



When choosing an environmental rating for a building outside the UK, it is generally preferable to use the local system. For example, the Singapore Green Mark system was used for the National Library in Singapore. But where nothing else is available or suitable, both LEED US and BREEAM International claim to be usable anywhere in the world.

Assessing the assessor

BREEAM VS LEED

▶ The rating of buildings in terms of environmental performance has been growing rapidly over the last decade using systems like BREEAM in the UK and LEED in the US. In the UK, BREEAM may be incorporated into the building regulations by 2019 in line with the push towards building and living more sustainably. However, as these systems develop around the world, developers and architects are currently facing a very difficult decision in choosing which one to use, according to AUREORE JULIEN, Head of Llewelyn Davies Yeang's new Eco Systems unit. An expert in both BREEAM and LEED, she examines the issues and evaluates which system works the best.

Choosing an environmental-performance system for a proposed building is a very difficult decision to make; a wrong choice has repercussions to both project cost and design quality. A right decision, however, can dramatically improve the design and quality of a building, as well as its environmental impact and the health of its occupants.

Rating the environmental performance of a building is necessary to ensure that its green credentials incorporate both the visible and invisible elements that make it 'green'. Visible green methods, sometimes described as 'eco-bling', such as photovoltaics, are clearly evident on a building; however, invisible methods like energy efficiency are often more important and can only be identified and recorded by rating or certification. Planners are also increasingly advising applicants to produce green buildings, so certification is sometimes a requirement and can help many projects, such as schools, with their funding applications.

Since BREEAM was setup in the UK, a number of other countries have developed their own environmental-performance rating system, including LEED in the US, to ensure that each certification is relevant to the like of local regulations, climate and supply chain. However, many countries still don't have their own rating method. In the UK, using BREEAM is the most appropriate and easiest system, as it is tried and tested and most adapted to local issues. The multiple variations of BREEAM-UK, such as the healthcare version, are tailored to distinct building uses. Then again, when choosing an environmental rating for a building outside the UK, it is generally preferable to use the local system, unless deemed particularly deficient. For example, the Singapore Green Mark system was used for the National Library in Singapore. But where nothing else is available or suitable, both LEED US and BREEAM International (a bespoke BREEAM system that is devised for each country)

claim to be usable anywhere in the world, however each has its own limitations.

Recently Llewelyn Davies Yeang (LDY) Eco Systems found it necessary to compare LEED US to BREEAM International for a large office building in Malaysia, known as the Putrajaya Precinct 2 - 2C5 Project, because Malaysia currently doesn't have its own certification system. While working with the LEED checklist, LDY Eco Systems found that many of the LEED points were either insufficient or out of place for the locality. For example, a major problem in Malaysia is increasing flooding in urban areas and although LEED examines this to some extent, the criteria are better adapted to the US context than to a wet tropical

climate. More strikingly, the main environmental problem in Malaysia is deforestation, mainly due to palm oil production, which not only destroys the habitat of some endangered species, it creates other problems such as landslides and is one of the key causes of global warming. Many Malaysian rainforests lie atop peat bogs containing large amounts of carbon that is released into the atmosphere when the forests are cut down. Surprisingly, LEED includes a credit for onsite renewable energy which allows energy production using biofuels from agricultural crops. So, using biofuels derived from palm oil which encourages deforestation would credit a point under LEED. Obviously, as conscientious designers, LDY Eco Systems would not support such a strategy and it is clear that this aspect of LEED should be altered.

CONTENTS AND CRITERIA

The LDY Eco Systems team attempted to fit the LEED credits into the BREEAM UK categories, such as water, energy, pollution, air quality, ecology, use of land and transport, and found that LEED gives slightly more importance to the occupant's health and comfort, while BREEAM UK and Bespoke Checklists would tend to be more focused around environmental impacts. Overall, the weightings are comparable, but the detail of the criteria differs significantly.

The criteria for both systems rely extensively on regulations, guidance and third-party standards. As the two methods use different standards, the fact that a credit is achieved in one method won't guarantee the equivalent being achieved with the other – as highlighted in a recent BRE report. So a building that receives a high BREEAM International rating may score relatively poorly at LEED, and vice-versa. Overall, as regulations in the UK are tougher

IMAGE: The National Library in Singapore





than in the US, the criteria from BREEAM UK may be slightly more onerous than that of LEED and this difference may be reflected in BREEAM International to some extent. However, BREEAM International uses local guidance, regulations, climatic distinctiveness and environmental priorities, so ultimately it is very likely that its criteria are easier to comply with than LEED. And, for many major LEED credits, American standards for heating and energy must be used along with Imperial units, so the conversion of these measurements makes the process more complex and arduous.

COSTS

There is very little information about the construction-cost implications of pursuing LEED or BREEAM for international projects. Added construction costs will depend on how the regional standards compare to the assessment standards. And where, for example, some sources give added costs of 3 to 8 per cent of construction costs for LEED accreditations, one could expect that these might be significantly higher should the system be applied to a non-US country. This may partly be due to building regulations being disparate (for example, in relation to energy performance). The other added difficulty is that supply processes, contractors and suppliers may not be familiar or adapted to the requirements, or there may be a lack of green building products. As BREEAM International is bespoke to each country, it is expected that the added cost may be equal or possibly lower than that of LEED despite a higher level of environmental performance.

THE BREEAM PROCESS

Evidently BREEAM International methodology has the potential to be more relevant to local needs, resulting in a more appropriate design and a system that is easier to implement. However, this summer LDY Eco Systems was asked by a client to prepare a quotation for an environmental assessment, so the team contacted the BRE in the hope of carrying out a BREEAM International assessment. Unfortunately, the BRE was unable to respond to queries for two months, whereas the US Green Building Council was immediately responsive.

Setting up bespoke standards for new countries or projects each time is a huge undertaking, and appears to have resulted in the BREEAM office being unable to deal with the demand. This is risky for clients within the context of starting a new environmental assessment, because in order to achieve a high score at BREEAM it is essential to look at the credits list as early as possible.

LDY Eco Systems addressed these issues with the BREEAM office, which responded with the promise that processes were due to improve dramatically; the BRE is 'streamlining' the system to make it more efficient by standardising elements rather than starting from scratch each time. In fact, results are already evident, with the team's last request being answered within days. Additionally, the BRE suggested that the first draft criteria checklists could be available within two weeks of the projects being registered.

It is clearly very important that this process is managed well to ensure that objectives for environmental performance are implemented and evaluated throughout the design and construction of a building. Ultimately, each country should have their own system that is run by local people who understand issues such as local planning regulations, the supply chain and climate, making the process much more effective. However, where there isn't a country-specific system, BREEAM International is a serious contender to LEED and quite possibly the better option in achieving greener, high-quality buildings.

CASE STUDIES

MITTAL CHILDREN'S MEDICAL CENTRE, GREAT ORMOND STREET HOSPITAL, LONDON

Llewelyn Davies Yeang has designed a new 'green' building for Great Ormond Street Hospital (GOSH) that will set the standard for new hospitals in the 21st century. Due for completion in 2011, GOSH doesn't display any of the 'eco gadgets' that usually mark out a green building; there are no photovoltaics, wind turbines or greywater systems. Yet despite this, GOSH is a green building that uses resources efficiently and reduces its impacts on human health and the environment.

The new development will save about 60 per cent carbon emissions over the building regulations standards. It will reduce its impact on the environment through both its construction and operation, whilst offering the levels of comfort and functionality which are required for a modern hospital. A lower ecological footprint will be achieved through using land more efficiently, improving the local ecology, consuming less energy and using green materials. The Building Research Establishment predicted a score of 77 per cent or "Excellent", using NEAT, the NHS environmental assessment method.

The scheme submitted for planning application combines an optimised bioclimatic design approach with carefully engineered solutions for energy efficiency, a site-wide distribution system, and a 2.8MWe biofuel/natural-gas Combined Cooling Heat and Power system to deliver a Carbon Negative Phase 2 scheme, and thus a benchmark for sustainable development by any standard.

NATIONAL LIBRARY OF SINGAPORE, SINGAPORE

Designed by Llewelyn Davies Yeang's sister company TR Hamzah Yeang Sdn.Bhd., the National Library of Singapore was completed in 2005. It received the 2005 Singapore Green Mark Platinum Award, the highest award achievable for green design, as well as the 2005 World Association of Chinese Architects Gold Medal.

The use of green garden spaces throughout the library provides a positive psychological effect on building users and improves general working environments. The actual design of the building is an assemblage of distinctive sun-shading blades (6m deep at some locations) that boldly define the tropical aesthetics for the building, as well as providing solar shading and anti-glare performance that in totality produces a contemporary climatic-responsive built form.

Low Energy Design is used on the National Library of Singapore by assembling together collective strategies for a low-energy, high-comfort building, known as Passive Mode, Mixed Mode and Full.

The environmental impact of the National Library Building is lower as compared to a typical office building, even though the specifications for a library are generally higher. The total energy embodiment of the building (being its "first costs") was calculated to be 17GJ/sq m which is within generally accepted benchmarks for commercial buildings (between 10 - 18GJ/sq m). Simulations also conducted on the energy consumption and building performance of the design and results show an energy-consumption rate of around 185kWh/sq m/annum, which is less than a typical commercial office tower (230kWh/sq m/annum) in Singapore.

ASSESSMENT METHOD

Both BREEAM and LEED assess buildings against a wide range of environmental and sustainability issues covering a number of categories. For each issue, one or more 'credits' are available when specific levels of performance or process are achieved. Overall, the total number of points or credits obtained determines the final LEED or BREEAM score, which results in a rating, ranging from Pass to Outstanding for BREEAM, and Certified to Platinum for LEED.

BREEAM is the UK Building Research Establishment (BRE) Environmental Assessment Method and was created in 1990. Buildings outside the UK can be assessed using BREEAM International, which is tailored to suit local circumstances. A BREEAM International assessment relies on the BRE setting up a list of criteria specifically for the project, or for series of projects which have similar characteristics (unless something exists already such as BREEAM Gulf, for example). It is carried out by an accredited assessor who then submits a report to the BRE for Quality Assurance, resulting in a rating such as Pass, Good, Very Good, Excellent, or Outstanding and a BREEAM certificate. BREEAM has over 110,000 certified buildings, most of which are residential projects.

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ has been developed by the US Green Building Council (USGBC) and officially launched in 1998 in the US. The scheme has been inspired by the other schemes including BREEAM. Unless a country-specific LEED system is in place, the LEED US Criteria are used for any country in the world. The LEED Accredited Professional (LEED AP) gives support and guidance to the Design Team on LEED issues, but the LEED certification is provided by independent, third-party verification from the USGBC. All certified projects receive a LEED plaque and a certificate, with ratings such as Certified, Silver, Gold or Platinum. Although the USGBC is a large organisation, fewer than 2,000 buildings, (mostly commercial), have acquired LEED rating.

PUTRAJAYA PRECINCT 2, SITE 2C5, MALAYSIA

LDY Eco Systems unit has been appointed as the Sustainable Consultant advising on LEED and BREEAM environmental assessments to the client, Putrajaya Holdings Sdn. Bhd. This project is a 120,000sq m, 14-storey mixed-use office and retail development, designed by Llewelyn Davies Yeang's sister company in Kuala Lumpur, TR Hamzah & Yeang. The landmark building will stand as an iconic, ecologically sensitive project, with the objective to achieve LEED certification at a minimum level of 'Silver' or a BREEAM equivalent. Early energy computer-simulation analysis is carried out for the building to improve its energy efficiency and the

performance of the fabric will be enhanced to minimise the cooling demand, for example through an effective shading system. This is very important in Malaysia, where the weather is very hot a lot of the time, and solar gains are high. The design concept of the blocks is a set of solar shafts, with a series of diagonal voids cut into the floor plates which allow light and air to penetrate deep into the building's interior spaces. This will also bring sunlight and daylight to the core of the development, reducing the need for lighting, and is essential so plants can grow. Much attention will also be given to a careful landscaping strategy that will reduce irrigation needs.

IMAGE: The Putrajaya Precinct 2 - 2C5 project in Malaysia is targeting a LEED rating of Silver.

