Innovative refurbishment of a 1960 commercial building

The post-WWII economic boom (of the 1960s and 70s) led to a considerable increase in number of non-domestic buildings across the UK, including public sector, commercial, health and educational facilities. Buildings constructed during this period make up around 15% of London’s current offices and over 40% of higher education buildings.

Background

Buildings of this period are, generally, poorly-insulated, using external cladding systems featuring large areas of single glazing, asbestos-containing insulation and other elements, deep plan layouts requiring high levels of artificial lighting, are difficult to heat in winter and prone to summertime overheating, use inefficient air conditioning systems, have high energy costs and large carbon footprints. Users and occupiers experience stress caused by thermal discomfort, patients in healthcare buildings of that era recover more slowly, and students find it harder to learn. Fifty years on, these challenges translate into complex and costly refurbishment projects, including the challenge of extra costs incurred in relocating tenants, and the disruption to the operations of the building. Replacement of external cladding systems is considered difficult and expensive, offering no gain in internal space so no increase in value, despite being the most important intervention from the energy efficiency point of view.

However, retrofitting and refurbishing commercial properties can offer significant advantages compared to building new: building programme benefits (with up to 70% time saving), with improved rental and yield values at a lower cost capital investment and retention of tenants.

Aim of the project

We want to demonstrate through this project that if refurbishments of 1960s and 70s non-domestic buildings are approached strategically and the whole supply chain is involved from inception, risks can be minimised, energy saved and profitability enhanced, with minimal disruptions to the operations in the building and without extra capital costs compared to standard comprehensive refurbishments.

What we plan to do

Built in 1964 with a host of problems typical of the buildings from this era, Building 14 at BRE overheats, uses an exorbitant amount of energy, emits 42 tonnes CO2/year, has a crumbling façade and as such it is an ideal candidate for a strategic sustainable makeover.

It will be used as the physical demonstrator for a research and testing programme allowing refurbishment options to be evaluated in a controlled environment. The key output from the project will be a performance specification / ‘balanced scorecard’ (strategic planning and management system), with the potential to be rolled out large scale to similar buildings.

This will deliver:

1. Exceptional sustainability and energy efficiency improvements (including 80% reductions in energy use, compliance with BREEAM Refurbishment and other recognised standards) with no increase in capital cost investments compared to standard comprehensive refurbishments;
2. Drastic reductions in operational and embodied carbon;
3. Improved indoor environment, including better air quality and thermal comfort;
4. Exemplar project, construction and procurement efficiency with minimal disruption to the day-to-day activities in the building.

BRE Building 14 has been chosen because its design and construction are typical of many other buildings from the period. It is prominent within the BRE campus, close to main reception and the Innovation Park, giving good visitor access and making it ideal for demonstration. It is currently an extremely inefficient building, with an EPC rating of E, therefore offering much scope for improvement.
It is anticipated that, as a first step to support this project financially, an application will be submitted under the Technology Strategy Board’s call Invest in Innovative Refurbishment (deadline 28th November 2012).

**How we will do it**

In order to respond to these challenges, we hope to use innovative materials and technologies in refurbishing the demonstration building. But product innovation will be only one part of the strategy to demonstrate a step-change in the approach adopted in refurbishing similar buildings. The second, but crucial point of the project is to adopt a strategic approach, aiming to demonstrate that it is possible to refurbish to the highest standards without additional capital investment. Extensive monitoring of the building before, during and post refurbishment will ensure the process and results are scientifically sound.

Some of the specific objectives this project aims to achieve are:

- Energy Performance Certificate rating improvement from E to A
- Outstanding, comprehensive refurbishment of the building at standard industry capital costs
- Energy / carbon savings greater than 80%
- BREEAM In-Use assessment prior to works, and Post-Construction BREEAM Excellent / Outstanding for refurbishment in commercial building
- Integration of Green Deal compliant technologies
- Dividing the building in a number of identical zones allowing comparison of fabric and system performance improvement technologies, (e.g. Different cladding, shading, ventilation and servicing strategies) and evaluation of the effects on air quality, thermal efficiency and human reactions and perceptions.
- Fire protection product analysis, including sensor technologies
- Best practice in site management, including no accidents / environmental incidents and minimal waste generation
- Integration of the full supply chain for optimum results
- A ‘balanced score card’, created to capture this best practice process and to make it replicable.

**Why get involved**

- There is an appetite for refurbishment in the current economic climate owing to the financial advantages / time savings of refurbishment compared to building new;
- The forthcoming incentives for energy efficiency in refurbishment projects and the Green Deal for non-domestic properties put refurbishment at the forefront of current and future industry trends;
- The need to push the boundaries of sustainability, cut carbon and reach higher BREEAM ratings in refurbishment projects make this project ideal for research and development;
- To get ahead of the game with competitors and become leaders in the refurbishment scenario;
- There will be a dedicated exhibition space within the building, where partner’s products will be seen by thousands of industry experts every year, supported by a programme of engagement and dissemination;
- To learn about the process and be able to replicate it in other projects with a strong consortium of partners (similarly to the successful residential, BRE collaborative project AIMC4);
- To be involved in a project that will transform the refurbishment market in the UK and will shed light on many currently unresolved issues.

**What happens when the building is finished?**

The building will be a live demonstrator of innovative technologies for the commercial refurbishment sector, which will be updated as new products become available on the market (parallel to the BRE Victorian Terrace domestic refurbishment project). The building will provide new accommodation that will be used as exhibition space open to Innovation Park visitors, business incubator space for start-up companies, office, meeting and seminar areas. A programme of dissemination and promotion will follow for all those companies that will form part of the building consortium with BRE.

Companies involved in this project will be able to benefit from and share the learning generated by it, and capitalise on the opportunities. This project will lead the way and influence the thinking of private and public bodies to change and embrace best practice, while happening right at the heart of the Government’s Green Deal implementation programme, and as such will receive extensive media coverage and public interest.

**For further information, please contact:**

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