

The Building Operation Award is presented to the building operator who delivers outstanding building performance from an individual building or a site with several buildings. This will include delivering the comfort levels and working conditions required by the users or occupants, and demonstrating substantially reduced energy consumption and carbon emissions without compromising overall user satisfaction.

Entries may be submitted by any or all members (together) of the project team, and should be for energy management projects where the initial activity was completed during the period **1 April 2011 to 31 August 2012**, thus having a full year of operational performance data following completion of the initial energy management interventions. Entries from SMEs are particularly encouraged.

Please complete the entry form below. The headings reflect the judging criteria and the judges will be looking for you to provide the relevant information under each heading.

<b>Project Details</b>	
<b>Project name/s</b> <i>As you wish the project to be referred to throughout the competition.</i>	
Energy reductions at Exchange House	
<b>Project Address/es</b>	
Exchange House, Broadgate in the City of London	
<b>Organisations</b>	
<i>Please provide the names of all organisations that you would like to be credited in your entry. Please ensure that the company names you list are accurate as we will be reproducing these on screen and in print. It is essential that you have the consent of all those named below to include them.</i>	
Building Services Engineer:	Broadgate Estates Limited
Building Owner:	British Land and Blackstone
Building Occupier:	F&C Asset Management, Herbert Smith Freehills and Société Générale. Broadgate Estates Ltd also has an Estate Management Office in the building.
Project Manager:	Click here to enter text.
Quantity Surveyor:	Click here to enter text.
Brief Consultant:	Click here to enter text.
Architect:	Click here to enter text.
Interior Designer:	Click here to enter text.
Mechanical / Electrical Engineer:	Click here to enter text.
Contractor:	Click here to enter text.
Investment / Property Company:	Click here to enter text.
Developer:	Click here to enter text.

<b>Entry Details</b>
<b>Summary</b> <i>Please provide a synopsis of the project/s and its/their building performance, low carbon and energy efficiency objectives.</i>
Developed by British Land, Exchange House is a multi-occupied 386,900 sq ft building completed in 1990. Working together with the occupiers, British Land and Broadgate Estates Ltd have implemented a raft of changes to make it more energy efficient, easier to operate and more adaptable to occupiers' changing occupational needs. We have cut landlord-influenced energy by 31% since 2009 (with the majority of the savings realised in 2012/13). We have also helped occupiers achieve 23% reductions in their areas. Total building reductions have cut carbon emissions by 8,500 tonnes and benefited occupiers by delivering energy cost savings of over £1 million in the last four years.

**Please outline how your entry meets each of the entry criteria – judges will be looking for information in each of the sections when assessing the entries:**

*Any documents, charts or photos can be referenced and included in your supporting documents.*

Specific energy management measures taken to improve the building/s performance including changes to the lighting, heating, and cooling provision, including changes to equipment, hours of operation or other control parameters.

\* **INVESTMENT IN NEW TECHNOLOGIES:** British Land forward-funded £163,000 in a new dynamic energy monitoring and management system at Exchange House in 2010, following a successful pilot at our Head Office. This measures energy use every 15 minutes, which a team of specialists monitors in real time, identifying opportunities for the building management team to optimise consumption, with successful examples at Exchange House including:

- Reducing how long the air conditioning system operates when the override option is used, from four hours to one hour. This saves 35,000 kWh each year.
- Addressing an increase in the air conditioning base load, due to a faulty power pack. This would otherwise have wasted 33,600 kWh each year.
- Optimising the heating schedule for late Sept/early Oct, when the ambient temperature decreases.
- Adjusting the lighting timings and patterns for external areas. This saves 156,000 kWh each year. (Supporting Docs P1-4)

\* **REDUCING OUT-OF-HOURS CONSUMPTION** at Exchange House and applying the solutions we trialled here in other buildings across our portfolio. In the past, the central plant at Exchange House ran practically 24/7 for the entire building. We engaged with occupiers to introduce three measures to align plant run times with operational needs:

1. Introducing out-of-hours energy billing to incentivise the 24/7 businesses to explore more efficient alternatives to operating out-of-hours (whereas previously this was subsidised by other occupiers).
2. Agreeing core hours for the building, initially from 7am to 8pm and then, as occupiers became comfortable with the principle of core hours, from 7am to 6pm.
3. Removing override switches on the office floors for heating and cooling out-of-hours. Occupiers now schedule out-of-hours requirements with the building manager who applies the most efficient option. (Supporting Docs P5-6)

\* **ENGAGEMENT WITH OCCUPIERS:** Our occupiers are more receptive because we can quantify savings and provide secure projections before capital expenditure or management changes are made. British Land and Broadgate Estates lead a well-established green building group with all occupiers at Exchange House, and provide them with six-monthly building environmental statements we believe are unique in the sector. Recent examples of capital investment initiatives agreed to help individual occupiers improve energy efficiency and cut costs include working with:

- Herbert Smith to arrange for variable speed drive (VSD) fans to be installed on part of the air conditioning system that was operating continuously, due to fans running constantly at full speed. This saves 118,600 kWh a year.
- Société Générale to deliver savings on its out-of-hours energy costs. As a result, the firm funded the installation of a roof mounted chiller to supply its out-of-hours cooling water requirements. This allows central chilled water plant to return to a minimum run state more frequently, reducing electricity use.

\* **COMPREHENSIVE LIGHTING REPLACEMENT PROGRAMME:** Investing £103,000 to replace traditional light fittings throughout the building with energy efficient alternatives, and install motion sensors (PIR and microwave) on lighting in the reception area and all stairwells, and daylight sensors in the car park and loading ramp. New T5 fluorescent tubes in the basement, plant rooms, stairwells and car parks dim to 25% after ten minutes and then to 15%. Following the savings seen from LED bulbs in the reception area and security office, the Estate Management Office will be retrofitted with LED lighting throughout the office area. (Supporting Docs P7)

Specific evidence of training and education initiatives to support the programme.

We work closely with key specialists to learn from their expertise and then share information with all parties, including occupiers. Recent examples include benefiting from Hurley Palmer Flatt's expertise on the chiller redesign and free cooling re-optimisation, Assured Energy Solutions on lighting, SVM Consulting Engineers on the lifts and Norland Managed services on behalf of occupier Hebert Smith Freehills. We also hold monthly meetings with EP&T Global (our energy metering and monitoring partner) and Switch Controls (our BMS contractor) to investigate and minimise energy overuse. There have been several education run throughs with occupiers on how to use the energy management system to enable them to get the most out of it.

Evidence of user feedback on the building/s and satisfaction with the measures adopted.

Independent surveys consistently show that occupier satisfaction with British Land and Broadgate Estates Ltd outperforms the industry average. Feedback from occupiers at Exchange House:

- Building Operations Manager, Herbert Smith Freehills: "Working in conjunction with the Engineering Manager at Exchange House, we have exceeded our reduction target of 20% from our baseline year

of 2008, by implementing action points of plant run times, solar film, LED lighting and PIR controls. We have since reviewed our reduction target to 35% by the end of 2014. Our trial of upgrading the landlord's plant to renew the variable speed drives to the air conditioning system has been incredibly successful. So much so that we have achieved a 51% saving on a single upgrade and are now undertaking the works to replace our existing 12 variable speed drives. This is a £200,000 capital expenditure project which will provide us with a payback period of just 18 months upon completion."

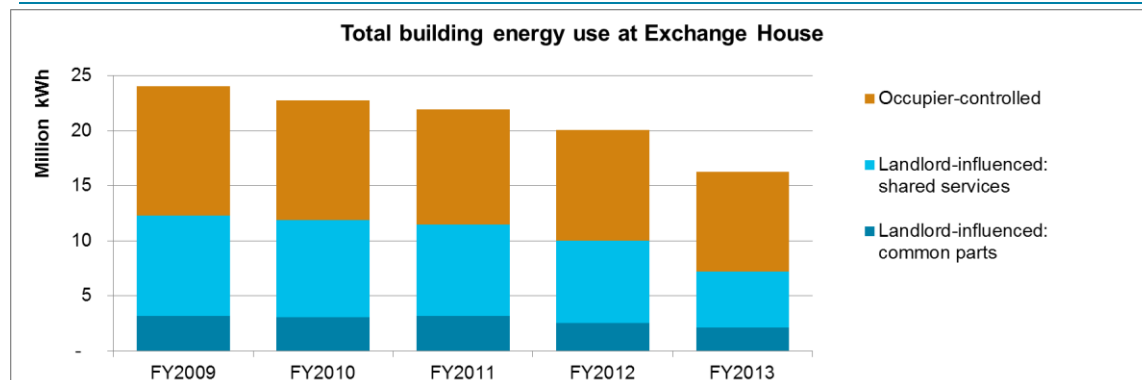
- Engineering Consultant: "Société Générale has worked in partnership with Broadgate Estates to reduce the energy usage and carbon footprint of both our occupied areas and the building as a whole. The installation of the extensive power metering system throughout the building in 2011 was a fundamental investment to allow energy usage to be monitored. Since installation the landlord and tenant plant usage has been closely monitored and non-critical plant now runs out of hours by exception only. The results of the cooperation between British Land, Broadgate Estates and Société Générale are clear to see in the energy savings achieved in the past three years in Exchange House."

- Facilities Manager, F&C Asset Management: "Since I joined F&C in 2007, we have worked with Broadgate Estates to reduce energy consumption within Exchange House. Projects such as new passenger lifts, new generators and energy monitoring through EP&T Global metering have significantly reduced energy consumption. Together we have reviewed plant run times and adjusted where possible to maximise savings throughout the building. Lighting systems have been replaced and new operating times defined. The BMS has been used to adjust set points and where necessary sensors calibrated to ensure accurate measurement. Energy efficient new chillers will be installed in 2013/14, further enhancing future building performance. We continue to work with Broadgate Estates on all aspects of energy reduction and the cost benefits this has to our business."

The on-site Engineering Manager at Exchange House reports that the number of help desk calls related to room temperature has reduced in recent years. Healthy Building International reports for the building confirm that temperature control is generally either good or excellent. (Supporting Docs P8)

Evidence of actual performance based on measured energy consumption.

Energy Use at Exchange House	kWh					Cumulative savings since FY2009		
	FY2009	FY2010	FY2011	FY2012	FY2013	kWh	£	Tonnes CO <sub>2</sub> e
<b>Landlord influenced</b>	12,313,466	11,907,038	11,493,960	9,992,414	7,196,938	8,663,514	£459,718	3,907
<b>Occupier-controlled</b>	11,710,547	10,828,176	10,472,098	10,048,466	9,073,736	6,419,712	£ 581,132	4,571
<b>Total building</b>	<b>24,024,013</b>	<b>22,735,214</b>	<b>21,966,058</b>	<b>20,040,880</b>	<b>16,270,674</b>	<b>15,083,226</b>	<b>£1,040,850</b>	<b>8,478</b>



A copy of the DEC and associated information and a CarbonBuzz entry (for buildings that are not required to have a DEC a voluntary DEC is strongly encouraged).

Supporting Docs P9-11.

Evidence of collaboration between members of the project team, including the building occupiers that has contributed to improved performance.

Through green building group sessions, one-to-one meetings and written reports, we have liaised with occupiers on several plant replacement opportunities that they have then agreed to fund, based on the robust business cases we have established. Recent examples include:

- Replacing the eight main passenger lifts with energy efficient alternatives, improving efficiency by 40%, saving 80,000 kWh each year through regenerative braking that recovers excess energy from the lift, and new variable frequency driven motors and controls. Following the success of these lifts, the goods and fire lifts are undergoing the same retrofit, which will improve reliability and save energy.
- Replacing boiler burners and introducing VSD booster units, producing a 32% saving, exceeding the project projection of 13%, through close management of on floor temperatures and supply set points, which allows the boilers to cycle off more often.

- Replacing the building main extract fans for high efficiency motors with VSD drives, which vary the speed and extraction rate according to the amount of fresh air on the floor. This delivers a £185,300 annual energy cost saving, with a 16 month payback period. (Supporting Docs P12)

Any special challenges or problems and how they were overcome.

British Land's willingness to forward-fund the dynamic energy monitoring and management system at Exchange House overcame a significant potential barrier to getting the data needed to improve how utilities are consumed on site. Once this metering was in place, the building management team was able to use the data both to identify opportunities to optimise consumption through effective management and to review other capital investment opportunities. Occupiers have since agreed to fund further energy efficiency investment where the business case is strong. British Land is recovering its original investment through utility cost savings generated as a result of energy reductions.

### Further Information

*Please provide any further information, evidence or references that you would like to include in your entry.*

We recognise that a 'fix and forget' approach would see energy use creep back up, and so we are constantly working to achieve further reductions. Current plans include replacing the main chilled water plant and all associated auxiliaries (we are in detailed design stage), and re-optimising the free cooling and central valving. This is set to deliver £149,400 annual energy cost saving, with a £1.5 million return on investment for occupiers over their lease terms. Savings result from more flexible use of cooling towers, use of the building's free cooling system, VSD pumps and a greater turn down ratio so the plant can run at a minimum of 10% rather than 40%. The new plant will also increase the building's resilience and redundancy. (Supporting Docs P13-14)

We have also extended our efficiency efforts to water, with key initiatives including extensive water sub-metering and a waterless urinal trial with occupier Herbert Smith Freehills and supplier Whiffaway. This joint trial has shown that toilet sanitary conditions can be maintained without any water into the bowl. We are now awaiting confirmation from other occupiers to refit all floors.

### Supporting Documents Check List

*Entries should include supporting documents or evidence to supplement this written part of the submission. All supporting documents should be collated into one PDF document for upload.*

- DEC
- BREEAM Certificate
- LEED Certificate
- CarbonBuzz entry (please supply a link): <http://www.carbonbuzz.org/projectsummary.jsp>
- Other (please specify): Energy management system graphs, Blog on reducing out-of-hours energy use at Exchange House, Extract from a Health Buildings International review of temperature controls at Exchange House. More detail on capital expenditure projects, Exchange House case study by the Better Buildings Partnership.