

## **The use of SBTool on public procurement: Challenges and opportunities**

**Marcia Castilho Correia**

*Oswaldo Cruz Foundation – FIOCRUZ RJ and Architecture Post-graduate Program, Universidade Federal do Rio de Janeiro, Brazil*  
[marcia.correia@fiocruz.br](mailto:marcia.correia@fiocruz.br)

**Mônica Santos Salgado**

*Architecture Graduate Program, Universidade Federal do Rio de Janeiro, Brazil,*  
[monicassalgado@ufrj.br](mailto:monicassalgado@ufrj.br)

**Luís Bragança**

*University of Minho, School of Engineering, Department of Civil Engineering, Guimarães, Portugal*  
[braganca@civil.uminho.pt](mailto:braganca@civil.uminho.pt)

**ABSTRACT:** The discussion of the difficulties in the integration of environmental sustainability requirements in public buildings and the subsequent evaluation of the design projects leads to the analysis of the limits imposed by the laws governing the public procurement process, the formulation of the call for bids and the Terms of Reference for the assessment criteria. In 1993, Brazil implemented into practice the 37<sup>th</sup> article of Brazilian Federal Constitution by means of the signature of federal law number 8666 enforcing general rules on administrative contracts for design projects (construction and engineering services). All government levels must obey this regulation. In 2010, the law received an amendment obliging all contracts to follow sustainability requirements. In this sense, some difficulties have been detected. Although LEED and HQE / AQUA have been adopted by some Brazilians entrepreneurs, SBTool assessment method and tool is freely available to the public and, for this reason, can be easily adapted and integrated in public procurement processes. Thus, this research deals with the preliminary analysis of the potential adoption of SBTool in biddings in order to lead development assessment of projects with environmental quality. Results already indicate the potential of SBTool on Brazilian's public procurement process as long as it has been considered since the beginning of the design process (pre-design phase).

**Keywords** *Architecture, Sustainable rating system, Sustainable construction*

## 1. INTRODUCTION

The concern about environmental sustainability in civil construction industry is a vital aspect that should be considered from design and construction until demolition phase. Despite the fact that this issue has been on the agenda of professionals for several years, many questions and doubts persist. Architects and constructors are looking for specifications which could guarantee proper environmental behaviour to their buildings. The major goal is to minimize the negative impact of a building, considering not only the design and the construction phases, but also the operation, maintenance and rehabilitation phases. However, it is necessary to understand that depending on the type of activities that will take place in the building, the requirements that must be considered become complex, and it is necessary to review the design process in order to integrate all requirements. (SALGADO & LEMOS, 2005)

This research aims to bring the debate into the management of projects contracted to third parties by public authorities. These contracts require technical evaluation of projects with clear and objective criteria, beyond the quality of the project including environmental sustainability. By objective criteria, it is understood that there can be no interference of subjectivity or biased assessment.

Developed in an international collaborative process, the Sustainable Building Method (SB Method) “is a generic framework for rating the sustainable performance of buildings and projects. It may also be thought of as a toolkit that assists local organizations to develop local SBTool rating systems” (iiSBE, 2016).

Thus, this research presents the results of a preliminary analysis considering the potential of STool in biddings in order to guarantee the development assessment of projects with environmental quality.

## 2. ENVIRONMENTAL SUSTAINABILITY IN PUBLIC PROCUREMENT

In 1993, Brazil implemented into practice the 37<sup>th</sup> article of Brazilian Federal Constitution by means of the signature of Federal Law N° 8666 (BRASIL, 1993), enforcing general rules on administrative contracts for design projects (construction and engineering services). It seeks the best proposal for the Public Administration, usually by choosing the lowest price but also can be by lowest price together with best technique. All government levels must obey this regulation (BRASIL, 2014) in a very complex procedure.

In 2010 this law received an amendment obliging all contracts to observe national sustainable aspects referred to building construction requirements. In this sense, difficulties have increased, particularly on including environmental high quality requirements on public announcements. Depending on the type of public procurement (invitation, public competition, live or virtual reverse auction, design competition and RDC as defined in Table 1) the obstacles are higher, considering that the project must give answer to a certain number of legal and bureaucratic requirements, and include environmental sustainability requirements.

It must be observed that each country has their own specific legal framework and this paper is an attempt to translate Brazilian legal framework to English, not to compare Brazilian

laws to the ones of any other country. In this sense this paper doesn't present a parallel neither to North American nor to British or any other English spoken country legal framework.

Table 1 lists Brazilian in force public procurement modes and its main characteristics in what they concern to this paper subject.

Table 1: Brazilian bidding modes for Engineering. Source: adapted from Federal Laws N°. 8666/1993, N°. 10.520/2016, N°. 12.462/2011 & N°. 13.303/2016

Types of Brazilian public procurement		Competitors
Invitation/ "Carta convite"	Contracts of low complexity and with values up to R\$ 150,000.00 for works and engineering services (art. 23 of Law 8.666 / 93.)	Companies registered or not, selected and invited, in minimum of 3.
Public competition/ "Concorrência"	High-value contracts above R\$ 1,500,000.00 for construction and engineering services (art. 23 of Law 8.666 / 93)	Allows the participation of any interested party.
Live reverse auction/ "Pregão presencial"	Bidding for the purchase of common goods and services, including engineering, regardless of the contract value (Federal Law N.º 10.520/2002, regulated by Federal Decree N.º 3.555/2000)	Allows the participation of any interested party. Dispute through proposals and bids in live public session.
Virtual reverse auction/ "Pregão eletrônico"	Bidding for the purchase of common goods and services, regardless of the contract value (Federal Law N.º 10.520/2002, regulated by Federal Decree N.º 5.450/2005)	Allows the participation of any interested party. Dispute through proposals and bids in virtual session (by Internet).
Design Competition/ "Concurso"	Contracts for the provision of specialized professional technical services should preferably be awarded by this competitive tendering with prior stipulation of award or remuneration. (Art. 13. §1 Federal Law N.º 8666/93)	Allows the participation of any interested party. Dispute through the competition of design projects.
Differentiated regime of hiring/ "Regime Diferenciado de Contratação - RDC"	Currently applies only to bids and contracts required to develop specific public procurement as the 2016 Olympic Games and Health Unic System (SUS) (Federal Law N.º 12.462/2011)	Wide publicity in electronic site must be ensured for all stages and procedures of the bidding process.
Public companies, Joint stock companies and its Subsidiaries' law	Contracts with values above R\$ 100,000.00 for works and engineering services (Art. 29, I Federal Law N.º 13.303/2016)	Wide publicity in electronic site must be ensured aiming to increase the participation of bidders.

Except for the mode Design Competition, which selects the design project, all the other modes aim to select the company that will develop the design project. In this sense must be assessed the companies technical-operational and technical-professional capacities, besides their economic and financial qualification: and guarantee insurance. (CAMPELO & CAVALCANTE, 2004)

As can be seen along Table 1, over the time Brazilian procurement laws have improved and are demonstrating an effort in speeding processes and, besides, are favoring broader participation and the Public Administration best interests. Also at least since 2010 there can be seen a progressive result of general concern with our natural environment with reflections in our laws and regulations.

The brand new bidding procedures and contracts awarded by public enterprises and joint stock companies (BRASIL, 2016) are designed to ensure the selection of the most advantageous offer, including regards to the life cycle of the building. Bids and contracts governed by this law must respect, especially the rules on:

- I - final disposal environmentally sound of solid waste generated by the contracted works;
- II - mitigation of environmental damage through constraining measures and environmental compensation, which will be defined in the licensing procedure;
- III - use of products, equipment and services that are proven to reduce the consumption of energy and natural resources;
- IV - assessment of neighborhood impacts, according to the town planning legislation;
- V - protection of cultural, historical, archaeological and immaterial heritage, demonstrating an evolution process towards sustainability.

Up to the present time the most used modes are public competition and live or virtual reverse auction. In case of common engineering services Federal Law N°. 10.520/2002 indicates the use of virtual reverse auction. Later on, Federal Decree 5.504/2005 obliges it use and in the case of impossibility it should be made a sound justification in the administrative process. In contradiction, as determined by Federal Law N° 8666/93 (BRASIL, 1993), contracts for the provision of specialized professional technical services, as Engineering ones, should preferably be awarded by Design Competition.

As the preliminary results of this research indicates, unfortunately, it seems that due to the difficulties implied by requirement of prior stipulation of objective design assessment criteria and also of the award or remuneration, this mode is rarely used. First of all, assessing the quality of design projects is a difficult task, full of human subjectivities, and objective judgement is mandatory by force of law creating great obstacles. On the other hand, the laws require the exclusive use of objective criteria, previously determined by the public announcement (called "*Editai*").

"*Editai*" is the notice, a written formal call for the tender, that must be broadly published. This document is accompanied by the Terms of Reference, which contains all the conditions for holding a public procurement, such as: description of the object, definition of terms, qualification requirements, judging criteria, payment of the future contract, etc.. There are also annexes, such as: budget spreadsheet, physical and financial schedules, the draft contract, etc. All those documents should be prepared in the first phase of a procurement, called "internal phase". These documents guide the entire process of bidding and also guide the contract stage.

Difficulties in the activities of this process must be already solved during the public procurement preparation considering all its parts, particularly the Term of Reference. The contract supervision will be also based on strict compliance with the "*Editai*". To properly guide the process, this document must already contain all the criteria and to ensure that these criteria are framed as goals, first they need to be selected, have description in clear language and be properly ordered, allocated into classes or categories. (ROY & BOUYSSOU, 1993).

### **3. ENSURING ENVIRONMENTAL SUSTAINABILITY OF BUILDINGS**

The concern about sustainability of buildings in Brazil is still recent. It is not the case, for example, of France and the UK, which for more than ten years, have published regulations forcing contractors to produce buildings with low energy.

Although LEED (developed by the United States Green Building Council) and HQE / AQUA (implemented in Brazil by Vanzolini Foundation) had been adopted by some Brazilians entrepreneurs, the process of evaluation and certifications are expensive which is very negative for public contracts.

On the other hand, SBTool assessment method and tool (developed by iiSBE - International Initiative for a Sustainable Built Environment) is freely available to the public and, for this reason, can be easily adapted and integrated in public procurement bidding processes.

### **3.1 SBTool assessment method and tool**

SBTool (Sustainable Building Tool), named GBTool (Green Building Tool) until 2006, is the assessment tool of SB Method and was initiated in 1996 for the first Green Building Challenge (GBC) held in 1998 in Vancouver, Canada. This first Green Building Challenge was promoted by the International Initiative for a Sustainable Built Environment and, since then, gathered the support and collaboration of experts from 20 countries. GBC is nowadays known as SBC (Sustainable Building Challenge) and is still being organized and promoted by iiSBE (SBC, 2008), being held every three years as a side event of the world conferences of the SB Series, nowadays SBE Series - Sustainable Built Environment Conference Series (SBE Series, 2016). Since then the SBTool led to Protocollo ITACA in Italy, Verde in Spain, SBTool<sup>PT</sup> in Portugal, SBTool CZ in the Czech Republic and ASUS in Brazil (Larsson, 2015; Souza, 2008).

The SBTool provided by iiSBE has a generic structure which needs to be adapted to local conditions, calibrating parameters with proper definition of weights and benchmarks (Larsson, 2012a). It is worth emphasizing that this generic tool does not certificate, since the local iiSBE Chapters may determine whether there will be a certification or not. According to Larsson (2012a), the tool consists of two assessment modules that are connected to the building's life cycle. The first module refers to the building pre-design phase and the second to the building evaluation. The first brings local data and the second module contains building data as the project phases, construction and operation (use). Each module is divided into two Excel files, respectively named files "A" and "B".

The file "A" refers to an appropriate generic structure for a particular country or region set by the head of the regional organization in order to reflect important local issues. In this file the weight of parameters and benchmarks for the type of occupation are established and also information such as latitude, longitude, annual rainfall volume, population estimates, among others.

The "A" file is also configured for its particular type of occupation. It may have mixed uses, but limited to a maximum of three types, creating "A" files, e.g. for residential, commercial buildings, different urban areas etc. (Larsson, 2012a).

Figure 1 demonstrates how the SBTool functions for three design projects (Alpha, Beta and Gamma) each one with a different occupancy type, all in an imaginary place named Izmir.

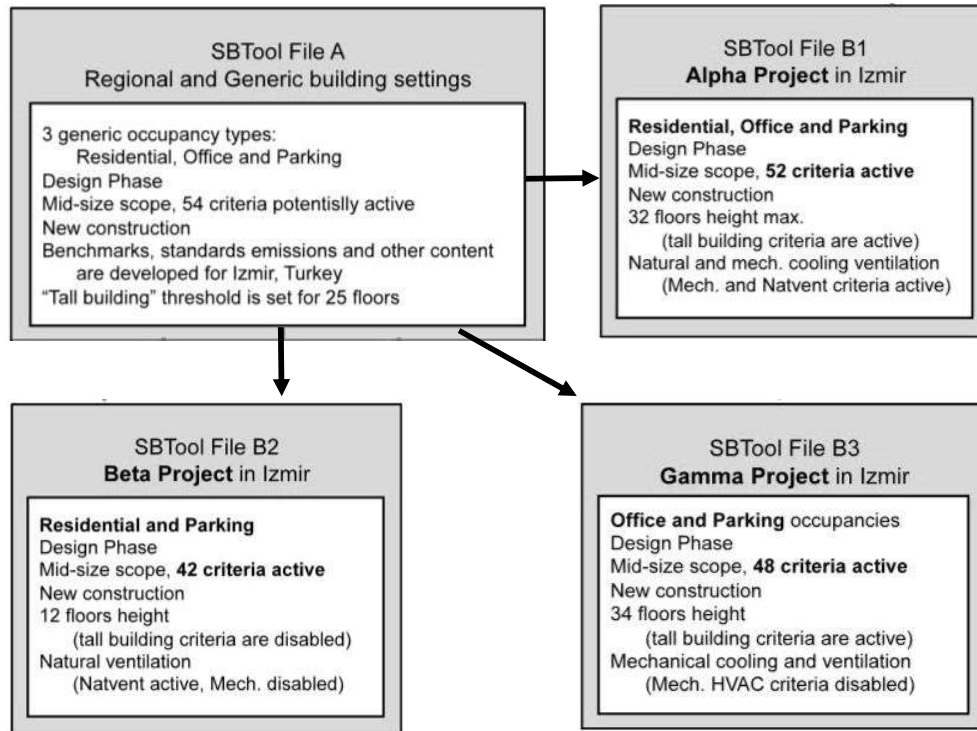


Figure 1. Three different File B versions from the same File A. Source: Adapted from Larsson, 2012b

In turn, the "B" file contains specific information for a particular project filled in by the project designer or by a professional qualified by iiSBE. However, before being released to the designers, the local representative must check whether the "A" and "B" files are linked and leave visible only the relevant information in order to prevent possible confusion during filling the "B" file. There can be several "B" files derived from a single "A" file (see Figure 1), since they have the same type of occupation, and "B" file settings are automatically determined by the adjustment made in "A" file (Larsson, 2012b).

SBTool provides a list of criteria, shown in table 2, divided in phases of the life cycle and categories. These categories are divided into criteria that vary according to the type of scope to be used: maximum scope, medium or low. The maximum covers all sustainability issues proposed by the tool, the minimum corresponds only to the essential evaluation criteria, while the average is a balance between the previous two. Thus, a building can be evaluated in only 3 or 107 criteria, depending on the type of scope and phase of the life cycle.

SBTool presents 8 categories for sustainability assessment. These categories are assessed by 29 indicators that are calculated through the use of 194 parameters, as can be seen in Table 1, aiming to cover the three dimensions that define sustainability – environmental, social, and economic aspects (iiSBE, 2016).

Table 2. List of SBTool criteria, 2015. Source: Adapted from iiSBE, 2016.

Assessment modules	Phases of the life-cycle	Category	Indicators	Number of Parameters		
Site assessment	Pre-Design	S. Location, Services and Site Characteristics	S1. Site Location and Context	12		
			S2. Off-site Services Available	9		
			S3. Site Characteristics	14		
Building assessment	Design, Construction and Operation	A. Site Regeneration and Development, Urban Design and Infrastructure	A1. Site Regeneration and Development	13		
			A2. Urban Design	6		
			A3. Project Infrastructure and Services	16		
		B. Energy and Resource Consumption	B1. Total Life Cycle Non-Renewable Energy	5		
			B2. Electrical Peak Demand	2		
			B3. Use of Materials	6		
			B4. Use of Potable Water, Stormwater and Greywater	4		
		C. Environmental Loadings	C1. Greenhouse Gas Emissions	4		
			C2. Other Atmospheric Emissions	3		
			C3. Solid and Liquid Wastes	5		
			C4. Impacts on Project Site	5		
			C5. Other Local and Regional Impacts	8		
		D. Indoor Environmental Quality	D1. Indoor Air Quality and Ventilation	10		
			D2. Air Temperature and Relative Humidity	2		
			D3. Daylighting and Illumination	3		
			D4. Noise and Acoustics	4		
			D5. Control of Electromagnetic Emissions	1		
		E. Service Quality	E1. Safety and Security	10		
			E2. Functionality and efficiency	8		
			E3. Controllability	4		
			E4. Flexibility and Adaptability	5		
			E5. Optimization and Maintenance of Operating Performance	9		
		F. Social, Cultural and Perceptual Aspects	F1. Social Aspects	5		
			F2. Culture and Heritage	6		
			F3. Perceptual	7		
		G. Cost and Economic Aspects	G1. Cost and Economics	8		
		<b>TOTAL</b>		<b>8</b>	<b>29</b>	<b>194</b>

In addition, a project is evaluated according to the four phases of the building lifecycle - pre-design, design, construction and operation - and the weighting system is adjusted according to the local characteristics. Some parameters can be switched off, if necessary, without interference with the final score (Larsson, 2012a).

As showed on Table 2, SBTool provides assessment to up to 194 parameters for a single location, but the number of active parameters varies with the stage of design and the type of scope. (iiSBE, 2016).

#### 4. CHALLENGES AND OPPORTUNITIES IN THE USE OF SBTOOL

SBTool is a flexible tool and adaptable to the particularities of different locations in different territories, which is one of the great advantages towards commercial certifications (Aulicino, 2008). But SBTool itself does not certificate. Moreover, from a common methodology (SB Method) creates multiple versions of a single tool for different regions and different building uses (Larsson, 2012a).

As shown in Table 1, except for the mode Design Competition, which selects the design project, all the other modes aim to select the company that will develop the design project. That means that, in the majority of cases, the assessment of projects with environmental quality will only be needed in the contract phase, after the procurement process is over.

Table 3: Brazilian bidding modes and the potential adoption of SBTool

Types of Brazilian public procurement	Characteristic of the mode	Potential for adoption of SBTool
Invitation/“Carta convite”	This bidding mode selects the company that will develop the design project.	Can be adopted but must be previously determined in the procurement announcement / “Edital”. Creating a local benchmark is a difficulty.
Public competition/ “Concorrência”		The use of SBTool on this modality must be made during the contract phase, after the bidding itself., during design phase ..
Live reverse auction/ “Pregão presencial”		
Virtual reverse auction/ “Pregão eletrônico”	This bidding mode selects the design project.	Can be adopted but must be previously determined in the procurement announcement / “Edital”
Design competition/ “Concurso”		The use of SBTool on this modality must be made during the selection phase, the bidding itself.. It could help in the classification of competing projects and could also guide detailing options after the selection has been made.
Differentiated regime of hiring/ “Regime Diferenciado de Contratação - RDC”	This bidding mode selects the company that will develop the design project or, in the integrated sub-mode design-build the one that will both develop and build.	Can be adopted but must be previously determined in the procurement announcement / “Edital”. Creating a local benchmark is a difficulty. The use of SBTool on this modality must be made during the contract phase, after the bidding itself., during design phase
Public companies, Joint stock companies and its Subsidiaries’ law	This bidding mode selects the company that will develop the design project or, in the integrated sub-mode design-build the one that will both develop and build.	Can be adopted but must be previously determined in the procurement announcement / “Edital”. Creating a local benchmark is a difficulty. The use of SBTool on this modality must be made during the contract phase, after the bidding itself., during design phase

The method allows analyzing a building in four life cycle phases in addition to considering all dimensions defining the sustainability thus allowing a more thorough check of the building. The generic SBTool is free, which is a relevant aspect to public bodies and used as a zero reference the best regional construction practice and the impact of local materials in the evaluation process (iiSBE, 2016). In this way it provides an opportunity for continuous improvement. Another important issue, according to Souza (2008), is that the SBTool is the only system that takes into account the perception of the user in the assessment of existing buildings, since it has assessment criteria set for building operation / use. However, some challenges were found. SBTool has a difficult and complex structure that is hampered by the



Excel program, since the user needs to fully understand the program in order not to make mistakes that can change the whole assessment system (Aulicino, 2008). In addition, file B needs to be synchronized with file A in order to update the information to file B and to allow the system to work properly (iiSBE, 2016).

As shown in Table 3, creating a SBTool local benchmark would be a common difficulty to all procurement modes. Another barrier to be considered is the continuous evolution and updating of the generic SBTool method, which may cause differences between the local and the generic tools and may confuse users and companies and create problems. When the Edict is not clear or doesn't fulfill these specifications the procurement process itself can be contested by the interested companies or the supervision of future contract will have to deal with the gaps during the contract. In a certain way, the most used options postpone most problems to the contract supervision phase. Design competition is the exception.

The evaluation through SBTool method requires the use of other tools and methods, such as the assessment of the energy performance of the building, or the user satisfaction indicators.

## **5. CONCLUSIONS**

SBTool is a very objective tool, with clear parameters, meeting the needed requirements to guide the development of design projects by contractors and carry out the evaluation of the design projects by the contractor, within the same parameters.

The present stage of this research indicates that SBTool can be applied in all modes of Brazilian procurement, during procurement phase in case of the adoption of contest mode and during contract phase in other modes.

Despite the challenges, the positive points outweigh the negatives, which, with effort and preparation, can be widely overcome.

This research deals with the preliminary analysis of the potential adoption of SBTool tool in biddings in order to lead development assessment of projects with environmental quality. Positive results, as shown, already indicate the potential of SBTool on Brazilian's public procurement process as long as it has been considered since the beginning of design process (pre-design phase) establishing the assessment parameters from the very beginning of the process.

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