

# UNEP-FI / SBCI Financial & Sustainability Metrics Report

## An international review of sustainable building performance indicators & benchmarks

LOWE, C. & PONCE, A. (2009 in press) SUSTAINABILITY METRICS REPORT An international review of sustainable building performance indicators & benchmarks UNEP Finance Initiative Responsible Property Working Group/UNEP Sustainable Buildings & Climate Initiative, Paris.

### Executive summary

This report brings together current thinking on defining and measuring sustainability of the built environment. It sets out concisely the key issues in this large and complex area. In this report, the Brundtland definition of sustainability is used: «meeting the needs of the present without compromising the ability of future generations to meet their own needs». Unfortunately the simplicity of this definition belies what is a complex web of systems and cycles in science, economics, politics, ethics and engineering. Fortunately, pioneers of sustainability assessment in the built environment have devised ways of addressing sustainability measurement and delivery by focusing on the key issues in terms of economic, environmental and social impacts. Through clarity, transparency, stakeholder engagement, and peer review, the leading organizations are also attempting to achieve the objective of Brundtland. This requires that as understanding improves, we identify and reconcile all of the key issues, which are inextricably interwoven. If we are to address the challenges of sustainability, we need numbers, not adjectives, and we must base what we do on «evidence not public relations» (MaKay, 2008).

### Definition of common core of sustainability indicators

The analysis of existing assessment systems carried-out in this report demonstrates that historically, such systems have been predominantly developed to assess environmental issues, and even now, few of them could be considered to adequately assess the full range of sustainability issues.

The reasons for this are in themselves, a potential area of further research but are likely to be, at least partially, due to the fact that environmental issues are typically easier to quantify and can therefore be assessed objectively! Social and economic sub-issues are often difficult to assess, relying on either subjective judgment or complex calculations which do not sit well in assessment systems that aim to be objective and time /cost effective to use.

It should be noted that, whilst the core indicators identified in this report are as applicable to new as to existing operational buildings, a number of issues need further consideration to allow the development of a core set of indicators that could be used to assess the sustainability of buildings in any location. These are listed below:

### Scale of assessment

Many of the issues related to building impacts (especially social and economic) are difficult to influence when considered on the basis of a single building and would be more suitably addressed at a neighbourhood or development level. The extension of this study to cover systems such as CASBEE for Urban Development, LEED Neighborhoods and other schemes under development such as BREEAM Communities would identify whether this is a major reason for the current imbalance between these issues in building scale systems.

### Balance of environmental, social and economic issues

As noted earlier, the majority of issues common to all systems are environmental. For developing countries, which are likely to have a far less developed construction infrastructure, it could be more important to consider issues related to social and economic impacts. The development of local employment opportunities, the use of local materials, or community involvement in projects are a few of many issues that are likely to be far more important when attempting to establish a sustainable construction industry in a developing country.

### Tailoring to local context

What is apparent is that none of the systems reviewed ‘travel’ well. This is not solely due to technical issues (i.e. the need to measure such systems against national standards) but is also affected by the cultural acceptability of such systems (i.e. the way in which buildings are procured, constructed and operated). In addition, the more widely used systems (i.e. those covered by this review) have evolved from countries with well developed construction industries and therefore would require further adaptation to be used within developing countries.

### **Degree of technical rigour**

One of the major issues that define the success of building assessment systems is the balance between usability and technical rigour. Whilst any system must be built on strong scientific foundations, it is also important that the approach would not be so academic as to render the system unwieldy in terms of either requirements or time taken to carry out the assessment. It would be advisable to consider ‘tiers’ of complexity for any such system that would allow a developing country to adopt a simple system at the outset, but to build in more detail as its construction industry develops.

### **Most effective means of benchmarking**

Typically, the systems reviewed benchmarked building performance against established local regulations, codes and standards, only resorting to ‘bespoke’ benchmarks where necessary. In the case of developing countries, such sets of standards are likely to be far less developed. It would therefore be necessary to define the process by which suitable local benchmarks could be set when no local standards exist.

### **Financial indicators**

The analysis in this report demonstrates that within the property sector, sustainability issues link through to financial performance in many ways. But, whilst in some cases the relationships are straightforward, in others they are less clear and more difficult to measure. The current need is for new decision support instruments for property professionals and decision makers. Investors are currently forced to analyze and evaluate various aspects of building performance whilst also having to take into account a variety of complex institutional influences and externalities. The success of their investments depends on their ability to interpret all of these complex factors. As a result, any decision support instruments will have to allow interlinking information from many different and diverse sources which may vary depending on the life-cycle of a building. Most importantly, such instruments will need to bridge the gap between financial, environmental, social, physical and technical performance measures in order to establish the necessary feedback mechanisms to encourage and drive change in the property industry.

In order to facilitate the integration of the traditional methods and tools for valuation, risk analysis and cost estimation with the methods and tools developed by the sustainable building community for assessing and communicating the contribution of buildings to sustainable development, it will be necessary to develop new methods of information management. This would enable information collected at, for example, the construction stage, to be stored in order to be used when assessing a building’s value later in its life cycle.

Also, as the information gathered on buildings is often complex and not understandable by all stakeholders, it is important to identify new means for displaying data and performance reporting in a clear and understandable manner. For example the production of executive reports could be used by investors to concentrate on strategic issues, such as how real estate affects the balance sheet, whilst reports for operational purposes could be more detailed, providing information on operating costs, rent levels, etc.

## Main findings

Sustainability metrics have the potential to put the generic concept of sustainability into action. Today, however, we are far from turning this potential into reality. Sustainability metrics have evolved by leaps and bounds over the past few decades. To keep it simple:

The earliest were merely absolute metrics of whatever was easiest to measure. Things that were difficult to measure were either ignored or given an arbitrary value.

The next development was the conversion of absolute measures into relative measures, such as ratios, which screen out statistical 'noise' such as differences in size or output, and focus on relationships.

The third generation compared less conventional risk measurements (e.g. environmental risk) with conventional economic risk. This was when the financial benefits of sustainability performance began to show.

Lately, practitioners have combined all of these approaches, together with newly minted Life Cycle Assessment data, leading to a much more accurate and comprehensive description of the impacts, but with a tendency to information overload and poor international comparability. The challenge is now shifting from metric availability to metric suitability and international comparability.

The analysis of existing assessment systems demonstrates that most of the building environmental assessment methods currently in use in the marketplace were not designed to assess the full range of sustainability issues. They are predominantly focused on the assessment of environmental issues and often have a significant local flavour (national regulations, local building practices, climatic zones, etc.) and therefore corroborate this statement.

Today, we cannot find a standardized set of indicators, and several private corporations are creating their own, suitable for their purposes, while international institutions are still trying to develop a generic indicator for measuring and monitoring sustainable development.

The quest for a standardized measure of performance which can be used to monitor and compare internationally ecological behaviour and performance in a clear and consensual manner, which allows practitioners to assess the built environment on a multi-scale and multi-criteria basis, has not ended.

Environmental, health and safety (EHS) metric theory has undergone a major transformation over the past 30 years. Driven by evolving EHS strategies and public attitudes, the shift is clearly moving away from the traditional, regulatory-based metrics toward broader measurements of corporate responsibility. This evolution is well described in the work by the TNO Institute for Strategy, Technology and Policy in the Netherlands:

Aspect	First	Second	Third	Fourth
Drivers	Legislation and external pressure	Efficiency	Strategic performance	Societal license to operate
Public attitude	"Trust me"	"Tell me"	"Show me"	"Involve me"
Measures	Clean-up operations	Prevention	Chain management	Sustainable measures
Functions	Registration, monitoring	Process changes, communication	Product design, balanced scorecard	Integrated decision-making, portfolio assessment
Expression	Emissions, costs	Material and energy use, efficiency	Eco-efficiency, product characteristics	Resources, societal costs/values
Scope	Substances, emissions	Processes	Products, production, chain processes	Sustainability issues
Reference value	Regulatory targets	Other processes previous years	Other products, suppliers	Societal values, sustainable issues

(L. Simons, A. Slob, and H. Holswilder, "The Fourth Generation - New strategies call for new indicators," TNO Institute of Strategy, Technology and Policy, Netherlands, September 2000).

In addition to the changing theory of EHS metrics, there has been a dramatic increase in the spectrum of assessment methods in many countries since the introduction of BREEAM in the 90's (Richard MacLean, 2002).

With many countries either having, or being in the process of developing domestic assessment methods, international exchanges and coordination have been increasingly evident.

In 1997, for example, the International Organization for Standardization's Technical Committee 59 (ISO TC59) resolved to establish an ad hoc group to investigate the need for standardized tools within the field of sustainable building. This subsequently evolved and was formalized as Sub-Committee ISO TC59/SC17 – Sustainability in building construction. Its scope includes the issues that should be taken into account within building environmental assessment methods.

In Europe, under CEN TC350 -Sustainability of Construction Works, a consensus-building process that relates to other standards (ISO) and harmonizes existing approaches was launched. These standards shall enable the exchange of sustainability information related to internationally traded products and services.

Other initiatives, mainly in the research field, such as the following EU funded research programs:

- CRISP
- LifeTime / LifeCycle initiative
- European thematic network on practical recommendations for sustainable construction

have evidenced the need for international coordination and advanced the stabilization of language and the standardization of the description frameworks for environmental impacts.

An interesting example of such efforts is the LEnSE project, a 6th Framework project cofounded by the EC, that was completed in March 2008. The programme draws on the existing knowledge available in the European Union on building assessment methodologies and aimed at a methodology development towards a label for environmental, social and economic buildings in analogy with the Energy Performance Directive.

The project developed a list of key issues that were considered relevant when assessing the sustainability of any building type. The LEnSE framework is intended to cover all aspects of sustainability rather than just focusing on the environmental aspects. This framework was used to compare the most well known systems in this UNEP study.

So we have seen that sustainability is a matter of ever-increasing international concern among OECD countries. The many existing measures vary enormously both in their complexity and in their application. Those which gain the widest attention are for the moment the so called building environmental assessment methods that provide a ranking or profile of buildings in terms of ecological performance.

The difficulty then arises that such methods do not travel very well, and can seem counter-intuitive when compared with each other for the same building. This can for example be noted in Europe's biggest business district, La Défense, Paris, where several high-rise buildings are currently being assessed with two or more methods at the same time, without any kind of coordination on the part of the scheme operators. This situation is profoundly unhelpful for those who wish to establish and refer to international standards.

There may always be differences between the standards set between each system, even if there is a clear move towards more international comparability. Comparison with other standards markets, such as the LPCB and VdS standards relating to the approval of sprinkler systems and safe doors, suggests that once there is transparency, the market will mature to allow 'licensing', 'cross certification' and 'multiple labelling' in a concerted way.

These developments and the work of leading international organizations will probably result in the near future in the development of a measure of ecological behaviour which can yield unequivocal metrics, and which would be credible in the comity of nations. International organizations are raising awareness amongst owners and occupants of the practical choices open to them in the design, construction and operation of their buildings and sharing experiences in promoting this agenda. Working to create and strengthen links, metrics and promotion of sustainability practices would have a dramatic effect both in terms of accessibility and in contributing to the development of government policy and industry strategies. The international dimension and coordination is paramount in taking this forward. Increased international benchmarking and mapping of standards is vital. Drivers and needs vary considerably between climates, regulatory frameworks and, indeed, social and cultural priorities, and so there is no space for a «one size fits all» approach.