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Sustainability assessment of buildings: Would LEED lead Brazil anywhere?

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ABSTRACT

Innumerable building environmental assessment methodologies are currently available and share the goal of stimulating market demand for higher performance levels, though still exclusively focused on this single dimension of sustainability. Given the absence of a national system, LEED certification was selected in 2005 to state superior environmental performance of the national oil company's new major premises, triggering a buzz around the system. An extensive earlier work demonstrated however that the most coherent approach for Brazil is to develop a method tailored by local priorities and constraints, and embrace the broader challenge of carrying out sustainability assessments. This paper calls for further reflection regarding appropriateness of LEED application to measure and prove superior environmental performance of Brazilian buildings.

Keywords: Sustainable Building; Rating Systems; LEED; Brazil.

1 INTRODUCTION

The first methodologies developed for the environmental assessment of buildings emerged in the 90s and, nowadays, almost each European country, plus the United States, Canada, Australia, Japan, Hong Kong and South Africa, to name a few, have their own assessment system. All of these methods share the common goal to stimulate market demands for higher environmental performance levels, providing evaluations that could be either detailed enough to point out the necessity of intervention in the built environment or simplified, mainly to give guidance to designers or support the environmental labelling of buildings. With the remarkable

exception of South Africa's SBAT, all of them deal exclusively with the environmental dimension of sustainability.

In an earlier encompassing work, Silva (2003) demonstrated that it is, however, neither adequate or enough to import the existing foreign methods to evaluate buildings in Brazil, and that a more coherent and efficient means is to develop a method considering Brazilian priorities, conditions and constraints, within the broader challenge of widening the scope for carrying out sustainability assessments. The consultation process embedded in that work also made clear that the Brazilian market was not prepared to be evaluated against a sophisticated method in the short term, indicating that the best route to take was the gradual implementation of an evolutionary assessment system, backed up by a consistent information input process. The basis of a methodology and implementation strategy was proposed and launched the foundations for subsequent progress, including the ongoing development of a rating system for social housing.

In 2005, the Brazilian oil company decided to go for environmental certification of its major premises, starting with the significant enlargement of its research labs in Rio de Janeiro, RJ, and its headquarters in Vitória, ES. In the absence of a national assessment system in place, the Leadership in Energy and Environmental Design (LEED) certification was chosen to prove the buildings superior environmental performance. Workshops were organized for the involved architecture practices and other interested parties. Colossal design competitions gained equally enormous visibility in the media, including the International Architecture Biannual Expo held in Sao Paulo. As more people heard about the rating system, a buzz around LEED started in Brazil, thereby triggering the need for further reflection.

2 ENVIRONMENTAL ASSESSMENT SYSTEMS: MAJOR INITIATIVES AND BRIEF METHODOLOGY DISCUSSION

An extensive list of works, including Crawley, Aho (1999), Silva (2003) and Larsson (2004), draws on the analysis of several different assessment methods. Analysis of an amplified list of existing methods shows that they are naturally different, as sustainability agendas vary across countries; as well as design and construction practices, climate, traditions and market friendliness to introduction of assessment practicing. All systems rest on a relatively common scope foundation, even though their applicability is impacted by a certain variation in detailing and analytic depth.

Ideal assessment methodology development envisages migration from prescriptive to performance criteria. In this case, the role of benchmarks – implicitly considered in goals definition moves to the foreground and signalized the challenge regarding data collection for reliable benchmark construction. Due to the complexity of applying true performance assessment, most methods are feature-based and use checklists that grant credits according to adoption of design strategies or equipment specification. This approach assumes that a collection of

strategies and equipments would probably lead to some performance improvement, even though this shift cannot be estimated. This is also a more market-friendly approach, that can be easily incorporated as design tool, but even complete compliance to the checklist does not necessarily ensures the best overall development, and could simply favour qualification of featured-containing buildings instead.

The first and most renowned assessment and rating system is the Building Establishment Environmental Assessment Method (BREEAM), developed in the UK by private sector and BRE researchers (Baldwin et al., 1998). BREEAM was also the adopted basis for development of HK-Beam (Hong Kong) and Green Stars (Australia).

Development of Leadership for Energy and Environmental Design - LEED – in the United States began in 1996, and the first version was piloted in 1999. This program was created for and based on the US commercial market and tapped the demand for reliable information with a rigorous rating system and checklist designed to capture environmental, economic, and human health benefits. A checklist prompts designers to reduce impacts in five categories related to site planning, energy consumption, water usage, indoor environmental quality, and building materials. A set of pre-requisites must be complied before proceeding to performance classification. Projects earn points for criteria that they fulfill and, the minimum points being achieved, one of four certification levels (certified, silver, gold or platinum) is awarded according to the overall score.

GBTool follows a different methodological approach, and was specifically developed to reflect different priorities, technologies, construction traditions and even cultural values across countries and regions (Cole and Larsson, 2000). GBTool is probably the most performance-oriented system currently available. In order to provide results adherent to local contexts, it establishes benchmarks that indicate local typical practice; assessment teams are encouraged to indicate the best weighting among impact categories for each case and, for each assessed item, a performance scale indicates actual performance as measured against the correspondent benchmark (Silva, 2005).

Once categories are assessed, some schemes apply different weights to indicate relative importance within categories to reach a series of performance indicators (as in GBTool) or to get single performance indexes (like in BREEAM). But not all systems apply weighting, basically due to the lack of a consensual methodology for objective decision-making on which impacts are more critical than the others.

LEED and Green Stars are possibly the assessment systems currently showing the highest growth rates. Given the crescent - though not yet significant - insertion of LEED in the Brazilian market, the following sections elaborate on its specificities and insertion in such construction context.

3 DISCUSSION

3.1 Is it wise to import an existing method to assess buildings in Brazil?

The methodology discussion of existing assessment systems and the case studies performed by Silva (2003) demonstrated that - regardless of histories of success in the original countries - it is not advisable to apply a foreign method in any context but the one it was created for, and that it is rather paramount to develop a method that adequately considers Brazilian (or of any other country) priorities, conditions and constraints.

It should be highlighted that the central question here is not about the quality of existing methods. Certain aspects loose validity or items not always considered internationally are of utmost importance in local contexts and must be included¹. Universal application of a given system is contradictory, because (1) what these methods assess is insufficient and assessed items of regional/local outreach do not necessarily reflect the Brazilian agenda; (2) how these methods make assessments is inappropriate for Brazil, and it is necessary to locally define weighting criteria; and it is inconsistent to assess impacts of products and technologies using international data; and (3) how much should be accomplished in each method is defined by the synergy of factors (such as state of products and technologies available in the market, building practices and regulations), which sum up to delineate the reference levels that support establishment of goals. Therefore, huge differences in construction contexts reflect in differences in expected improvement.

Though it is not necessary to start from scratch, and existing tools serve well as good starting points for deriving an appropriate assessment for Brazilian conditions, a meticulous revision of items and benchmarks to be considered is required, so that meaningful, adherent to national context, results are obtained.

Silva (2003) also defends that the quality of an assessment method is determined by four essential principles:

- To be technically consistent, an assessment method should be adapted to national relevant data;
- To be practically feasible, an assessment method should be adapted to local construction market, practices and traditions;
- To take off rapidly, an assessment method should be developed in partnership with major construction stakeholders; and
- To be appropriate to the national context, the items assessed in the process should be weighted to reflect priorities and national interests.

¹ For detailed discussions, see Silva *et al.* (2002) and Silva (2005).

All of them are locally defined, and therefore contradicted by importation. Sustainable building requires a change of mindset. If this change is established by wrong parameters, it could be a disservice rather than a benefit.

3.2 Specific concerns regarding the use of LEED in Brazil

Although interest in green building seemed to grow exponentially (Mendler, 2002), and regardless of LEED's success as a marketing and policy tool, a number of substantive, constructive critiques were gradually voiced (Scheuer and Kooleian, 2002; Stein and Reiss, 2004; Greenspirit Strategies Ltd., 2004; McLennan and Rumsey, 2004). Yet, the toughest criticism came probably from Schendler and Udall's provocative essay (2004), which explored imperfections in the LEED system, based on their experience of practicing its implementation.

Most of these reviews trace back to the central methodology basis LEED rests upon: the (prescriptive, feature-oriented, non-weighted, flexibly chosen) point system, which ultimately allows for a myopic twist in design process when focus is shifted from building performance to certification, as all credits are equal, even though some of them demand more effort and money to be accomplished, or have greater environmental benefits than others.

Exercising suppositions of LEED application in Brazil brings up two other major factors: added costs, and uncertain contribution to market transformation.

a) cost burden (and the risk of pursuing cheaper points rather than environmentally effective ones)

Associated costs of pursuing LEED certification are real. They exist in the US and may be escalated in Brazil, because of lack of familiarization with the subject, with the referred standards and with the services required. Scoring successive points beyond standard practice design can considerably increase design effort and capital costs for construction particularly if the assumed standard practice, as defined by the American market, is not really the local standard. The certification itself adds on the consultant fees (commissioning, computer modeling, design facilitation and construction coordination...), not forgetting about registration and certification costs, overall inflated by the overwhelming documentation-gathering effort. The number of "LEED-like buildings" in the US has grown thus far, perhaps indicating a trend that it would have become satisfactory to use LEED strictly as guidance, because of the cost-² and time-consuming facets of the certification.

² In that regard, it is important to mention that in the recent GreenBuild 2006 Conference, the USGBC announced that certification costs will be fully waived for buildings that reach LEED Platinum.

In Brazil, though early to affirm yet, ongoing experience indicate that in the upper market extreme (triple A office buildings, incorporated by international companies, and therefore meeting most of the requested standards) the costs for LEED certification appear to be marginal. In most of the remaining cases, however, the above mentioned costs can be really significant and, chances are that LEED certification would draw funds that otherwise could be used to actually improve the building. Furthermore, the local community may not be prepared to meet the requirements on time and under budget or to cope with the extra costs, or might simply not want to, once it realizes they do not necessarily ensure improved environmental performance.

LEED system makes of commissioning a prerequisite, which can indeed bring substantial savings during operation. Yet, it adds significant upfront costs, not necessarily recoverable by those who invested on it. Energy modeling following ASHRAE protocols is another pre-requisite and the door for several energy points, but ASHRAE standards are not standard in Brazil. Modeling is also expensive in the local market, and reaches prohibitively expensive status for smaller buildings because a large portion of the work involved does not escalate with building size. Both design and construction aids should be mainstream and may represent future market opportunities, but truth is that in Brazil, less than a handful of professionals are capable to conduct energy modeling or commissioning on a regular basis, which in the short and medium terms, rockets up consultancy costs. Other points, less effective in environmental terms but cheaper, would probably be pursued instead.

b) uncertain contribution to real market transformation

The use of a point system tailored for a different market leaves room for (local) market confusion about sustainable building and risks to institutionalize greenwash instead of green design.

Credits that address global environmental issues such as the ozone layer, or the greenhouse effect will of course be relevant for all projects, in all locations, but those that essentially address local or regional issues, such as water conservation or waste management, are likely to have a different relevance in each circumstance. Design strategies contribute differently to a building's environmental performance depending on the regional climate, sites, and locations; and local zoning and regulations and may invalidate valuable strategies that benefit projects in other circumstances. Some strategies are simply not applicable to certain building programs. Moreover, goals are established according to the local construction context and improvement envisaged. In overlooking a whole set of conditions diverse from the ones that shaped LEED probably lays the major fragility of its wider use in Brazil. Contexts are different, so should be the environmental assessments.

Many requirements to score LEED points are prescriptive in nature, and require the implementation of a given product or technology. Whereas performance based requirements relate directly the intent of the credit and award points based on the extent it is met, prescriptive requirements give a point for implementing a specific solution or technology and their

performance value is considered fixed and implicit. Abstraction of a mitigated environmental impact by a strategy into a point is a loss of information through rationalization. Being indirect measures, if unavoidable in practice, prescriptions should be reduced to the minimum possible extent and be carefully chosen to effectively be the closest translation or performance intents and goals.

In Brazil, a “technology basket” approach can become an unforeseen counter back, if mistaken as a sustainable building proxy, which only scratches the surface, without really internalizing the concept. Recent local examples show a trend to fish up as many prescriptive points as possible to honour efforts and money invested on certification, once performance as described by LEED is jeopardized by the late decision to go for the certification. Yet, the points are awarded for adding bike racks or parking spaces for sharing vehicles in cities where crippling bikeways, urban sprawl and security concerns make cycling and carpooling inadvisable or unfeasible, meeting prescriptive requirements without addressing the intent behind them.

Most Brazilian construction industry agents are newcomers to sustainable building. Though rating systems indeed provide frameworks to assist designers in determining what design and construction elements need to be addressed, effective sustainable design will always be a matter of (good) design, and depends on the efforts and expertise of the designers themselves. The point system, however, may give the impression that it is better to use low voc emitting materials than no-voc-emitting materials. If no carpet or paints are used, the low voc-emitting points are not granted. Same apply for (certified) wood. In Brazil, IFC certified wood is scarcely available, still expensive, and mostly reserved for furniture. Lining up for certified formwork or other construction elements may take several months, jeopardizing the building schedule. Rented formwork is exempted from this math (and pushes the problem somewhere further), but extra-design effort to use no wood at all is not awarded.

Use of LEED certification to push and measure sustainability advance in Brazil poses further contra sense. Brazilian hydropower (over 86% in the country's energy matrix) is not green power as envisioned by LEED. Conversely, despite being widely available in the country for decades now, ethanol gets a point for alternative fuel, because it still holds this status in the US.

Some aspects considered by LEED are irrelevant or are less effective in bringing sustainability-driven reinvention to the Brazilian market (recycled content; day lighting and views; green power; and several alternative transportation credits). Other ones that are crucial in Brazil are not addressed, for instance: materials wastage; durability, passive design or at least building orientation. Several materials and resources requirements, for example, are either easily achieved by any Brazilian “brown” building (e.g. as standard cement has up to 70% post industrial recycled content, and steel up to 90% post consumer waste, most concrete or steel structures can achieve the recycled content points) or impossible to get (e.g. low emitting sealants). As a result, the latter are simply dropped, instead of stimulating market change.

Finally, recent experience seems to prove that it is actually possible to certify a not-green-from-the-outcome-building. Most critically: without getting one single energy point. Clients, managers and designers must keep focus on practicing good sustainable design that is worthy of certification, rather than blindly relying on a rating system to guide the greening of their projects. If certification concerns – rather than performance - take over and drive the production of green buildings, then their very essence is missed. At circumstantial extremes, one could end up with no certificate at all or a meaningless one. In a perverse turnaround, in a world of financial pressures, the very system developed to address greenwashing runs the risk of becoming greenwash itself, with unpredictable effects on the sustainability efforts that have been carried out for decades in the country. Not speaking of the damage of the brand itself.

4 CONCLUDING REMARKS

Brazil – and this is also valid for all developing countries – has a long way to go in both economic and social development, and the need for reduction of economic and social inequity join the fundamental need for balancing the cost and environmental benefit involved in actions for national development. All existing assessment systems essentially focus on environmental impacts of buildings. A central question in developing countries is the need to shift from environmental to sustainability assessment of buildings, and also encompass social and economic aspects related to production, operation and modification of the built environment. Brazil needs to undergo the same maturation process that countries that now have their rating systems underwent before finally reaching an agreed assessment framework to start with. Nevertheless, we can indeed learn from previous experiences.

Interest in green building is virtually exploding worldwide, and LEED's success as a marketing and policy tool has started to reach the Brazilian market. It is time for careful reflection then.

The same relative simplicity of the point system that have contributed significantly to LEED success so far also presents challenges, as some of the vital information needed for informed decision-making has been set aside. The challenges of handling relative weighting and more grounded scientific rigor also persist.

Fixing this may take several years, but LEED is continually evolving to incorporate new information. The USGBC itself is quite aware of the criticism it gets and has its hands full with constant internal reviews and the mushrooming assortment of new LEED specifications to address more types of building projects. USGBC, by the way, deserves endless credit for pioneering an American standard of what makes a building greener where none existed before, and for expanding the answer beyond energy.

LEED deserves recognition likewise, as it accomplished much in the past five years or so. It helped to reduce upsetting greenwashing, to consolidate experience, to make many innovations and environmentally-preferable materials mainstream or more widely accepted, at lower costs.

Its rapid adoption has been phenomenal, building the potential to establish itself as a standard for the US business environment. With all that, LEED is a robust starting point on the long journey to a sustainable future, still not a blueprint or the single right answer, which by the way it does not aim to be.

Due to the lack of performance data or other practicalities, the choice for a point system might be actually the answer found in some contexts to address construction industry impacts. However, overlaying prescriptive and non-weighted natures combines two key drawbacks. Firstly, because a set of prescriptions is essentially an indirect measure that assumes that the final whole will have the potential to accomplish better performance. Shaping points to accurately describe environmental performance is absolutely no easy task. If the prescriptive and feature oriented course is chosen, it should be ensured that the prescribed items and features are the most effective in the assessment context, and would unmistakably contribute for a positive market shift, considering the variable relative environmental value and applicability of a given strategy according to geographical region, climate, and building type.

Secondly, when points are not weighted, again to reflect contextual priorities or environmental benefit, points cease to be a metric of environmental performance, since – despite all guideline strategies have indirect potential environmental benefit – some strategies that achieve the same points may not have analogous environmental performance. As flexibility built-in in non-weighted point systems allows designers, owners and project managers to have discretion over which criteria are chosen to be met, gaming the point system could then reduce or compromise the functional and economic effectiveness of the various components and drive investment away from sound environmental performance strategies. If not reviewed or controlled, this may lead to a new – and harder to fight – breed of greenwashing.

Several questions can easily emerge at this point, for example: How does LEED prevent greenwashing? Can it? Can any system? Its adoption abroad would not result in unexpected internationally-stamped greenwash?

A rating system helps to shape up a certain perception of a sustainable building. Different rating systems – even being derived from a common set of basic generic requirements – naturally provide different visions. In this sense, LEED and all other rating systems around are extremely valuable.

For a real market change, understanding the environmental performance of a building should be as easy as choosing any consumption good. Certification is a well-known instrument for market recognition. But its effectiveness in changing markets has its own limits. Moreover, certification schemes are not about how to get a green building, but about how to certify one. They should be thought of as a means to an end, not the end itself, otherwise there is a concrete risk that certification concerns – rather than performance – take over and drive the process.

Only when certified requirements become and continuously exceed common practice and irrefutable benefits can be measured, market shifts are accomplished and the intent behind the certificate fully addressed. Otherwise, it is simply pancaking paperwork. Being one of the big

developing markets, the Brazilian case walks a delicate line here, as a certification program that fails to consider the filigree exposed in this paper, can instead lead to a "salt dispenser" effect, in which individual buildings are labeled, but missing the overarching goal of promoting a positive shift for the market as a whole.

Performance declaration, on the other hand, details and makes performance description transparent to the client or consumer, leaving to them the final decision to opt among a number of alternatives. It is also a powerful instrument for market distinction that states confidence in the quality/performance of a given product... without certification burdens.

Brazilian construction industry earlier negative experiences in seeking certificates and in "tropicalizing" foreign technologies and thinking are important discouraging factors to be accounted for.

Green sells, and the Brazilian market begins to acknowledge it. The "why reinvent the wheel?" discourse has been recurrently recited to defend introduction of LEED in Brazil, seeming to be guided more by local commercial interests than by thoughtful reflection, missing the very essence of green building principles. Unambiguously, this is not a fault of the LEED rating system itself, but can eventually stain the credibility of USGBC and put its brand at risk.

As splendidly stated by Schendler and Udall (2005): "...In the final analysis, the world needs green buildings a lot more than green buildings need [...] certification. The first is essential and inevitable. The second is optional. If [it costs] too much in dollars, time, and effort, we will not stop building green projects; we will just stop certifying them". The danger in Brazil is that the willingness to do something, the aversion of reinvention - or mere ignorance - halts the sustainable building wheel before it has the opportunity to start rolling. Adequately made and tuned for the local pavement.

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