WINNERS’ BROCHURE

cibse.org/BPA
We are honoured to be this year’s headline sponsor.
Good luck to everyone who has been shortlisted and thank you to all who took the time to submit their entry.
As this year’s President of the Chartered Institution of Building Services Engineers (CIBSE), I am delighted to present to you the winners of CIBSE’s flagship event, the Building Performance Awards.

Now in their 11th year, the awards provide the ultimate recognition of outstanding building services engineering practice and support the quest for a more sustainable built environment. They bring built environment professionals together to improve efficiency, quality and reduce operational costs through more effective building services to the benefit of businesses and society.

Increasingly, the awards stand for ethical, sustainable and environmentally sound business. Those organisations who take their commitment to energy management and WELL Building seriously should be championed and their examples followed by others. The summaries of winning projects, people and products in this brochure and the more detailed case studies of winners that you can read over the next year in the CIBSE Journal showcase the best the built environment has to offer. I praise the good work of all of the finalists and the winners and encourage others who have not previously entered to follow their lead to set the bar ever-higher.

This year’s Building Performance Champion, the University of Oxford for its Carbon Reduction programme, demonstrates the innovation and excellence in performance that these awards celebrate. It shows CIBSE members, their colleagues and project teams are prepared to go beyond what we thought was possible in pursuit of outstanding performance levels that should become the norm.

I congratulate our finalists for having the skill and courage to make it this far and the winners for their fine work. Thank you to all of our sponsors whose support enables our engineers to achieve their performance goals and to all of our guests at the spectacular awards ceremony at Grosvenor House. You are a credit to our profession.

Peter Y Wong CEng FCIIBSE
CIBSE President
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Photography: © Dan Paton - www.danpaton.net
cibse.org/bpa CIBSE Building Performance Awards 2018
FINALISTS FOR THE CIBSE BUILDING PERFORMANCE AWARDS 2018

BUILDING PERFORMANCE CONSULTANCY
(UP TO 100 EMPLOYEES)
» Crookes Walker Consulting
» Elementa Consulting - p13
» Keysource

BUILDING PERFORMANCE CONSULTANCY
(101 - 1000 EMPLOYEES)
» BDP - p17
» Couch Perry Wilkes
» Hoare Lea
» Red Engineering Design
» TÜV SÜD Real Estate

BUILDING PERFORMANCE CONSULTANCY
(OVER 1000 EMPLOYEES)
» AECOM
» Atkins
» BuroHappold Engineering - p19

COLLABORATIVE WORKING PARTNERSHIP
» 5 Broadgate London Real Estate Programme – UBS
» David Attenborough Building – BuroHappold Engineering
» Energy Monitoring Platform with Intelligent Apportioning – Next Control Systems
» Royal Academy of Arts Heating Refurbishment – Remeha / Arup / CBRE
» The NEDO (New Energy & Industrial Technology Development Organization) Project – NPS North West - p21

LEARNING AND DEVELOPMENT
» Atkins Human-Centred Design Initiative – Atkins
» Building Maintenance Apprenticeship Initiative – George Birchall Service
» GATES Training Scheme – Hurley Palmer Flatt
» Getting to Zero – Elementa Consulting
» Net Zero Buildings offsite construction tour/Redmoor Academy’s Schoolhaus® grand opening – Net Zero Buildings
» Sustainability Matters – Landsec - p23

ENERGY MANAGEMENT INITIATIVE
» Aquatics Centre on the Queen Elizabeth Olympic Park – ENGIE
» Creation of a new London HQ at Broadgate that achieves the highest level of sustainability – UBS
» Knowledge-based Energy Management of Swire Properties Hong Kong Portfolio – Swire Properties
» Riverside Museum – IES / Glasgow Life
» Beyond The 6 Star NABERS Barrier, Melbourne, Australia – Energy Action - p25

FACILITIES MANAGEMENT TEAM
» Midway House, Birmingham – CBRE Global Workplace Solutions
» Regent’s Place Office Buildings – Broadgate Estates
» University of Oxford Carbon Reduction Programme – University of Oxford - p27

ENERGY EFFICIENT PRODUCT OR INNOVATION
» Artus: Hybrid Low Energy Fan Coil Unit – Arup
» Danfoss FlatStation – 7 Series DS (R-Fi) – SAV Systems
» i-FX-Q2 – Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A
» NewMass – BuroHappold Engineering - p28
» RQM MultiEvo – Nicotra Gebhardt
» SmartAir – R & B Industrial

ENERGY SAVING PRODUCT OR INNOVATION
» Alreflex Full Fill – Thermal Economics
» C-Tech – Cavendish Engineers
» Q-Floor – Q-Bot - p29
» Speed Technology for Lift – SODIMAS

PROJECT OF THE YEAR – COMMERCIAL/INDUSTRIAL
» 350 Euston Road HVAC Refurbishment – Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A
» David Attenborough Building (Cambridge Conservation Initiative offices) – BuroHappold Engineering
» The Enterprise Centre – Architype / BDP - p31
» Wellcome Wolfson Institute for Experimental Medicine (WWIEM) – WYG

PROJECT OF THE YEAR – LEISURE
» Oriam – Max Fordham - p33
» Sharnbrook Mill Theatre Phase 1 – Ash Building Services Consultants

PROJECT OF THE YEAR – PUBLIC USE
» Blavatnik School of Government – Hoare Lea
» Centre for Medicine, University of Leicester – Willmott Dixon - p36
» GlaxoSmithKline Carbon Neutral Laboratory for Sustainable Chemistry – AECOM
» Fusion Building – Hoare Lea
» University of York Environment Building – BuroHappold Engineering
» Windmill Community Campus – Fife Council - Property Services

PROJECT OF THE YEAR – RESIDENTIAL
» Cobalt Place – TÜV SÜD Real Estate
» Hampshire Passivhaus – Cundall
» Killynure Green, Carryduff – Choice Housing Ireland - p38
» The Paise – Newton Architects

PROJECT OF THE YEAR – INTERNATIONAL
» Cajamar Headquarters, Almería, Spain – Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A
» Pomona: Ultra-Low Energy Lab Eliminates Performance Gap, California, USA – Elementa Consulting - p41
» The "New healthy office", Warsaw, Poland – BuroHappold Engineering
» UCLA Engineering VI – Phase I (WIN-GEM), California, USA – BuroHappold Engineering
The awards focus on actual, measured performance outcomes, not just design intent or performance specifications.
Do you have a project, initiative, innovation or product that demonstrates engineering excellence in the built environment? Now is the time to shine the spotlight on your achievements by entering the Building Performance Awards 2019.

Entries should be submitted through the online entry system. To make this process straightforward we have created a template entry form for each category which can be downloaded from the categories pages.

Entries should also include supporting documentation and/or evidence to supplement the written submissions. All supporting information should be collated into one PDF document for upload. For inspiration and guidance on how to put together your entry you can view past winners’ exemplar case studies.

For more information on the awards categories and how to enter, visit: www.cibse.org/bpa

5 STEPS OF ENTRY

1. SELECT WHICH CATEGORY(IES) YOU WISH TO ENTER
   TOP TIP: Check the dates – ensure that your entry is for the period indicated in the eligibility criteria for each specific category.

2. DOWNLOAD AND COMPLETE YOUR ENTRY FORM(S)
   TOP TIP: Include measured data – you must provide evidence of measurable results against specific objectives. Explain how the results link to the objectives.
   TOP TIP: Sell the people/project/product – what is the biggest achievement or unique selling point? Bring out the winning points. Explain what is unique or innovative about your entry, how important it is, or the scale of the challenges that had to be overcome.
   TOP TIP: Provide evidence of user satisfaction – how did you meet and exceed client expectations? Client testimonials can provide valuable insight.

3. REGISTER YOUR ENTRY ONLINE FREE

4. UPLOAD YOUR ENTRY FORM, SUPPORTING DOCUMENT PDF AND PHOTOGRAPHS
   TOP TIP: Send supporting photos – we ask for 10 high resolution images to be included in support of your entry. Photographs are valuable to the submission as they will be used to represent your entry at the awards ceremony and in the winners’ supplement, should your entry be successful. Think about which relevant images would help to bring the entry to life.

5. SELECT FINISH TO SUBMIT YOUR ENTRY

KEY DATES FOR 2019
ENTRIES DEADLINE: Friday 14 September 2018
SHORTLIST ANNOUNCED: Thursday 15 November 2018
AWARDS DINNER: Tuesday 12 February 2019

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DEAR LADIES AND GENTLEMEN

WHAT A PLEASURE IT IS TO BE PART OF THIS WONDERFUL CELEBRATION THAT RECOGNISES THE VERY FINEST EXAMPLES OF PEOPLE, PRODUCTS AND PROJECTS THE BUILT ENVIRONMENT HAS TO OFFER.

I would like to extend a warm welcome to you all, and I am sure you will join me in congratulating all the finalists and winners of these prestigious awards. Thanks also to CiBSE for organising this great occasion for the eleventh year running.

As we applaud success this evening, it is worth remembering that people are delivering this sort of excellence every day. And no one person or organisation can do it alone. As our marketplace changes, collaboration is more important than ever, getting the right people and organisations working together to provide the most energy efficient, sustainable and effective building solutions.

Over the last year at Baxi Heating, we have brought the expertise and experience of our four commercial brands, Remeha, Andrews Water Heaters, Potterton Commercial and Packaged Plant Solutions, under one roof to provide the UK’s most comprehensive range of boilers and water heaters, along with complementary products such as CHP, cylinders, HIUs and accessories. Our products and systems can be combined to provide all of your heating and hot water requirements, with the added capability to build fully finished plant rooms for a turnkey installation.

By collaborating with all stakeholders and the supply chain from the project inception, we can deliver the most appropriate and cost-effective solutions, and support them in a close working relationship from design right through to installation, and beyond. From product selection and design assistance, to installation guidance, training and after sales support (including commissioning), our internal and external teams pride themselves on their expertise and knowledge.

The immediate future presents enormous challenges for our industry, and it could be a difficult time for us all. However, there are also many opportunities and we can take advantage of these by collaborating to advance innovation, educating and sharing skills with upcoming built environment professionals, and promoting best practice throughout the industry.

Tonight, let us congratulate with raucous applause, our fantastic finalists as we celebrate the very best our industry has to offer. Good luck everyone!
We are honoured to be this year’s headline sponsor.

Good luck to everyone who has been shortlisted and thank you to all who took the time to submit their entry.
The carbon reduction programme at the University of Oxford ticks several critical sustainability engagement boxes. It provides a rigorous, strategic, all-encompassing approach to realise significant carbon reductions at the university whilst offering staff and students the opportunity to be involved in the process, and delivering data and learning to feed back into university and industry practices.

The programme has inspired a host of collaborative initiatives, allowing new partnerships to develop between staff, students, the City Council and industry. The wide-ranging stakeholder engagement makes this programme particularly distinctive, with over 200 projects covering solar photovoltaic systems, lighting upgrades and building management system optimisation and developing skills, transferring knowledge and empowering users. The programme benefits the whole university by improving user experiences.

The university has set an ambitious target to reduce scope one and two carbon emissions by 33% by the end of 2020 against a 2005/06 baseline. This is amidst a challenging environment, a wide range of building uses and a very varied building stock, including highly valued heritage buildings. The university has already made progress towards this target. For example, 5,536 tonnes of carbon and £1.3 million of annual energy costs are estimated to have been saved at the university since 2011. Furthermore, we commend the university’s ambition, persistence and continuing efforts to increase the pace of change, and their openness and willingness to share information on a public website.

The programme benefits the whole university by improving user experiences. The University of Oxford is leading the way for the higher education sector not only in the global rankings of universities, but in their management of their extensive and diverse estate. The university views the work completed so far as just a start, and the early results, have encouraged further commitment to develop this project. They have shown that better energy performance can be achieved without disrupting operational performance, releasing resources for other purposes. What Oxford is doing could be done across the higher education sector.

CIBSE is delighted to award the 2018 Building Performance Champion to the University of Oxford in recognition of its leadership and long-term commitment to energy and carbon management.
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Are you starting to understand what the future will be like?
Another example is Elementa Consulting’s commitment in early 2017 to becoming a Fitwel champion and certifying its London office within six weeks, which it accomplished. Fitwel is a third-party rating system that focuses on occupant health and productivity through improvements to workplace design and policies.

The judges were particularly impressed with the London Energy Transformation Initiative (LETI) and commended Elementa, especially Clara Bagenal-George. LETI demonstrates clear leadership by trying to create solutions to deliver real carbon emissions reductions, moving beyond the limits of the current compliance-focused approach. It has done so with determination, in a true spirit of collaboration across the built environment sector, and engaging constructively with policy makers. LETI was made possible by Elementa giving their staff the opportunity to develop and drive a particular project of their interest, and this is a fantastic demonstration of the benefits.

Elementa places a high value on acquiring, developing and transferring both technical knowledge and project experience within the company, using a range of face-to-face and intranet systems. Their Practical Completion documents have become known internally as FCD’s (Fabulous Completion Documents) or FSCD’s (Fabulous Sectional Completion Documents) because they tie in every aspect of the building services.

Elementa has developed a programme of in-house awards to identify and recognise projects that incorporate unusual and exciting ideas; from spreadsheets that accelerate and automate processes to ways of encouraging and helping clients to view projects from a sustainability angle.

JUDGES’ COMMENTS
“There was tough competition but they have really good processes in place and we particularly loved what they call their FCDs, or ‘fabulous completion documents’, and how staff go out of their way to push the boundaries of building performance.”

FINALISTS:
• Crookes Walker Consulting
• Keysource

Elementa Consulting has shown genuine environmental leadership by developing a clear vision which it has dubbed: ‘Deep Green Engineering – Imagine, Perform, Accelerate, Sustain’. This pioneering initiative includes actions to boost building performance and enhance health and wellbeing.

This vision allows the consultancy’s teams to make significant, and sometimes game-changing, contributions to the world of engineering and building services by developing ideas based on four essential pillars – Imagine, Perform, Accelerate and Sustain.

As one of three sponsors of the World Green Building Council’s ‘Advancing Net Zero’, a global initiative intended to ensure buildings are zero-carbon by 2050, Elementa Consulting has designed more than 80 Net Zero projects, including DPR Construction’s Net Positive Energy San Francisco Office, winner of CIBSE International Project of the Year 2017. Several of the projects are independently certified through metered verification, each year producing more renewable energy than consumed.

Elementa Consulting

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YOUR EXPERIENCE COUNTS

Years of experience but no formal qualifications?

Whether you’re starting out, have been working in the field for years or are already professionally registered with another engineering institution, our range of membership grades and routes to membership mean that there are options to suit everyone.

“It is easy to forget a lifetime of personal achievement. Experience is invaluable and should never be underestimated.”

Martin Trentham MCIBSE IEng, Interserve Engineering Services.

“Having gained a BEng degree, I needed to demonstrate technical ability to Masters Level to gain CEng registration. There were two options open to me, either return to university full or part-time to complete a Masters or undertake a Technical Report. I decided to pursue the Technical Report Route.”

James Outram, MCIBSE CEng, Hoare Lea.

Interested in joining CIBSE?

We can help you find out which membership grade or registration level is right for you and can talk you through your eligibility for the alternative routes to membership for those who do not have accredited qualifications or who have no formal qualifications. Get in touch by emailing membership@cibse.org or call +44 (0) 208 772 3650

www.cibse.org/membership
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Proud sponsors of the CIBSE Building Performance Awards 2018 Consultancy of the Year (101-1000 employees)
BDP says: “Our focus is always on making sure the occupants get the best from their spaces; designing for simplicity of operation, ease of control, minimal maintenance, low embodied carbon, generally creating spaces that are light, airy, quiet and comfortable is our goal.”

At the centre of the BDP philosophy is the delivery of holistic, sustainable design through collaborative, interdisciplinary working. Understanding how buildings perform is critical to this, so BDP conducts post-occupancy evaluation of all its projects. It is a vocal advocate of Soft Landings, and has developed internal processes that incorporate the Soft Landings approach from the inception of a project. It has begun to implement the WELL standard, which explores how design, operations and behaviour can be optimised to advance human health and wellbeing in the places we live, work, learn and play.

BDP designed the first BREEAM Excellent school over a decade ago and the first BREEAM Outstanding office in London. The Enterprise Centre at the University of East Anglia in Norwich (Project of the Year – Commercial / Industrial winner, see page 31) has achieved both Passivhaus certification and BREEAM Outstanding, and is the subject of ongoing post-occupancy evaluation. They worked closely with the University Estates sector, developing a Sustainability Toolkit for the Association of University Directors of Estates to help assess and report the legacy of the 1960s and 1970s university estate buildings, incorporating best practice guidelines on the sustainability whole-life cost and performance of these buildings.

JUDGES’ COMMENTS

“BDP are on another level, with such a great range of things that they are doing. Some of the initiatives they showed really stood out as innovative and put them ahead of the other entries.”

FINALISTS:

- Couch Perry Wilkes
- Hoare Lea
- Red Engineering Design
- TÜV SÜD Real Estate

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BuroHappold is a global, independent, multi-disciplinary engineering and consultancy practice. It is actively engaged in addressing the most challenging current issues in building services through six core ‘focus projects’ which address these issues across the business: delivering building performance; health, wellbeing and productivity; BIM for efficient delivery; smart buildings and controls; digital design for the built environment; and design for pre-fabrication.

Headline objectives over the next three years include:

- Developing a database of building energy performance data (containing, as a minimum, the EPC, DEC or EUI in kWh/m²/year), mapping out typical areas where designs do and don’t achieve their potential, to ensure these are incorporated into its specifications.
- Committing to integrating the WELL Standard and Fitwel health and wellbeing initiatives as part of its standard offering. Over the next three years the business plans to conduct at least five ground-breaking wellbeing projects and will use the knowledge gained to feed into policy development.
- Investing in a rolling intake of Engineering Doctorates and PhDs in areas such as building performance, well-being, smart buildings and resilience.

BuroHappold provides numerous examples of effective collaboration. Its trailblazing projects include the David Attenborough Building at the University of Cambridge, refurbishing a legacy building with significant constraints, and the Urban Sciences Building at Newcastle University.

It has successfully applied innovative tools and processes on both these projects, including stakeholder engagement workshops and engagement throughout the project. It established detailed sustainability frameworks to manage delivery of outcomes in a transparent and auditable way and baseline surveys to understand how the existing building and/or similar assets are performing. The result is a high level of user satisfaction in the new facilities.

The practice has a significant programme of research dating back many years to develop new tools and processes which address the six core topics, and invests in an ongoing programme of Engineering Doctorate research. The programme addresses both design and operational challenges, including the rapidly emerging challenge of analysing operational data from modern control systems.

BuroHappold invests heavily in staff, obtaining a wide range of industry recognised accreditations such as energy, ESOS and BREEAM assessors, enabling them to demonstrate competence in these activities.
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between this wide group of participants and for its active engagement with the occupiers of the homes being upgraded. There was a major undertaking to ensure that those receiving the upgrades were made fully aware of the nature of the work to be undertaken and supported in using the new systems. Aspects of the project were revised and modified as a direct result of engagement with the end users. The pilot demonstrates replacing old heating systems in over 550 social housing properties across Wigan, Bury and Manchester with cutting-edge electrical and hybrid ASHPs, and developing an energy aggregation system and ICT platforms to control and co-ordinate the electricity usage of the ASHPs. Hitachi and Daikin Industries supplied ASHPs and Hitachi provided the DR monitoring equipment and a computer tablet for each tenant to monitor and control the new heating systems.

A procurement management company (Procure Plus) worked with the ALMOs and NEDO to produce a competitive tender package to find a main contractor to carry out the installations, and managed a thorough evaluation process by the client partners to ensure that the selected partner would deliver the required engagement with the tenants and users. The NEDO project could be a national exemplar, showing the way for similar retrofit programmes in more homes across the region.

The NEDO Project – also known as the ‘Smart Community Demonstration Project’ – is an enterprising heat pump demonstration project with several stakeholders, developed by the Greater Manchester Combined Authority (GMCA) and Japan’s New Energy and Industrial Technology Development Organization (NEDO). NEDO aims to address energy problems and raise the level of industrial technology through integrated management of technology development from the discovery of technology seeds to the promotion of mid- to long-term projects and support for practical applications. The three-year Smart Communities Project began in March 2014 with an extensive team of project partners and delivered a successful pilot project within the social housing sector. It trialled the implementation and use of air source heat pumps (ASHPs) at scale and tested the effectiveness of demand response (DR) in the social housing sector.

The project stood out to the judges for the level of collaborative engagement

JUDGES’ COMMENTS

“NEDO had a lot of impressive user results despite many stakeholders that would have been difficult to engage with. This project really showcases what can be done in housing and if the project was replicated it could have a serious impact on stock and change how we operate in this market.”

WINNER: The NEDO (New Energy & Industrial Technology Development Organization) Project - NPS North West

PROJECT ADDRESS: Greater Manchester (550 individual domestic dwellings)

PROJECT TEAM:
Building Services Engineer: NPS North West
Building Owners: Wigan & Leigh Homes / Sixtown Housing / Northwards Housing / (ALMO’s)
Building Occupiers: Social Housing Tenants
Project Managers: Green Blue Skies / NPS North West
Quantity Surveyor: Procure Plus
Brief Consultants: Hitachi / Daikin Industries / Mizuho R&D / Manchester Council
Mechanical/Electrical Engineer: NPS North West
Contractor: Warmer Energy Services (WES)
Investment/Property Companies: NEDO / Mizuho Corporate Bank
Developer: Greater Manchester Combined Authority (GMCA)
Facilities Managers: Wigan & Leigh Homes / Sixtown Housing / Northwards Housing
Other: Azymuth Acoustics / Electricity Northwest

FINALISTS:
- 5 Broadgate London Real Estate Programme - UBS
- David Attenborough Building - BuroHappold Engineering
- Energy Monitoring Platform with Intelligent Apportioning - Next Control Systems
- Royal Academy of Arts Heating Refurbishment - Remeha / Arup / CBRE

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*Offer expires on 1 March 2018. This offer can be used on both member and standard ticket rates but not in addition to any other discount offers.

**In-house courses are only available in the UK and Europe with a minimum of 6 delegates per course.
How a learning and development initiative has improved the understanding of building performance within an organisation and/or in the wider built environment sector, including applied research initiatives from academia.

**WINNER:** Sustainability Matters – Landsec

- Level 1 (introduction) – an online module covering the global issues facing society and expected impacts of climate change; why this is important; an overview of the Landsec sustainability approach through the property lifecycle. It includes the implications of Landsec’s sustainability strategy on different job roles across the business. The module ends with a short test to confirm employee understanding.
- Level 2 (for enhanced learning) – three workshop-style modules including smart investments, sustainable design and construction, and efficient operations.
- Level 3 – workshop-style technical masterclasses on specialist subjects such as energy monitoring and verification and evaluating performance of buildings.

The courses were in the form of carefully targeted training sessions for key business functions focused on the needs of their role. Outputs so far include 100% completion rate of the Level 1 online module, development of five bespoke Level 2 training modules and 14 face-to-face workshops.

Interactive learning methods were used throughout. Practical exercises were developed to give delegates an opportunity to use their newly-acquired learning in a real scenario, helping them understand how to apply the new insights to real projects.

Knowledge was measured before and after the learning intervention. The number of staff trained since launching is a substantial achievement in the judges’ opinion.

Landsec has promoted best practice by inviting expert speakers from a host of organisations and sectors. It collected feedback at all courses, and then acted upon it.

The company has also shared the story of ‘Sustainability Matters’ through numerous internal events and communication channels and externally through its own sustainability report and the UKGBC impact report.

**JUDGES’ COMMENTS**

“Sustainability Matters covers every aspect of sustainable design, hitting every point and showing real commitment to delivering sustainable learning for Landsec’s staff. We applaud it.”

**HIGHLY COMMENDED:**

- Net Zero Buildings offsite construction tour/Redmoor Academy’s Schoolhaus® grand opening – Net Zero Buildings

**FINALISTS:**

- Atkins Human-Centred Design Initiative – Atkins
- Building Maintenance Apprenticeship Initiative – George Birchall Service
- GATES Training Scheme – Hurley Palmer Flatt
- Getting to Zero – Elementa Consulting

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CIBSE Building Performance Awards 2018
Imtech has recently exceeded its guaranteed energy savings for the North West Ambulance Service (NWAS) by 13% and is on target to deliver cost savings of over £4m to frontline patient care by 2029, as well as helping the NWAS achieve its’ carbon reduction aims.

Proud sponsor of the Energy Management Initiative Award

Imtech is one of the largest technical services providers in the UK, with extensive expertise and experience in engineering services, technical facilities management and systems integration, delivering innovative sustainable solutions through digital engineering technology.

Imtech.co.uk

Succeed by delivering a better experience
This project has successfully achieved a cutting-edge 6 star rating without GreenPower for the 12 months to 30 September 2016, only the second multi-story office building to achieve this. This was done by:

- Identifying building tuning opportunities through detailed analysis of the building management system.
- Facilitating the implementation of the recommendations, in collaboration with the site management and the incumbent BMS contractor, to ensure that those running the building understood how the systems were being operated.
- Monthly monitoring and reporting of base building performance and sub-systems.

Energy Action was also engaged by CIMB to install a 100kW solar photovoltaic system on the roof of the building. This was commissioned in early July 2016 and won the 2016 award for ‘Best Solar PV System Design and Installation’ from the Clean Efficiency Council of Australia.

The improvement at Tower 3 shows that, even in an already energy-efficient building significant energy efficiency improvements can be achieved. It also demonstrates the importance of the people as well as the systems and process in delivering truly high-performance buildings.

JUDGES’ COMMENTS

“This project shows that it doesn’t have to be difficult if you apply some simple rules. It’s a great example of what happens when you make incremental gains and add them all up. They showed their benchmarking data and recorded the performance getting better and better. We would love this kind of evidence for every entry submission.”

FINALISTS:

- Aquatics Centre on the Queen Elizabeth Olympic Park - ENGIE
- Creation of a new London HQ at Broadgate that achieves the highest level of sustainability - UBS
- Knowledge-based Energy Management of Swire Properties Hong Kong Portfolio - Swire Properties
- Riverside Museum - IES / Glasgow Life

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A creative carbon reduction programme at the University of Oxford has inspired a range of collaborative initiatives that have allowed new partnerships to grow between staff, students, the City Council and industry. The programme is particularly distinctive because of this high degree of engagement from all its stakeholders.

The university set an ambitious target to reduce scope one and two carbon emissions by 33%, by the end of 2020, against a 2005/06 baseline. The expanding estate meant the university had increased its total emissions by 3% by 2015 so it still needs to see a 36% reduction in carbon emissions by 2020.

The programme is so far estimated to have saved the university around 5,536 tonnes of carbon and £1.3 million of annual energy costs since 2011. With more than 200 projects completed, including solar photovoltaic (PV) systems, lighting upgrades, building management system optimisation, building system improvements and roof insulation. There are five categories of project:

1. Renewable energy – Over 1,000 PV panels have been installed with a payback of between 6-10 years, or 14-20 where the Feed-In Tariff (FIT) scheme is not available.
2. Building fabric – Investment in a range of loft and pipework insulation to reduce heating costs.
3. Building systems – The university runs a range of facilities (libraries, museums and laboratories) that require specialised operation. Optimising control of these systems reduces carbon emissions and operating costs with a relatively low investment.
4. Engagement and behavioural change – Workshops to share knowledge and raise awareness of building and facility managers. To accompany this, the university has invested in monitoring and targeting software to give building users access to their energy performance data and allow direct billing. Engagement materials have also been developed, such as ‘shut the sash stickers’ for fume cupboards.
5. Plug loads – Mathematical, Physical, Medical and Life Sciences Divisions are responsible for 76% of the carbon emissions of the university. As a result, a new procurement user group was set up to work with the departments, and new service contracts agreed. A subsidy scheme has been put in place to upgrade ultra-low temperature freezers, of which the University has more than 500.

An impressive undertaking that has seen the University of Oxford’s Carbon Reduction Programme also awarded this year’s Building Performance Champion title (see page 11).
The NewMass cooling system created by BuroHappold Engineering’s Gideon Susman is a low energy cooling system comprising an array of finned tubes that sit below the ceiling of an occupied space. The tubes are filled with a phase change material (PCM) that passively absorbs excess heat from the space by changing from a solid to a liquid.

At night, this absorbed heat is either passively discharged to the night air or rejected to a chilled water loop. Depending on ambient temperatures, the chilled water loop may be able to provide free cooling; otherwise, a chiller can ‘sink’ the heat. The chiller can also operate on particularly hot days to boost cooling as required.

The NewMass system was designed and tested as part of a Brunel University Engineering Doctorate in Environmental Technology. A prototype design was tested at Brunel University in a custom-built test chamber and compared against other commercially available passive PCM products. The prototype tests revealed competitive temperature moderation in passive mode and excellent temperature control during active operation. Informed by the measured system characteristics, creation of a bespoke modeling tool, coupled with IES VE, for full building modeling, allowed a prediction of 34% energy savings for a typical UK office building.

The system maximises energy savings by prioritising passive operation (30 to 40% for London offices or schools, for example). Its modular nature allows an array to be sized according to the cooling load in a space. The active cooling function ensures desired cooling set points are always achieved. This combination of passive and active function achieves the best of both worlds – the energy savings of passive design and the control of active mechanical cooling.

NewMass can also operate in heating mode when supplied with hot water from a boiler or heat pump. This saves money by eliminating the need for radiators or other heating systems.

As well as being a passive system with the option of active thermal discharge to a chilled water circuit, the system also contains several features which, together, constitute an entirely new design, including modularity and superior conductivity to improve performance.

Increasing the conductivity with Raschig rings (small aluminium cylinders) means the units maintain a higher cooling capacity for longer, effectively increasing thermal capacity and aiding the discharge of accumulated heat.

Finally, enhanced convective and radiative heat transfer at surface maximises cooling capacity and heat discharge rate.

JUDGES’ COMMENTS

“A lot of thought has gone into NewMass. We were really impressed with the supporting documentation and how open they were with the testing they have done.”

WITH CREDIT TO:

• Brunel University / Chalfont Energy Investments / ICE Architects / Brentfield Primary School / Brent Council

FINALISTS:

• Artus: Hybrid Low Energy Fan Coil Unit - Arup
• Danfoss FlatStation - 7 Series DS (R-FI) - SAV Systems
• i-FX-Q2 - Mitsubishi Electric Hydronics & IT Cooling Systems S.p.A
• RQM MultiEvo - Nicotra Gebhardt
• SmartAir - R & B Industrial

WINNER:

NewMass – BuroHappold Engineering
This innovation has just gained BBA Accreditation and has been adopted by a range of housing associations and local authorities to help reduce fuel poverty of their tenants and improve the energy efficiency of their housing stock.

Q-Floor has been installed in more than 100 dwellings and been thoroughly tested and monitored during numerous trials. The results have exceeded expectations with the measure, on its own, able to reduce overall energy consumption by a quarter.

Q-Bot confirmed the value of Q-Floor by commissioning a range of research from Imperial College London, University College London, Leeds Beckett University, the Association for Environmentally Conscious Building, Parity Projects, PRP Architects and others, conducting simulations of coupled heat and moisture transfer, risk assessments, moisture and condensation analysis, co-heating tests, post-occupancy evaluation, in-situ U-value tests and occupant surveys.

Energy savings are more than twice that achieved when the floor is insulated with rigid board or glass fibre batts, with much greater impact on energy use and comfort. The fact that Q-Floor achieves this at less than half the cost of the alternatives significantly adds to its appeal and emphasises the innovation in its design.

Q-Floor underfloor insulation from Q-Bot dramatically speeds up suspended timber floor insulation installation in existing buildings at a fraction of the cost and time of alternative methods, while also ensuring gains in energy efficiency and comfort.

The standard method of insulating suspended timber floors involves removing furniture, carpets and floorboards; cutting and fitting insulation material between the floor joists by hand; and refitting the floorboards and carpets.

Q-Floor can improve the U-value of a floor by as much as 85% without the need for disruptive installation from within the house, by deploying a small robot (the SprayBot) in the floor void to spray-apply insulation from below. The entire insulation process lasts one or two days, and it saves occupiers a whole lot of "hassle", removing a major disincentive to take action.

The system creates little waste, is non-disruptive as floor removal is not required, is quick and relatively inexpensive, while also providing exceptionally good energy savings due to full contact of insulation with the timber and better airtightness. It also strengthens the floor and retains timber on the warm, dry side of the insulation, extending its lifespan.

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Recognising building services solutions that help to reduce energy loads and make a significant contribution to improving building performance.

WINNER: Q-Floor – Q-Bot

JUDGES’ COMMENTS

"Q-Floor is an innovative product that could really make a difference. They provided a lot of data including independent testing, which we were impressed with. This is a great fun product that makes it much easier to save money on your energy bills."

FINALISTS:
- Alreflex Full Fill - Thermal Economics
- C-Tech - Cavendish Engineers
- Speed Technology for LIFT - SODIMAS
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Gas, oil, diesel fuels and compressed air pipework can be connected with Megapress G.

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1. Branch connections can be added in minutes with the Megapress press-in connection system.
2. Gas, oil, diesel fuels and compressed air pipework can be connected with Megapress G.
The Enterprise Centre is the most recent addition to the University of East Anglia campus; a groundbreaking project showcasing genuinely low-carbon architecture and materiality that achieves the client’s aspiration of Passivhaus, BREEAM Outstanding, and a 100-year performance lifecycle.

The design reflects an ambitious vision to create a high quality and truly sustainable building for people, the environment and the economy. The judges were really impressed with this ambitious goal of setting out to achieve a really good building that would perform very well. The centre provides dedicated space for small businesses, including open-plan offices, support workshops, networking spaces, and incubation-hatchery space to support and develop start-up organisations.

A key part of the brief was to design a working environment that focused on the health and wellbeing of the building’s users. The Passivhaus strategy, combined with the natural materials used within the building, provides a low-energy, comfortable, non-toxic internal environment for the businesses that occupy the centre.

To support the occupation of this innovative building, the client opted for a Soft Landings process that started at the inception stage and ran for three years after completion in June 2015.

A high proportion of the materials for the building are sourced from within 30 miles of the site. This includes the vast timber glulam that support the canopy and 70% of the stud-work which is from Thetford Forest. The iconic thatch façade came from the Norfolk Broads, as did the reed for the internal reed board coverings.
Examples of optimisation to reduce the building’s embodied carbon include low-carbon thermal mass exposed in the slab, as well as the use of bio-based materials and recycled materials.

A key objective was to have every internal space benefiting from a natural light strategy as much as possible. The challenge was to create this without causing the building to overheat during the summer months. The robust shading strategy is designed to prevent overheating, with features such as the brise soleil on the southern facing elevations and thatch overhangs.

A low energy, task-focused LED lighting scheme provides illumination only where required, fittings are daylight dimmed and intelligent controls ensure lights switch off when spaces are unoccupied.

A mixed mode ventilation approach with variable air volume demand control provides fresh air ventilation. Building users can also open windows and vent panels.

Night cooling strategies combine with the thermal mass of the polished concrete ground slab and fermacell partitions to ensure spaces do not exceed 28°C for more than 1% of the occupied hours. The lecture theatre has an air handling unit integrated heat pump to offer peak loop cooling in the summer although this is rarely required.

Power and data is distributed around the perimeter feeding desk modules which are located in the furniture. Although the Passivhaus approach means heat demand is minimal, occupied rooms are provided with a small radiator and TRV. Heating is provided by a district heating connection from the campus wide infrastructure.

Standing heat losses from the hot water system are minimised by super insulation and reducing distribution pipework where possible, including the use of micro bore to reduce standing losses from un-circulating water volume. Hot water outlets remote from the DHM heat exchanger unit are served by local electric water heaters controlled by time switches.

In the first year of operation the building consumed 103 kWh/m²/annum in primary energy, well below the stringent 120 kWh/m²/annum Primary Energy target for Passivhaus and just below the predicted 111 kWh/m²/annum design stage figure. Independent Post Occupancy Evaluation in the third year of operation identified improved energy consumption figures with a total of 19.2 KCO2/m²/annum (GIA) emissions. This equates to 45 kWh/m²/annum (thermal and electric) demand and Primary Energy Demand of 87.36 kWh/m²/annum (excluding any reductions from renewables).

The judges were impressed with the Soft Landings process that started at the inception stage and would run for a full three years after Practical Completion. This demonstrates their commitment to optimising the buildings potential and their involvement throughout design and delivery to produce a building that is universally understood by its users. The Enterprise Centre is currently undergoing a 3-year post occupancy research programme into energy use and comfort levels.
Recognising the new build or refurbishment of a building within the leisure sector that most effectively demonstrates high levels of user satisfaction and comfort whilst delivering outstanding measured building performance.

**WINNER:**
Oriam - Max Fordham

**MAX FORDHAM**

The high performance Oriam Health and Fitness facility at Heriot-Watt University, Edinburgh provides extensive natural ventilation and daylighting to reduce the need for mechanical cooling, fan energy and artificial lighting.

To optimise energy usage this state-of-the-art sports centre has been designed to suit a wide range of activity and occupancy levels.

The Soft Landings process has been instrumental in fine tuning the lighting, heating and ventilation control within the sports hall, improving user comfort and reducing energy consumption.

For example, in the main sports hall, levels of the zoned lighting can be adjusted to meet the specific requirements of the sport being played and the level of competition. Heating, ventilation and lighting are zoned so that each court can be controlled individually if required, and ventilation is also controlled according to occupancy through use of CO2 sensors.

Max Fordham carried out analysis to establish the optimum balance between roof transparency and ventilation openings to avoid summer overheating in the indoor 3G football pitch. The openings were integrated into the building envelope at a high level to avoid cold drafts to spectators in winter.

The sports hall is naturally day lit to avoid glare, create a more pleasant sporting environment and also save energy. It incorporates roof lighting with diffusing glass, providing sufficient daylight to allow the artificial lighting to be switched off during daylight hours while controlling glare for occupants.
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The roof lights incorporate automatic actuators to provide natural ventilation adequate for up to 800 people during graduation ceremonies.

The pitch incorporates a translucent roof membrane with a transparency which has been tuned to control solar gain while delivering a daylight factor of 6%, sufficient to play sport without artificial lighting for the majority of the year. The lighting controls allow the light levels to be easily managed between 250 lux for training purposes and 500 lux for high-profile matches. The judges praised Max Fordham for their focus on natural lighting to reduce energy consumption throughout the building.

The large indoor 3G football pitch is unheated, but is adjacent to heated accommodation on both sides. This could have caused thermal bridging where the structure crosses from unheated to heated spaces. Untreated, this would result in significant heat losses from the adjacent spaces. The judges were impressed that to combat this, Max Fordham raised the issue early in the design stage with the architect and structural engineer to include thermal breaks in the structure to limit the cold bridging as much as possible. The arched shape of the building reduces the surface to volume ratio and, therefore, heat loss.

The fitness suite experiences very high occupancies, requiring high ventilation rates and cooling loads. To reduce energy consumption whilst maintaining an appropriate indoor environment the ventilation is controlled on CO2 to match the variable occupancy and the air conditioning has been designed to transfer the waste heat from the fitness suite to the café above.

Max Fordham showed the actual energy consumption for Oriam for the last year compared to design estimates and also estimated consumption from the final energy performance certificate. The total gas consumption over the year is significantly less than predicted and electricity use is more than predicted. Fine tuning has continued throughout the year (which will affect both gas and electricity) and should see a reduction in consumption over the next year of occupancy.

A Post Occupancy Evaluation using the BUS occupant survey shows that Oriam has performed very well during its first year of occupation, performing better than the benchmark in most categories.

JUDGES’ COMMENTS

“This was a tough category whilst comparing projects but Max Fordham’s supporting documents far outweighed the competition. Oriam had a really great focus on natural lighting which stood out.”

FINALIST:
- Sharnbrook Mill Theatre Phase 1 - Ash Building Services Consultants

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The impressively-designed Centre for Medicine (CfM) at the University of Leicester (UoL) has set a new best practice example for large-scale higher education buildings and has gained Passivhaus certification, the largest building in the UK to do so.

The CfM brings together the colleges of medicine, psychology and biological sciences under one roof for the first time and accommodates 2,400 occupants in a range of teaching, social, ‘dry’ laboratory and academic research spaces. These departments previously occupied 19 separate old and inefficient buildings.

A key driver behind the CfM has been UoL’s sustainability strategy and desire to reduce carbon emissions by 60% by 2020, based on a 2005 benchmark. It was recognised early on that achieving a low energy/low carbon building should be the first priority. The university has a long record of actively managing energy use, and was one of the first universities to publicise its Display Energy Certificates online.

The site is a former football pitch and is located on the edge of a conservation area. There are a number of listed buildings in the vicinity and views from Regents College to the north of the site towards the war memorial are protected. All of this created a sensitive site in terms of planning.

WINNER:
Centre for Medicine,
University of Leicester - Willmott Dixon

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The site is a former football pitch and is located on the edge of a conservation area. There are a number of listed buildings in the vicinity and views from Regents College to the north of the site towards the war memorial are protected. All of this created a sensitive site in terms of planning.
To respect and overcome these challenges, the building has a stepped down shape and is split between three main blocks. This largely satisfied the planning requirements, but meant that increased energy demand due to this deviation from the ideal form factor and orientation that Passivhaus favours, had to be made up elsewhere, such as by better airtightness and higher fabric thermal performance.

The university set several objectives: as well as achieving Passivhaus Certification it was to be BREEAM Excellent, have an ‘A’ rated EPC on construction and obtain an ‘A’ rated DEC by the end of the third year of operation. All were accomplished. It was also agreed to adopt the Soft Landings approach.

Willmott Dixon believes the Soft Landings framework has been central to the building achieving DEC rating of ‘A’ in just over a year, well ahead of the three-year post-completion deadline.

Measurements of CO2, humidity, temperature and a presence detection system are used by the building management system to create a highly automated building that maximises energy efficiency while maintaining a high level of user comfort. However, users have override control within a range as described in the building user guide.

To further reduce energy, the building benefits from a ground air heat exchange system (GAHE), which pre-heats and pre-cools incoming air. This 1.6km labyrinth of pipes had to be fitted between foundation piles, pile caps and other underground services. Two solutions were explored – install GAHE pipes either before or after piling. The latter was chosen as it would prevent the risk of GAHE pipes being damaged by piling, but meant design had to be modified to accommodate piles being partially exposed after installation and the unequal loadings they were subjected to. The judges praised Willmott Dixon for their approach and the objectives achieved.

Willmott Dixon has shared its approach and lessons from this project at a number of industry events including Passivhaus conferences, Passivhaus Trust site visit, and during presentations and site visits to staff and students from universities including Loughborough, Birmingham, Oxford and Leeds.

**JUDGES’ COMMENTS**

“The standard of the shortlist was incredibly high but the Centre for Medicine had the best performance and will be a tough project to follow. We are impressed with the actual energy performance as well as the application of Soft Landings and post-occupancy evaluation, which provide a great demonstration of best practice for the industry to follow.”

**HIGHLY COMMENDED:**
- Windmill Community Campus - Fife Council - Property Services

**FINALISTS:**
- Blavatnik School of Government - Hoare Lea
- GlaxoSmithKline Carbon Neutral Laboratory for Sustainable Chemistry - AECOM
- Fusion Building - Hoare Lea
- University of York Environment Building - BuroHappold Engineering
Representing a step change in sustainable building practice, Killynure Green is an inventive zero-carbon 39-home social housing development in Northern Ireland. It has achieved the rigorous demands of Level 5 of the Code for Sustainable Homes and it is anticipated that CO2 emissions are to be 60% less than Northern Ireland building regulation requirements.

The scheme was developed by Choice Housing Ireland (under its previous name, Oaklee Homes Group) following a competitive selection process by the Northern Ireland Housing Executive. An international design competition followed, with architectural practices as far away as Germany and America expressing interest in the project.

Topography on the site was difficult with steep slopes that led towards existing homes in the area. This created challenges in terms of daylight and solar gain, and so significant groundworks were carried out to make the site more suitable. Homes were orientated as closely as possible towards the south to take advantage of free heat, with ‘winter gardens’ designed on each home to capture this heat.

As a social housing rather than a private development, Killynure Green had to meet additional standards such as ‘lifetime homes’, ‘secured by design’ and standards from the Department for Communities (including space parameters and funding support). These standards sometimes conflicted with one another, so careful consideration had to be given to each.

A key objective was to reduce the reliance on renewable technologies and other equipment where possible. 4kWp of solar PV was installed on each home with generated electricity able to be used where possible and remaining electricity exported to the grid.

Each home has a mechanical ventilation system with heat recovery installed, providing filtered warmed air, which is projected to help reduce running costs and contribute to improved comfort and health.

**WINNER:**
Killynure Green, Carryduff
- Choice Housing Ireland

**JUDGES’ COMMENTS**

“Killynure Green was a really commendable approach to a social housing scheme. There were lots of references to lessons learnt from previous projects that they had reviewed and improved on.”

CIBSE Building Performance Awards 2018
Support was provided to occupants as part of the handover process and through subsequent visits. Integration with the local community has been encouraged through community engagement, with a play park built on site and named by the local primary school. The occupant engagement was noted by the judges as a key step in achieving good performance from the scheme.

Designed to achieve high standards with a focus on solar gain and building fabric measures, Killynure Green was intended to be part of a larger development of around 70 mixed tenure homes. Although the housing market dictated that this was no longer feasible, an initial phase of 39 social homes was developed.

Design is now under way to develop the second phase of homes, which will also be social housing tenure. The intention is to pilot this second phase to a new optional energy efficiency standard outlined by the Northern Ireland Department of Communities, with these new homes expected to be some of the first developed in this way in the province.

An important aspect to this scheme is the repeatability in relation to the design approach and the technologies used, and this should serve as a benchmark for future housing in Northern Ireland.

A spokesperson for Choice Housing Ireland said: “We believe there are valuable lessons to learn from the development of Killynure Green and recognition via this award would help to highlight the value of developing to higher standards.”
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The team at the new 7,000m² high performance laboratory at Pomona College, a private, coeducational, liberal arts college in Claremont, California, US, demonstrated best practice commitment to reducing its environmental impact wherever possible.

The 1950s portion of the building was replaced with a laboratory and classrooms totalling 4,600m² with additional work resulting in the full refurbishment of around 2,400m². This included an envelope upgrade to bring the performance up to the rest of the building and allow the integrated system solutions to work throughout.

The client opted to use enhanced filtration on a 100% fresh air system with user adjustable, displacement ventilation in all non-laboratory spaces. The radiant panels all have independent local comfort control for every space. Accurate temperature control throughout the experimentation zone for the physical sciences required air mixing so active chilled beams were used in these areas.

Based on measured data from contemporary labs from the online International Institute for Sustainable Laboratories benchmarking tool, Elementa Consulting confirmed that similar lab buildings in region have an energy use intensity (EUI) of 660 kW-hr/m²-yr. By comparison, the final total building energy from metered data resulted in an EUI of 168 kW-hr/m²-yr – eliminating the performance gap – a 75% reduction compared to the benchmark building and a 67% energy reduction from the existing building.
The project offsets 10% of the annual energy consumption with onsite photovoltaics. The client was keen to achieve LEED Gold, but, in fact, it achieved LEED Platinum Certification, the highest rating available from the US Green Building Council.

A number of challenges were overcome during this project. For example, lab spaces in the new-build portion of the building required higher ceilings which created constrained floor-to-floor heights at the transition zones to the old retained building wing, squeezing services. There were also strict planning requirements for the building height and the building required a flexible seismic joint between the new and old sections.

The cooling tower yard was relocated around 130m away from the building to create a beautiful new courtyard alongside the project. The chemical exhaust stacks were located in a visually obscured ‘well’ that was on the opposite side of the building from the laboratories, this required wind tunnel testing to minimise stack height (aesthetic impact) and exit velocity (energy impact). The tight configurations in the floor-to-floor height and remote distances travelled for the airside and waterside systems all added energy ‘penalties’ to the building. The team used lower pressure drop design for these systems to overcome the increased losses.

The climate has a large natural ventilation season for roughly half the year, but the remainder requires active heating and cooling.

The radiant panels used for cooling employ chilled water that can often end up below the dew point of the room air, creating a condensation risk. The team therefore used condensation sensors on the chilled water pipes. In the event of condensation forming, the control system floods the panels with warm water to stop the condensing process.

Occupant training in the appropriate use of the system and windows has been completed as part of the ‘enhanced commissioning’ process during the first year of occupation. Enhanced commissioning under LEED is akin to the soft landings approach taken in the UK.
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