TRAINING FOR BUILDING PERFORMANCE AWARD

Sponsored by Vaillant

- Energy Survey, Leisure Centre, Burgess Hill – CCL Consulting Limited
- IES & Gensler University Design Excellence 2012 (GUDX-2012) – Integrated Environmental Solutions (IES)
- Low Carbon Fit Out Guide for Retail 2012 – Land Securities – **WINNER**
- The Learning Curve – Mitsubishi Electric
- ILM Management Development Programme – Norland Managed Services

CARBON CHAMPION OF THE YEAR

Sponsored by Remeha Commercial

- British Land – **WINNER**
- This award is for the individual, team or organisation that has made the most outstanding contribution to achieving improved building performance.



The CIBSE Benevolent Fund

Members helping members, and their dependants, in need

The CIBSE Benfund was established in 1933 and has now been providing practical support to the Institution's members and their dependents for 80 years.

In 2010 the CIBSE Benfund received a **10% increase** in requests for help.

We are helping more Building Services Engineers than ever before.

Visit www.cibse.org/benfund to find out more about the work of the benfund
Email: benfund@cibse.org Tel: 020 8675 5211

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PUHZ-HW140VHA2/YHA2-(BS)



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