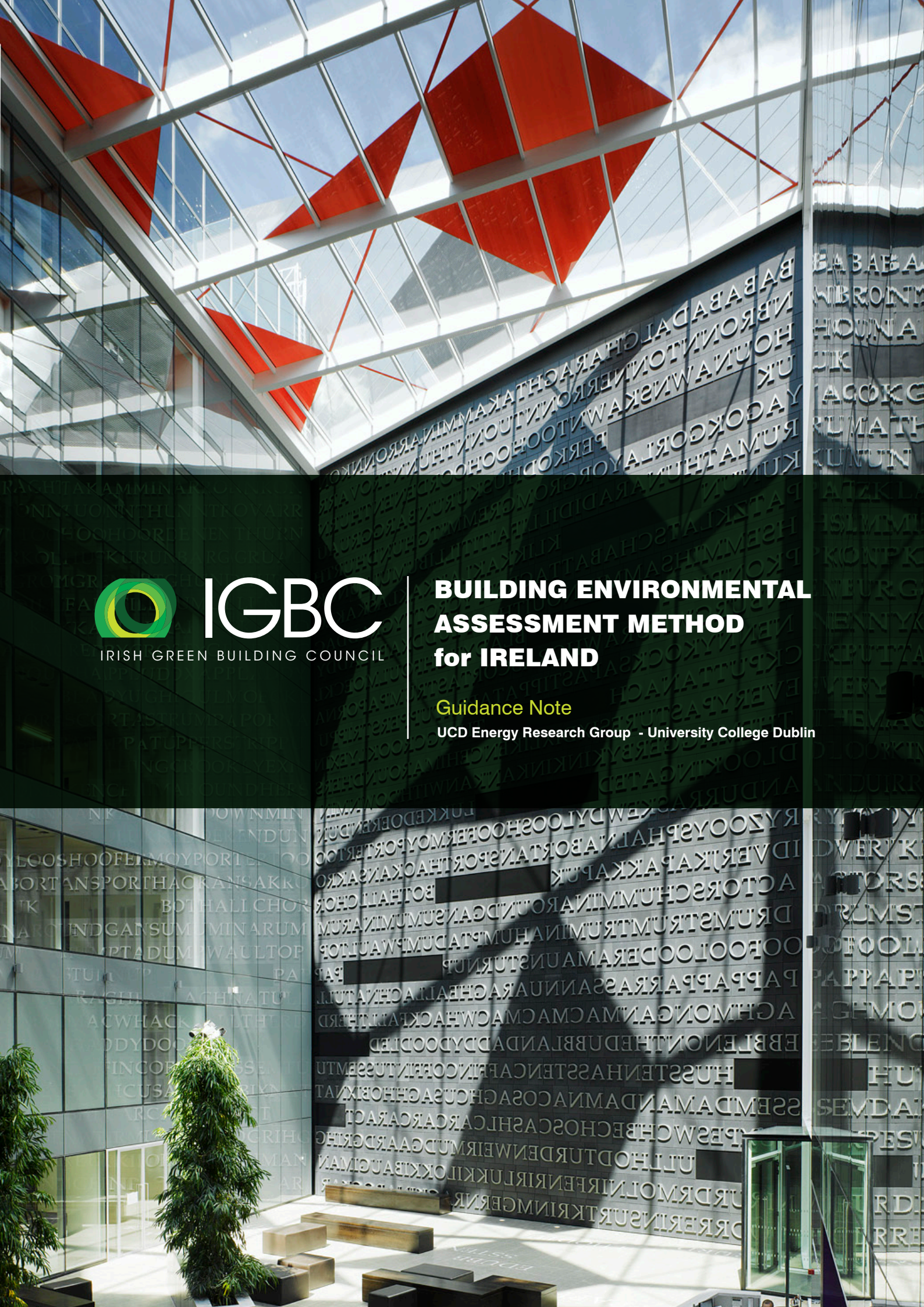


IGBC

IRISH GREEN BUILDING COUNCIL

BUILDING ENVIRONMENTAL ASSESSMENT METHOD for IRELAND

Guidance Note

UCD Energy Research Group - University College Dublin

INTRODUCTION

The Irish Green Building Council (IGBC) aims in this document to provide guidance on the use of Building Environmental Assessment Methods (BEAMs) in Ireland.

The Guidance has been developed through the findings of the IGBC exploratory study, 'Building Environmental Assessment Method for Ireland', prepared by the UCD Energy Research Group, and the IGBC workshop 'Applying Building Environmental Assessment Methods'.

It should be noted that this guidance is a snapshot of building environmental assessment methods at this point in time, and that both methods and their context are changing rapidly. Both the study and workshop reviewed current environmental assessment methods appropriate to commercial office buildings only, and while there are many other sustainability indicators that are applicable they are not addressed in this guidance.

BREEAM Excellent certified offices at Grand Canal harbour, Dublin. Image courtesy of Chartered land. ©Ros Kavanagh.

IGBC EXPLORATORY STUDY:

BUILDING ENVIRONMENTAL ASSESSMENT METHOD FOR IRELAND

The IGBC study, published in 2012, includes the historic and current context of environmental assessment; the evaluation of international assessment methods; and the comparison of Building Research Establishment Assessment Method (BREEAM), Deutsche Gesellschaft für Nachhaltiges Bauen (DGNB), Leadership in Energy and Environmental Design (LEED) and the Living Building Challenge (LBC) methods and the potential for their adoption and adaptation for Ireland. This is available at www.igbc.ie

The study identified issues related to both the product (assessment method) and the process (system required to support the methods' use) that require engagement on a national level to move towards a holistic approach to environmental assessment in Ireland.

It suggests issues to be addressed that, in the author's opinion, are necessary to provide clarity on the adoption of a preferred environmental assessment system for Ireland:

- Provision of a framework for the achievement of sustainable buildings in Ireland, identifying the role of environmental assessment in its implementation;
- Engagement with industry stakeholders and policy makers to explore the alignment of a national assessment approach with emerging international and national policy, GPP guidelines and Building Regulations;
- Selection and application of a limited number of assessment methods to representative Irish buildings to provide a full comparative technical analysis, to highlight the issues to be addressed in adopting a method and the specific evaluation criteria that require adaptation for Irish conditions;
- Further consultation with existing system designers and providers to assess the impact of BEAM application on all stakeholders (including clients, designers, contractors, manufacturers and suppliers), the resources required for achieving certification, and the process of adopting, adapting and implementing a suite of schemes and a certification system in Ireland;
- Further engagement with system stakeholders to determine, and provide where possible, training and user support;
- Development of strategies for a successful implementation and market adoption of the selected system, identifying those members of industry who may be directly involved or responsible for delivery of the system, and those whose participation or support may be necessary for its success;
- Publication of a programme of key actions and players to further the delivery of an appropriate, robust, rigorous, efficient, transparent and verifiable building environmental assessment system for Ireland.

The IGBC is currently in consultation with system designers and providers, providing training for BREEAM and LEED, and intends to continue, when the opportunity arises, the application of a number of assessment methods to Irish buildings. Many of the above issues require engagement with policymakers and will be pursued by the IGBC in the medium term, and others require the long term support of a robust construction industry.

IGBC WORKSHOP

APPLYING BUILDING ENVIRONMENTAL ASSESSMENT METHODS

In order to futher the recommendations of the IGBC Exploratory Study 'Building Environmental Assessment Method for Ireland', three environmental assessment methods, BREEAM, DGNB and LEED, were applied by qualified assessors, aided by the client and the integrated design team to large commercial office project at design stage proposed for a city centre site in Dublin. The project features high environmental aspirations and was expected to perform well in assessment under all three methods.

The workshop highlighted key differences in each assessment method's approach, categories and criteria, and documentation requirements. It reviewed the challenges specific to Irish buildings and the construction industry. It assessed the ease of adaptation and the relative costs of implementing the systems. The outcomes included assessor reports; design team observations; and conclusions on the merits of each assessment method.

CONCLUSIONS

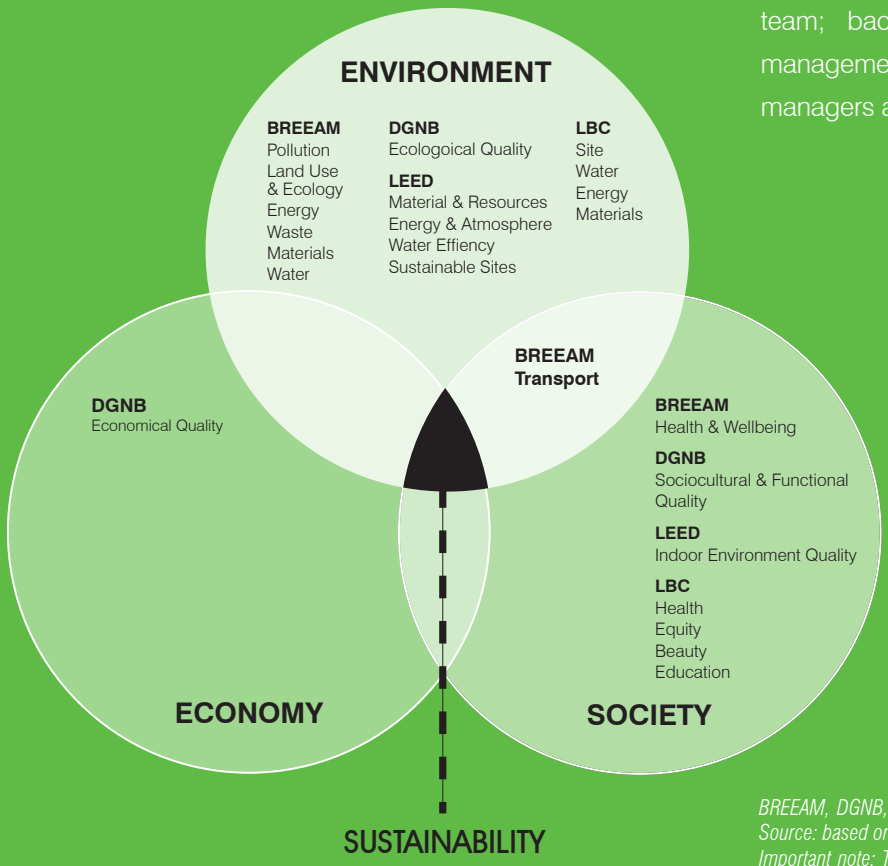
DRAWN FROM THE IGBC STUDY AND WORKSHOP

The study highlighted that the application of such methods to a project does not guarantee the delivery of a sustainable project, and could in some instances, if used inappropriately, hinder the achievement of appropriate holistic sustainability strategies.

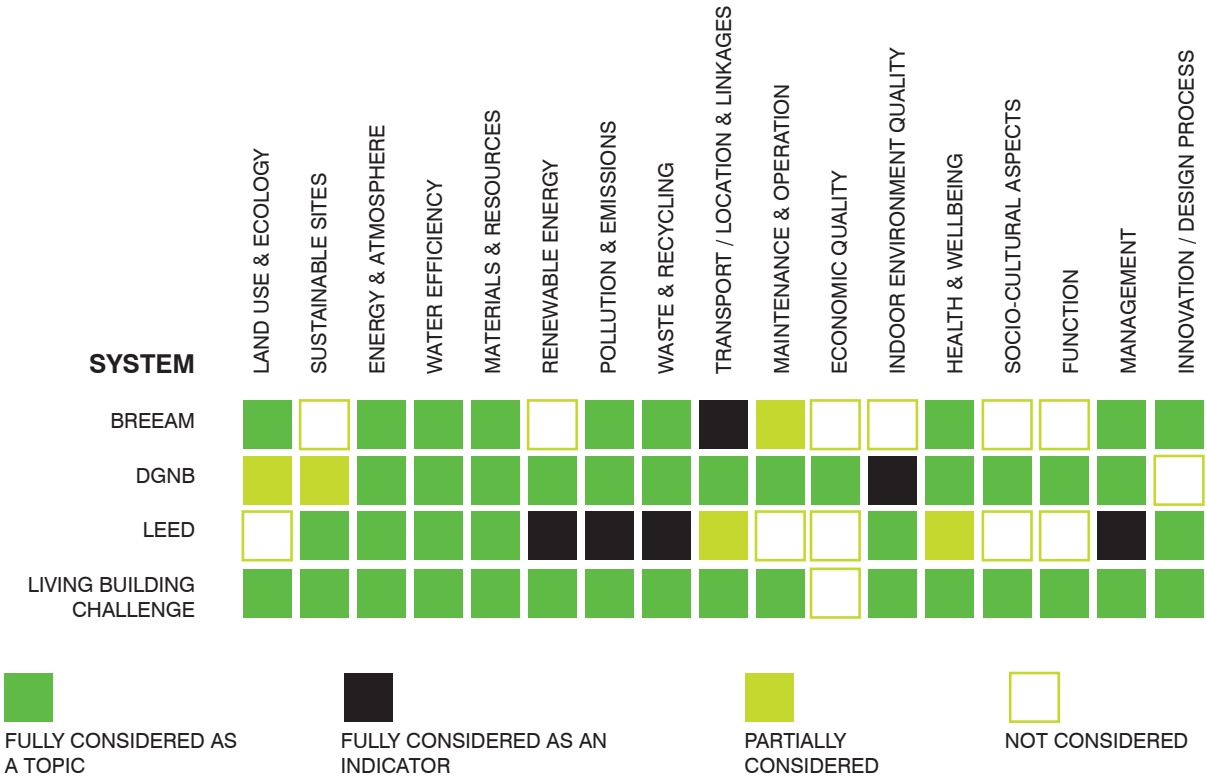
Some environmental assessment methods are considered to have become too prescriptive, and often strategies are selected because associated credits are inexpensive and easy to apply, rather than developing appropriate design solutions. Understanding by the client and design team of the principles and practice of sustainable architectural design is imperative to the achievement of cost-effective, high-performance, architectural quality. If the intent is only to achieve certification, without a genuine commitment to sustainability, optimization may be diminished and the delivered project is likely to be less successful.

One of the key findings in the study was that the majority of environmental assessment methods, while often considered and referred to as 'design tools', were developed, and still largely function as voluntary, market-led certification mechanisms, and should be used as such.

There is a growing practice of environmental assessment methods aligning themselves with particular corporate targets, addressing regional commitments, using locally defined benchmarks and assessment criteria. Increasingly, the financial and real estate sectors recognize BEAMs as indicators of desirable performance, and risk mitigators. The perceived long-term economic benefits, based on reduced life cycle costs and increased workplace productivity and health have been well documented. However, in order to achieve these benefits, an integrated whole-system approach must be applied by a knowledgeable, integrated design team; backed by robust commissioning, effective management, and collaboration between building managers and occupants.



BREEAM, DGNB, LEED and LBC – environmental, social and economical aspects.
Source: based on Alinghizadeh Kherzi, 2011 (amended to include LBC).
Important note: This reflects comparison of versions of Environmental Assessment methods available in 2011. It does not reflect revisions since.



BREEAM, DGNB, LEED and LBC – topic assessed based on assessment criteria and weightings. Source: based on Alinghizadeh Kherzi, 2011 (amended to include LBC). Important note: This reflects comparison of versions of Environmental Assessment methods available in 2011. It does not reflect revisions since.

Globalisation offers great choice to those selecting an environmental assessment method. The more developed systems, BREEAM and LEED, are increasingly applied outside of their countries of origin and, at the time of the study, 14 Irish buildings had been certified with BREEAM and two with LEED.

BREEAM, DGNB, LEED and LBC were compared within the study. The complexity of the methods and their development context, their weight of emphasis on environmental, social and economic issues, their differing baseline standards, assumptions, assessment criteria, credits and weighting, their varying evaluation period requirements, and their lack of transparency all conspire to hinder direct comparison of systems and the buildings certified, and the performance rating of buildings are not comparable, particularly at an international level.

In broad terms, the comparison found that while all four methods, or adapted versions, were being applied internationally, BREEAM was closely aligned to the United Kingdom, DGNB to the European Union, LEED and LBC to the United States.

The graphics illustrate the issues and the requirements in each method as evaluated. In particular, certain matters, such as economic considerations (life cycle cost) and socio-cultural and functional aspects, are only addressed in DGNB. Building life cycle cost is fully considered as an issue in DGNB, is considered as an indicator moderately in BREEAM, and partly in LEED and LBC.

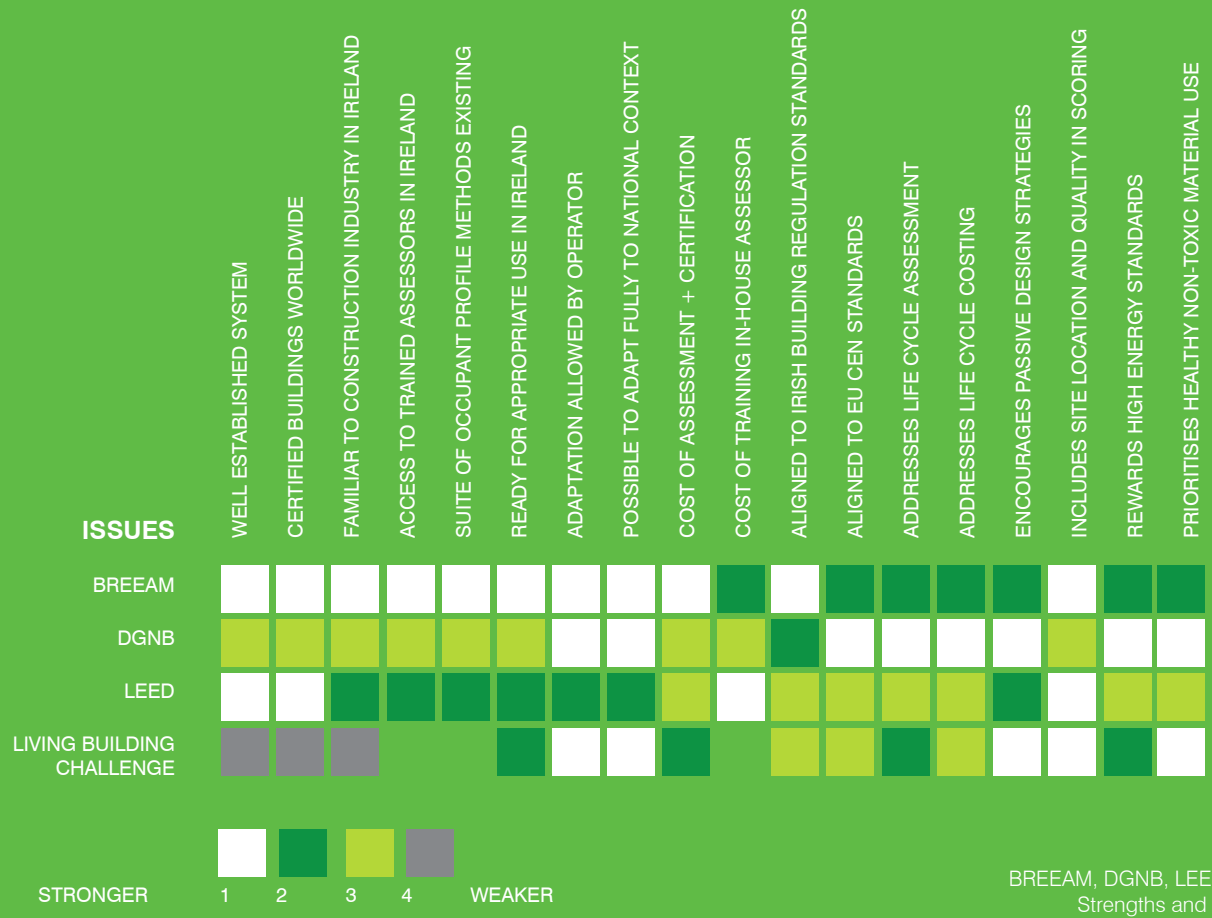
Energy is an important factor in all four methods; however, the importance differs (10% in DGNB, 14% in LBC, 19% in BREEAM and 32% in LEED) and there is little relationship between the percentages and the energy efficiency of a building. Energy is considered in differing ways (DGNB aggregates life cycle energy over 50 years and includes embodied environmental impacts) and baseline standards differ; indeed, the energy requirement in DGNB is higher, and LEED is lower than in the other two methods.

APPLYING BREEAM, DGNB AND LEED IN THE WORKSHOP

Applying BREEAM, DGNB and LEED in the Workshop gave an insight not only to the methods' differing requirements but also the practical application issues that arise as follows:

BREEAM was the most easily applied by the design team, mainly because Irish construction methods, building regulation standards and energy assessment methods are similar to those in the UK. It is the least onerous, and least costly, in measuring energy in commercial buildings as it accepts the national energy performance certificate (EPC) rather than requiring dynamic simulation, as DGNB and LEED do.

DGNB was the most thorough system and included Life Cycle Assessment and Life Cycle Costing; however, these mandatory requirements were seen as difficult and costly when not required by national regulation and unfamiliar to a design team. The client, however, was impressed with the method and considered that the application of life cycle analysis and costing provided a route to better decision making from the client perspective. DGNB is best aligned with EU CEN standards, which reflect the recast Energy Performance of Buildings Directive (EPBD). However it does not include site location and quality as part of the final score and only measures the building and not the treatment of the site on which the building sits. This could be considered a drawback in the Irish context.



BREEAM, DGNB, LEED and LBC - Strengths and weaknesses

continued from page 5

LEED version 3 used imperial units and was based on ASHRAE standards and required ASHRAE simulation modelling to be undertaken, which are unfamiliar to Irish design teams and can require time consuming (and therefore costly) familiarisation. However many of these issues are been addressed in LEED V4 and IGBC participates in the LEED international roundtable, where alternative compliance paths for Europe are been developed, including the use of metric units and European standards.

However the most important difference between the systems is the approach to localisation. BREEAM and DGNB can be adapted to the local context and climate of each country. This allows the weightings between categories to reflect local priorities and ensure that credits are relevant in that country. It sets the benchmarks relative to local standards and building regulations. This ensures that the higher levels of certification should indicate the best performing buildings in a country and continue to act as a driver for innovation in local markets when standards are raised. Currently LEED is developed and centrally administered in the US and allows very limited adaptation to national context. It sets global benchmarks irrespective of location so may not always react to, and reflect best practice in different European countries. For example energy standards are being continually revised in line with the requirements of the recast EPBD(Energy Performance of Buildings Directive) This requires all new buildings to be near zero energy buildings by the end of 2020.

LBC, which was included in the exploratory study but not applied to the workshop project, was alluded to in discussion on post occupancy evaluation. LBC is recognized as an ambitious framework for achieving holistic sustainability and is the only method based on achieving operational performance standards (following a twelve month operational period) for certification, rather than design and construction standards.

Both the study and workshop concluded that no one system, with its suite of occupancy profiles, could be recommended as the unique system suitable for all Irish circumstances. However, neither did they conclude that using an array of systems would be beneficial to the construction industry. Each have merits in their own right and while BREEAM may be the one most closely aligned and easily applied to Irish commercial buildings today, it may be that DGNB could become more suitable in the future. It is difficult to see that LEED, without significant European alignment, would move beyond its current use in providing building performance comparison for international corporate clients. The LBC is by far the most ambitious measure of sustainability in the built environment today and is particularly suited for buildings that wish to achieve restorative, regenerative and net zero goals.

CHANGING CONTEXT

Environmental assessment methods, and the context in which they operate, are changing rapidly. The drive in Europe to achieve near zero energy or carbon neutral buildings within this decade, and the growing emphasis on the production of low environmental impact products and the impact of construction practices on national policy and the construction industry supply chain, may suggest that some methods are more future proofed and appropriate than others for wide application in the future. While DGNB may be difficult to apply in Ireland today, it has the greater potential to deliver the requirements set out for EU Member States, and to achieve design enhanced, life cycle evaluated environmental, social and economical sustainability.

With the wider use of Building Information Modeling (BIM) it is expected that life cycle data for materials could be embedded in the software to provide automated, embodied environmental impact building-level assessment. However, proven data and appropriate benchmarks are critical to its success and it may be some time before it becomes mainstream. This would make the lifecycle analysis aspects of DGNB easier to achieve. BREEAM also intends to rewards the use of robust building-level BIM assessment tools.

In Europe, concern that the proliferation of national methods for buildings and construction assessment could lead to technical barriers to trade led the European Committee for Standardisation (CEN) Technical Committee CEN/TC 350 to develop in 2012 harmonized standards for the assessment of environmental aspects of buildings, including social and economic aspects.

The European Commission's Directorate General for the Environment funded the OPEN HOUSE project to develop and to implement a common European transparent building assessment methodology, complementing existing ones, for designing and constructing sustainable buildings by means of an open approach and technical platform. It is understood that the developed methodology shares much of the DGNB methodology.

The International Organisation for Standardisation (ISO) investigation of the need for standardization tools led to the formation of ISO/Technical Committee TC/59, which provided a framework for the development of a core set of sustainability indicators, and guidance for their implementation in 2011.

The development of a core set of standardized indicators form the basis of 'core' and 'comprehensive' criteria for EU Green Public Procurement (GPP) and has led to Member States developing guidelines to ensure public and semi-public authorities integrate sustainability criteria into 50% of procurement contracts. The role of environmental assessment in Ireland and its relationship with the proposed Office of Public Works (OPW) GPP guidance and future building regulation should be explored.

The successful delivery of truly sustainable projects lies in providing appropriate guidance for all sectors of the Irish construction industry, while utilizing BEAMs for assessment and certification.