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# Do Green Building Assessment Criteria Meet Sustainability Imperatives: A Critical Analysis

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## ABSTRACT AND KEYWORDS

### **Purpose of this paper**

The purpose of this paper is to determine whether green building assessment criteria meet the imperatives of sustainable development.

### **Design/methodology/approach**

The paper commences with an analysis of sustainable development imperatives. It makes use of the Brundtland report of 1987, *Our Common Future*, which established the definition and principles of sustainable development, as the measuring instrument. The paper then analyses the vision and assessment criteria of Green Building Councils and the main concepts and systems upon which assessment criteria are based. The paper concludes by comparing the key concepts of sustainable development against the key concepts of green building assessment criteria.

### **Findings**

The paper finds that green building assessment criteria fail to meet the sustainable development imperatives as defined in the Brundtland report.

### **Research limitations/implications (if applicable)**

The analysis of existing green building rating systems is limited to the assessment criteria that are common to green building rating systems globally.

### **Practical implications (if applicable)**

The findings of the paper suggest that green building assessment criteria need to be recalibrated if green buildings are to meet the objectives of sustainable development as defined by the Brundtland report.

### **What is original/value of the paper**

The original value of the paper is located in its argument for the inclusion of the key concepts of the Brundtland report in green building assessment criteria.

### **Keywords**

Sustainable development; green buildings; assessment criteria

## **1.0 SUSTAINABLE DEVELOPMENT HISTORY AND BACKGROUND**

Built Environment Professionals are some of the key people who conceptualise and oversee the delivery of the infrastructure that substantially forms the everyday built environment. This built environment provides the vehicle for communities and industry to develop and represents the product of urban planning and design, and construction processes within a defined spatial organisation in meeting the basic needs of shelter, food, safety and employment. Sustainable development, in turn, provides the structure by which the built environment develops across the world and requires a range of innovative economic, social, environmental, technological and ecological attributes, as well as a raft of strategic political, strategic and legislative instruments to guide and inform this process (Strong and Hemphill 2006).

Infrastructure in the context of this paper is defined as the basic physical assets of a country, community or organisation. These assets are usually referred to as fixed assets (e.g., buildings, highways, bridges, roads, pipelines, water networks, rail tracks, signals, power stations, communication systems, etc) and moving assets (e.g., aircraft, train rolling-stocks, defence equipment, buses, etc.) (Ciria 2007). For sake of accuracy, the built environment shall be defined as that environment which comprises urban design, land use and the transportation system, and the patterns of human activity within this physical environment (Handy, Boamet, Ewing and Killingsworth, 2002).

Twenty-one years ago, in 1987, Dr. Gro Harlem Brundtland, released the Brundtland report, also known as *Our Common Future*. Dr. Brundtland was Chair of the World Commission on Environment and Development (WCED) convened by the United Nations in 1983, also widely referred to as the Brundtland Commission, and developed the broad political concept of sustainable development in the course of extensive public hearings that were distinguished by their inclusiveness. Published by an international group of politicians, civil servants and experts on the environment and development, the report provided a key statement on sustainable development.

### **1.1 The World Commission on Environment and Development (WCED)**

The WCED was created to address growing concern about the accelerating deterioration of the human environment and natural resources and the consequences of that deterioration for economic and social development. In establishing the commission, the UN General Assembly recognised that environmental problems were global in nature and determined that it was in

the common interest of all nations to establish policies for sustainable development. In the 1983 United Nations approved resolution, the general Assembly:

"8. Suggests that the Special Commission, when established, should focus mainly on the following terms of reference for its work:

- (a) To propose long-term environmental strategies for achieving sustainable development to the year 2000 and beyond;
- (b) To recommend ways in which concern for the environment may be translated into greater co-operation among developing countries and between countries at different stages of economic and social development and lead to the achievement of common and mutually supportive objectives which take account of the interrelationships between people, resources, environment and development;
- (c) To consider ways and means by which the international community can deal more effectively with environmental concerns, in the light of the other recommendations in its report;
- (d) To help to define shared perceptions of long-term environmental issues and of the appropriate efforts needed to deal successfully with the problems of protecting and enhancing the environment, a long-term agenda for action during the coming decades, and aspirational goals for the world community, taking into account the relevant resolutions of the session of a special character of the Governing Council in 1982" (UN 1983).

This report alerted the world to the urgency of making progress toward economic development that could be sustained without depleting natural resources or harming the environment.

## **1.2 The Brundtland Report**

The reach of the Brundtland Commission was and remains enormous: it provided the momentum for the 1992 *Earth Summit, for Agenda 21*, and for the *World Summit on Sustainable Development (WSSD)* – also known as *Earth Summit +10* – that went on to ratify the Millennium Development Goals (MDGs).

The Brundtland report was primarily concerned with securing a global equity, redistributing resources towards poorer nations while encouraging their economic growth. The report also suggested that equity, growth and environmental maintenance are simultaneously possible and that each country is capable of achieving its full economic potential while at the same time enhancing its resource base. The report also recognised that achieving this equity and sustainable growth would require technological and social change.

The report highlighted three fundamental components to sustainable development: environmental protection, economic growth and social equity. It argued that the environment should be conserved and our resource base enhanced, by gradually changing the ways in which we develop and use technologies.

### **1.2.1 Five Key Concepts**

The Brundtland Report conceptualised a key statement on sustainable development, defining it as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The statement contains within it five key concepts:

- (1) The concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given;
- (2) The idea of limitations imposed by the state of technology and social organisation on the environment's ability to meet present and future needs;
- (3) The idea of generational responsibility, in particular the notion that a the environment is held as a proxy for social equity between generations;
- (4) That sustainability is pro-development, providing that development "involves a progressive transformation of economy and society"; and
- (5) The notion that free goods such as air and soil are also resources, thus sustainable development requires that the adverse impacts on the quality of air, water, and other natural elements are accounted for so as to sustain the ecosystem's overall integrity.

### **1.3 Critical Objectives of Sustainable Development**

Thus the report states that the critical objectives for environment and development policies that follow from the concept of sustainable development include:

- Reviving growth;
- Changing the quality of growth;
- Meeting essential needs for jobs, food, energy, water, and sanitation;
- Ensuring a sustainable level of population;
- Conserving and enhancing the resource base;
- Reorienting technology and managing risk; and
- Merging environment and economics in decision making.

This then must form the basis for assessing the sustainability of green building assessment criteria.

## **2.0 GREEN BUILDING**

### **2.1 Current Concepts of Green Building**

Green Building can be characterised as building with a conscious effort to minimise the negative impacts and encourage positive impacts of buildings

on both the indoor and outdoor environments. The practice of green building typically includes attention to the following primary concepts and systems:

- Sustainable/durable/low maintenance building design and operation;
- Energy efficiency and conservation;
- Site/land management, reclamation and conservation;
- Water efficiency, management and conservation;
- Indoor air quality;
- Outdoor air quality;
- Material resource management, recycling and conservation (including the reuse of building materials and products); and
- Innovation

Each of the above major concepts and systems are broken down into many specific and detailed components and the emphasis alters between green building assessment systems.

However, the concept of green building in contemporary usage is intended to imply building above and beyond minimum code requirements, with the primary focus and intent being to protect the environment. It does not intend to replace or supersede conventional building regulations aimed at safeguarding public health, safety and general welfare. Equally important to note is that being rated does not mean a building has no negative impact on the environment. Thus it can be argued that green buildings aim to have low environmental impact and high operational performance.

Even though green building continues to gain significant momentum, it is still very much in its infancy. While it is true that there are many buildings, particularly early vernacular buildings that could be deemed to be 'green', it must be acknowledged that the concept of controlling and measuring the impact of the construction of modern buildings on the environment is quite new and revolutionary, especially at the level of detail required by some green building rating systems. Concepts such as Life Cycle Analysis (LCA) and embodied energy are especially still in their early stages of development.

A fundamental aspect of many green building assessment criteria is also to spur innovation and the development of creative solutions related to green building. The concept of innovation however remains difficult to measure or to quantify. Some critics have pointed out that the application of rating systems such as Leadership in Energy and Environment (LEED) and, to a lesser extent, Green Globes and the Model Green Home Building Guidelines (MGHBG) of the National Association of Home Builders (NAHB) in the USA, can be an overwhelming and very subjective process with few criteria which are truly measurable.

While green building methodologies generally aim to reduce environmental impact while increasing the overall performance of buildings, the green building rhetoric however sketches a broader intent. David Gottfried, in the foreword to the United States Green Building Council's (USGBC) Sustainable Building Technical Manual (1996) states "this cradle-to-cradle approach, known as 'green' or 'sustainable' building, considers a building's total economic and environmental impact and performance, from

material extraction and product manufacture to product transportation, building design and construction, operations and maintenance, and building reuse or disposal. Ultimately, adoption of sustainable building practices will lead to a shift in the building industry, with sustainability thoroughly embedded in its practice, products, standards, codes, and regulations”.

The stated mission of the Green Building Council in the United Kingdom (UKGBC) is to “dramatically reduce the environmental impact of buildings by radically improving the way they are designed, built and maintained” (<http://www.ukgbc.org/>) while the USGBC states that its core purpose is to “transform the way buildings and communities are designed, built and operated, enabling an environmentally and socially responsible, healthy, and prosperous environment that improves the quality of life” (<http://www.usgbc.org/>). The Green Building Council in Canada (CaGBC) states that their vision is for “a transformed built environment leading to a sustainable future” (<http://www.cagbc.org/>). Similarly, the British Research Establishment (BRE) in the UK seeks to “build a better world” (<http://www.bre.co.uk/>).

Unfortunately, this promise of transformation and societal change is not captured in the current green building concepts as described above.

## 2.2 Current Debates about Green Building

Contemporary criticism of green building assessment criteria focuses on principles which are used to inform assessment criteria, with the two leading assessment systems, BREEAM and LEED coming under intense criticism. Schendler and Udall (2005) suggest that the world’s leading green building system (LEED) requires repair. James Bowyer, emeritus professor of bioproducts and biosystems engineering at the University of Minnesota, argues that green building assessment criteria have more to do with personal bias than science (Bady 2008). Del Parcio (2007) criticises LEED procedures as ‘costly’ and notes that it is an “essentially formulaic approach that leaves no room for the broader architectural implications that the building’s design presents”. BREEAM, the assessment system of the British Research Establishment (BRE), is facing criticism for its weak and bizarrely weighted ratings criteria (Kennett 2008). This, of course, cannot be taken to state that green building methodologies are unsustainable, but it does suggest that a vital point has been missed in current green building thinking and practice. Leaving aside the allocation of points and “point-mongering” as they put it, the gist of their argument is that rating systems are like obtaining a road worthy certificate for a vehicle. The examination is based on checking certain components on the vehicle without assessing the ability of the vehicle to continue providing outstanding service for the foreseeable future. Put differently, the system establishes certain vital but external checks without being able to certify the completeness of the whole. For example, proposed developments could have landscaped roofs, geothermal wells, photovoltaic panels, high-performance windows and extensive use of recycled and renewable materials, but be a hulking structure, out of scale with the neighbourhood, cram parking bays into

several floors of parking, handle vehicular access in a manner that interferes with the comfort of the people using nearby facilities, and deaden the street. As one critic put it, the technically advanced aspects may reduce damage to the natural environment, but be a threat to the neighbourhood's positive qualities due to a lack of focus on good contextual design.

However this paper posits that the fault line is the distinction between the promise of "industry transformation" contained in the vision of green building and the "do-least-harm" approach of the rating methodologies. And the rub is that apart from the vision of the USGBC, more recent green building councils all tend toward the "do-least-harm" approach. The result is that while, in the main, green building methodologies contribute toward the delivery of higher building performance in certain areas, it remains questionable whether they achieve the stated objectives of the two leading proponents of green building, USGBC and BRE, namely to "transform the building market" (USGBC) and to "build a better world" (BRE).

### **3.0 EVALUATION CRITERIA**

Physical sustainability cannot be secured unless development policies pay attention to such considerations as changes in access to resources and in the distribution of costs and benefits. The Brundtland report notes that sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.

For example, in any development there are winners and losers: losers in environmental/developmental conflicts include those who suffer more than their fair share of the health, property, and ecosystem damage costs of, for example, pollution. Furthermore, as a system approaches ecological limits, these inequalities sharpen. Thus rich urbanites are able to deal with suburban environmental deterioration better than poor urbanites; when urban air deteriorates, the poor, mostly located in far more vulnerable areas anyway, suffer more health damage than the rich, and cannot afford the adaptation and mitigation measures as well as the rich can; when mineral resources become depleted, late-comers to the industrialisation process (developing countries) lose the benefits of low-cost supplies, and poor countries cannot afford the higher prices arising out of global scarcity; globally, wealthier countries are better placed financially and technologically to deal with reconstruction following natural disasters, and wealthier countries are able to afford the adaptation and mitigation interventions required to deal with global climate change. Thus the Brundtland report stresses that our inability to promote the common interest in sustainable development is often a product of the relative neglect of economic and social justice within and among nations.

Sustainable development involves more than growth, it also requires a change in the content of growth, to make it less material- and energy-intensive and more equitable in its impact.

The Brundtland report also notes that sustainable economic development must be more soundly based upon the realities of the stock of capital that sustains it, including ecological stock. Sustainable development requires changes in all countries to manage the stock of ecological capital, to improve the distribution from this ecological capital, and to reduce the degree of vulnerability to ecological crises. Economic development is unsustainable if it increases vulnerability to crises. In all countries therefore, rich or poor, economic development must take full account in its measurements of growth of the improvement or deterioration in the stock of natural resources.

Thus the concept of transformation and fundamental societal change on the one hand, and ecological accounting on the other, are central to the Brundtland definition. The following variation, derived from the transport section, on the conventional Brundtland definition for sustainable development, provides a useful and sophisticated insight into rethinking a sustainable construction orthodoxy, namely; "the ability to meet the needs of society to move freely, gain access, communicate, trade and establish relationships without sacrificing other essential human or ecological values today and in the future" (WBCSD, 2006). This definition significantly overcomes some of the shortfalls of the original definition inasmuch as it:

- Identifies the benefactors as the broader society;
- Describes the scope of the need within the context of development and mobility; and
- Establishes an oversight doctrine aimed at resolving the conflict between humanity and ecology (people/planet interface) by upholding the values of both systems.

It might be argued by some that 'green building' is not meant to conform wholly with the definition of sustainable development as green building is but a sub-set of sustainable development: this would be valid were it not for the vision statements of BRE, USGBC, and Canada GBC. The moment reference is made to 'transformation' and 'building a better world', (as indeed such a reference should and must be made), an environmental limitation cannot be placed on green building methodologies.

The developmental agenda of the world, certainly as contained within the Millennium Development Goals (MDGs), is aimed at overcoming the unequal distribution of resources between the world's populations. The agenda recognises that to achieve equity in resource distribution alternative approaches based on preferably renewable resources are required. The developmental agenda therefore mirrors the primary intent of the Brundtland definition with regard to resource consumption and equity. However, the Brundtland definition, as we have seen, extends beyond the content of resource consumption: the definition additionally introduces the principle of legitimacy by compelling the current generation not to 'compromise' the ability of future generations.

Green building methodologies should conform to the greater promise of sustainable development, and therefore should too incorporate the principle of legitimacy: yet the concept of legitimacy is not evident within sustainable



design theory or green building methodologies. Legitimacy implies lawful and proper behaviour and, within the broader societal context, requires the recognition of the validity of the activity through conformance to essential human and ecological values.

As built environment professionals, we should know better: the architecture that has dominated our education and our collective landscape began as one of the most ambitious social movements ever conceived. Modernism was not intended to erase history (although it did), but rather save the common worker from squalor and promote equality throughout the world. It can be argued that for all its permutations, a single, breathtaking ethos dominated modernism: it was the first, and perhaps the last, movement to envision an idealised, everlasting future. Unfortunately a noble social experiment succumbed to fashion and the winds of change. It behoves the built environment professions to ensure that 'sustainable building' does not go the same way.

#### **4.0 CONCLUSIONS**

The beginning of the 21<sup>st</sup> century, or the emergence of the post-Modern epoch (Pieterse 2004), represents a turning point for humanity as sustainability subsumes old environmental management theories and practices. Sustainability is a more appropriate approach for building and construction because it recognises people and institutions as the primary actors that benefit from change, with indirect benefits also accruing in equal measure for natural systems as a result.

In terms of UNEP's Responsible Investment criteria, the Equator Principles (<http://www.equator-principles.com/>), investment must improve the quality of life: detracting from the quality of life, as previously required, is no longer good enough. Thus, the do-least-harm approach must be replaced with a do-most-good approach. Quality of Life implies a measurable benefit to the community as a whole. The benefit is therefore more than to the owner, the tenant or the users alone.

This is as it should be: design should always serve its constituents. Design that impacts in any way on public space has an even greater and more complicated obligation to do so: the design of a sustainable building is simply compelled to do so. Designing for the public, like public service, is not for the faint of heart. In the end, good design is about more than serving a function – and it is certainly more than a monument to the designers' own design philosophy. Committing scarce resources that are held in trust for future generations, to a building for private use, extends to respecting and honouring what is notable about the past, the present, and the future, and doing so in a manner that is restorative of the people/planet relationship. It is about seeing clearly the action that is ultimately the most compassionate, even to the people who don't inhabit the building.

Thus far, social, cultural and behavioural issues are less well developed concepts in sustainable construction orthodoxy, and, by implication, in green building assessment criteria. Yet the construction industry is a major

employer of people, a significant contributor to socio-economic development, and provider of shelter for all of humanity's activities. With infrastructure provision once again perceived as a major contributor to poverty alleviation, built environment professions have the opportunity to add value to the objectives of socio-economic development throughout the delivery and operational process. This includes contributing to poverty alleviation, quality job creation, creating a healthy, safe and fulfilling working environment, distributing social costs and benefits equitably, skills development and transfer, and community upliftment. Green building assessment criteria must not fail to recognise that enduring buildings are more than a checklist of eco-friendly features. The 'greenest' buildings of all are those that people will want to have around for the next 100 years or more.

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