An Overview of SBTool September 2007 Release

07 September 2007

To avoid tears, read this important note first:

Four example sets of files of the new SBTool system are available on our site for downloading, as follows:

SBT07_Full_DsnR3_Sep07: This example is set up for the assessment of a design phase project with new and renovated components, with three occupancies. A total of 116 parameters are active.

SBT07_Small_DsnR2_Sep07: This is the same as the first set, except that there are two occupancies and only 78 parameters are active.

SBT07_Tiny_DsnR3_Sep7: Same as the first set, except that only 36 parameters are active.

SBT07_Tiny_DsnN1_Sep07: This example assumes new construction for a single occupancy, and 36 parameters are active.

Note that the naming convention is: DsnR3 = Design phase, Renovation, 3 occupancies, and
DsnN1 = Design phase, New construction, 1 occupancy

All of these sets are zip files and each contains 3 files as described below.

The new, simplified, version of SBTool system consists of three files, all of which are interconnected. When first reviewing the system, please open files in the following order (names in brackets indicate linked files):

1. **SBT07-A (**Settings)
2. **SBT07-B (**Project - uses data from Settings file)
3. **SBT07-C (**Evaluation - uses data from Settings and Project files)

Make sure that you keep all linked files open if you are entering data, changing file formulas or file names. Conversely, you only need to open files that are linked.

Kindly report all errors or improvement ideas to Nils Larsson at the email below.

larsson@iisbe.org 07 September, 2007

Introduction to SBTool

This document describes the structure and function of SBTool, a software system formerly known as GBTool, that is designed to assess the environmental and sustainability performance of buildings. SBTool is the software implementation of the *Sustainable Building Challenge* (SBC) assessment method that has been under development as the GBC process since 1996 by a group of more than a dozen teams. The GBC process was launched by *Natural Resources Canada*, but responsibility was handed over to the *International Initiative for a Sustainable Built Environment* (iiSBE) in 2002. The generic method and software is calibrated by national teams to suit their local conditions, and is then tested on case study buildings. Results are displayed at international SB conferences, the most recent of which was the Tokyo SB05 conference in late September 2005.

The SBC assessment method is one of several systems that have been implemented around the world. The best-known systems are undoubtedly BREEAM, a system primarily used in the UK, and LEED, a system mainly confined to North America. BREEAM was the first system of this type and has been very influential since its development in the early 1990's. LEED is now growing at a very rapid rate and has undoubtedly been responsible for a major shift in industry attitudes in North America.

The SBC method and SBTool represents another approach. SBTool is a generic framework, and should be seen as a generic toolkit that allows local organizations to develop one or more rating systems that suit the region. The method allows authorized users to establish a scope for assessment, to have the system reflect the relative importance of performance issues in a particular region, and also to contain regionally relevant benchmarks. By replacing the generic benchmarks provided in the system with their own, regional authorities can ensure that the system will be relevant to their unique local conditions.

IiSBE is primarily involved in R&D and in helping local teams to come to grips with performance assessment, but we are also prepared to undertake large projects on a commercial basis.

Features of SBTool

- SBTool 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 rating systems.
- The system covers a wide range of sustainable building issues, not just green building concerns, but the scope of the system can be modified to be as narrow or as broad as desired, ranging from 125 criteria to half a dozen;
- The system allows third parties to establish parameter weights that reflect the varying importance of issues in the region, and to establish relevant benchmarks by occupancy type, in local languages. Thus, many rating systems can be developed in different regions that look quite different, but share a common methodology and set of terms. The main advantage, however, is that an SBTool version developed with local knowledge is likely to be much more relevant to local needs and values than other systems;
- Although the current version is set up to carry out Design-stage assessments only, the system has the capacity to carry out assessments at four distinct stages of the life-cycle and provides default benchmarks suited to each phase;
- Local organizations can select up to three building types out of a total of 18, and apply them separately or in a mixed-use project;
- SBTool takes into account region-specific and site-specific context factors, and these are used to switch off or reduce certain weights, as well as providing background information for all parties.
- The system handles large projects or single buildings, residential or commercial, new and existing construction, or a mix of the two;
- The system can provide approximations of annualized embodied energy for structural and building envelope components.
- Designers can specify performance targets and can score self-assessed performance;
- Assessors can accept self-assessed performance scores submitted by designers, or can modify them.

Elements of the SBTool system

- *SBT07-A* is used by regional third-party organizations to establish scope, eligible occupancy types, and locally valid weights, benchmarks and standards;
- *SBT07-B* allows designers to provide information about the site and project characteristics;
- *SBT07-C* is used to carry out self-assessments that are based on the data entered in the A and B files.

Parameters included within the system cover sustainable building issues within the three major areas of environment, social and economic sectors.

A distinguishing feature of SBTool is that it is designed as a generic framework, and requires a third party to adjust it to suit the unique conditions applicable to certain building types in various regions. This means that an assessment carried out using the system has little validity unless such a calibration feature is first carried out. Third party organizations are expected to adjust default weights, benchmarks and emission values throughout the system.

Default weights have been established by identifying strong, moderate or weak links between SBTool Criteria (the lowest level parameter type) and a small group of broad sustainability issues. These links are then weighted according to the apparent relative importance of the sustainability issue. All of these numbers are adjustable by authorized third-party organizations.

Figure 1: Partial view of worksheet WtA in the SBT07-A Settings file, used for establishing weights of Issues and Categories.

Weighting of Issues and Categories for Dorval, Canada				Design Phase	
				Generic	
Values range from 0 (not applicable) to 5 (most important), with the value 2 representing the normal default or null value, except for Mandatory parameters, which range from 3 to 5. Click on box at right to select Default or your own weighting values.	Use SBTool Defaults				
Instructions: First decide if you want to use the defaults If you want to set your own weights 1. First set relative importance for highest level Issues 2. Then set values for Categories within each Issue area 3. To set lowest level weights, go to WtB	Suggested nominal default values	Nominal weights adjusted for number of Categories	Weighted percent	Select your own nominal weighting values.	Mandatory
Issues	Active				
A **Site Selection, Project Planning and Development**	3	1.3	**7.8%**	0	
B **Energy and Resource Consumption**	5	3.6	**21.6%**	4	M
C **Environmental Loadings**	5	4.3	**25.9%**	5	M
D **Indoor Environmental Quality**	5	3.6	**21.6%**	4	M
E **Service Quality**	3	2.6	**15.5%**	3	
F **Social and Economic aspects**	3	0.9	**5.2%**	0	
G **Cultural and Perceptual Aspects**	3	0.4	**2.6%**	0	
Categories (note that some categories are only operational in certain phases)					
A *Site Selection, Project Planning and Development*	Suggested Default values	Weights adjusted for no. of Criteria	Weighted Percent within Issue	Use your values	
A1 Site Selection	3	9.0	33.3%	3	
A2 Project Planning	3	9.0	33.3%	3	
A3 Urban Design and Site Development	3	9.0	33.3%	3	
B *Energy and Resource Consumption*					
B1 Total Life Cycle Non-Renewable Energy	5	2.5	16.7%	5	M
B2 Electrical peak demand for facility operations	2	2.0	13.3%	2	
B3 Renewable Energy	3	1.5	10.0%	3	M
B4 Materials	3	7.5	50.0%	4	
B5 Potable Water	3	1.5	10.0%	3	M
C *Environmental Loadings*					
C1 Greenhouse Gas Emissions	5	2.5	21.7%	5	M
C2 Other Atmospheric Emissions	3	1.5	13.0%	3	

Figure 2: Partial view of worksheet WtB in the SBT07-A Settings file for establishing weights of Criteria (the lowest level of parameters)

Weighting of Criteria for Dorval, Canada					Generic	
					Design Phase	
Weighting on or off	Extent of potential effect (global or regional = 3, urban or nbhd. = 2, building or site = 1)	Intensity of potential effect (strong or direct = 3, moderate or indirect = 2, weak = 1)	Duration of potential effect (>50 yr = 3, >10 yr = 2, <10 yr = 1)	Weights for Criteria are established through the estimates of environmental impact at left. The initial weights are then modified by various Site Context conditions, or building characteristics, such as size, height etc. These settings can be seen in Columns H-J (hidden). The weights can also be turned off (Col. A).	Weights within group	Weights, total system
	Default values below =2. Range is 1 to 3.			**A Site Selection, Project Planning and Development**	**7.8%**	
				A1 Site Selection	33.3%	
✔	2	2	3	A1.1 Pre-development ecological value or sensitivity of land.	15.4%	0.4%
✔	2	2	3	A1.2 Pre-development agricultural value of land.	15.4%	0.4%
✔	2	3	1	A1.3 Vulnerability of land to flooding.	7.7%	0.2%
✔	3	2	3	A1.4 Potential for development to contaminate nearby bodies of water.	23.1%	0.6%
✔	2	3	3	A1.5 Pre-development contamination status of land.	23.1%	0.6%
✔	2	1	1	A1.6 Proximity of site to public transportation.	2.6%	0.1%
✔	2	1	1	A1.7 Distance between site and centres of employment or residential occupancies.	2.6%	0.1%
✔	2	1	1	A1.8 Proximity to commercial and cultural facilities.	2.6%	0.1%
✔	2	1	3	A1.9 Proximity to public recreation areas and facilities.	7.7%	0.2%
				A2 Project Planning	33.3%	
✔	1	2	3	A2.1 Feasibility of use of renewables.	10.0%	0.3%
✔	1	2	3	A2.2 Use of Integrated Design Process.	10.0%	0.3%
✔	2	2	3	A2.3 Potential environmental impact of development or re-development.	20.0%	0.5%
✔	2	2	2	A2.4 Provision of surface water management system.	13.3%	0.3%
✔	2	3	1	A2.5 Availability of potable water treatment system.	10.0%	0.3%
✔	2	2	1	A2.6 Availability of a split grey / potable water system.	6.7%	0.2%
✔	2	2	1	A2.7 Collection and recycling of solid wastes in the community or project.	6.7%	0.2%
✔	2	2	2	A2.8 Composting and re-use of sludge in the community or project.	13.3%	0.3%
✔	1	2	3	A2.9 Site orientation to maximize passive solar potential.	10.0%	0.3%

Please note that the individual Criteria can be switched off in the blue click boxes at the left. It should also be noted that some low-level weights are set automatically by SBTool, depending on specific context factors or features of the design. For example, if there is no access to bicycle pathways in the area, then the criterion weight for providing bicycle facilities is set to zero; and in a similar way, criteria dealing with mechanical HVAC systems are set to zero if the building is naturally ventilated. In such cases, all weights in the applicable Category are re-distributed amongst other criteria that remain active.

Figure 3: Context conditions for the general location are set in the A-Settings file, and site-specific conditions are established in the SBT07-B Project File.

Context for ERP project in Ottawa, Canada

Click 1 or 2 at upper left to show or hide details	*The upper section of this worksheet contains a description of context conditions in the Urban Area, as defined in the SBT Region file. The lower section contains descriptors of Site Conditions, as selected by the Project Assessor.*

Urban Area context issues selected in SBT Region file

	Title	Descriptors of condition
1	2 1/2% Winter Design Temperature	2 1/2% Winter Design Temperature is below 0 Deg. C.
2	Climate zone	5 (to be defined in the region)
3	Percentage of days during warm season when night temperatures are at least 10 deg. C. lower than day-time temps (free cooling potential).	0.75
4	Average annual hours of sunshine in the region	2,500
5	Urban area type	City with population of more than 250,000
6	Quality of public transportation in the area	There is public transport service with frequent service.
7	Capability of municipal potable water system to meet demand.	There is sufficient water for current and anticipated uses and there is no rationing.
8	Capability of local storm water infrastructure to meet marginal demand.	Existing storm water infrastructure can satisfy base and peak loads, using 95% of capacity or less.
9	Capability of local sewage infrastructure to meet marginal demand.	Existing sewage infrastructure can satisfy base and peak loads, using 98% of capacity or less.
10	Capability of electrical distribution infrastructure to meet marginal demand.	Existing infrastructure can satisfy base and peak loads, using 95% of capacity or less.
11	Regional availability of materials and products that can be re-used in a new structure.	There are materials, products or furnishings available in the region for re-use in the project, and they can be refurbished.
12	Regional availability of recycled materials that are produced in an energy-efficient process.	There is an adequate range of recycled materials available in the region for use in the project, and the recycling processes are somewhat efficient.

Site context conditions defined by Architect

	Title	Descriptors
13	Solar availability for a new building on the site	Natural features or built structures on adjacent land will block solar access at 1200 on Winter Soltice to 40% or more of the building envelope located as close to the property line as regulations permit.
14	Height of immediately adjacent buildings	Immediately adjacent building(s) have 17-20 floors above grade.
15	Availability & adequacy of sub-surface aquifer.	Aquifer can be used with some adverse effect on long-term aquifer capacity.
16	Presence of Radon	There is no Radon in the soil
17	Soil contamination	The site is documented as having moderate sub-surface contamination.
18	Existing land use on the site	The site has existing structures, or has previously been built on.
19	Agricultural value of land used for the project.	Land used for the project is Class C (lowest grade) agricultural land.
20	Ecological status of the site	The site currently supports a very limited range of flora and fauna.
21	Ambient noise conditions at the noisiest site boundary. If residential occupancy is included, measure average of peak values during hours of 2300-0600.	57.5 dba
22	Existence and suitability of existing structure(s) on the site	There is an existing structure on the site which is not well suited the functional requirements, but it can be renovated.
23	Feasibility of re-using materials or components from an existing building on the site.	Some materials and components of an existing structure on the site can be re-used to meet new requirements.
24	Heritage value of existing structure(s) on the site	There is an existing structure on the site which has some features of limited heritage value.

Figure 4: The *InitialSpec* worksheet of the *SBT07-B Project* file requires designers to provide preliminary information about the project. This is used to adjust or turn off various criteria or their weights.

Preliminary Project Information for ERP project, Ottawa, Canada

The purpose of this worksheet is to identify the basic characteristics of the project and the separate Elements within it, as far as may be known at this stage. Click on the upper left buttons to show 1, 2 or 3 block data sections.

Information	Click blue boxes to select specific conditions
Number of separate Elements in this project (1 to 3)	**3**
Identify existing Elements to be renovated (more than 50% of work).	Elements 2 & 3
Estimated age of existing structure in years	12
Is a site already selected?	Yes
Will the project include mechanical cooling?	Not yet decided
Will the project include mechanical ventilation?	Not yet decided
Will the project include hybrid or natural ventilation systems?	Not yet decided
Will the project include ground- or water-source heat pumps?	Not yet decided
Project name	**ERP project**
Site area of total project, m2	4,500
Name of Element 1 (new)	**Bayley Block**
Occupancy Type A in Bayley Block	Apartment
Specify number of residential dwelling units in Bayley Block	20
Number of floors below grade in Bayley Block	1
Number of floors above grade in Bayley Block	5
Building footprint of Bayley Block, m2	800
Gross floor area above grade in Bayley Block, m2	4,000
Total gross floor area in Bayley Block, m2	4,800
Name of Element 2 (renovated)	**Podium**
Occupancy Type B in Podium	Retail
N.A.	0
Number of floors below grade in Podium	1
Number of floors above grade in Podium	1
Building footprint of Podium, m2	0
Gross floor area above grade in Podium, m2	2,000
Total gross floor area in Podium, m2	4,000
Name of Element 3 (renovated)	**Parking**
Occupancy Type C in Parking	Indoor parking
N.A.	0
Number of floors below grade in Parking	1
Number of floors above grade in Parking	
Building footprint of Parking, m2	0
Gross floor area above grade in Parking, m2	
Total gross floor area in Parking, m2	2,400
Summary project data for ERP project	
Total number of Elements in project	3
Site area in project, m2	4,500
Maximum number of floors below grade in project	1
Maximum number of floors above grade in project	5
Total building footprint in project, m2	800
Total gross floor area above grade in all Elements	6,000
Total gross floor area above and below grade in all Elements	11,200
Floor area ratio (total gross area above grade / site area)	1.3
Percent of site built on at grade	17.8%
Total number of dwelling units in ERP project	20
Gross floor area of Apartment occupancy in ERP project, m2	4,800
Gross floor area of Retail occupancy in ERP project, m2	4,000
Gross floor area of Indoor parking occupancy in ERP project, m2	2,400

Structure of Benchmarks

Benchmarks are of two basic types: those that can be expressed as numeric values, and others that are best described in text form. In the SBTool system we have tried to express as many parameters as possible in a numeric form, but in some cases this would provide spurious results. In all cases, performance values are related to a scale that ranges from –1 to +5, with interpretation as follows:

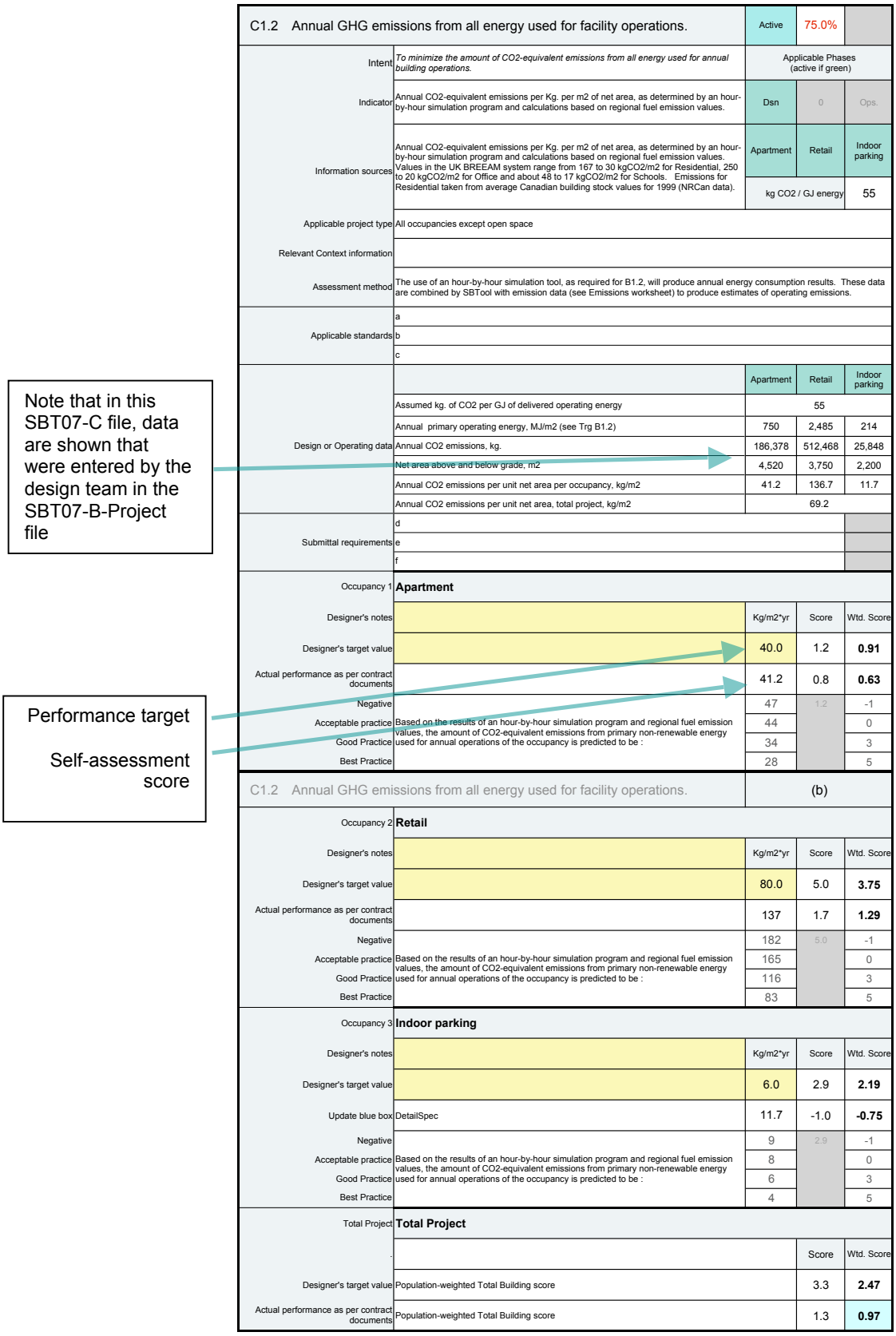
-1 Negative
0 Minimum acceptable performance (usually but not always defined by regulation)
3 Good Practice
5 Best practice

Naturally, the performance levels tied to each score will vary by location and often by building type, which is why SBTool requires local third parties to define appropriate performance levels. In the case of numeric parameters, this is done by setting two numeric values at the 0 and +5 levels (see Figure 5), which then defines the slope of a line for the –1 and +3 performance levels.

Figure 5: Typical Benchmark statement in the SBT07-A Settings file, for a numeric-based parameter, showing yellow cells for entry of local values for the generic occupancy type.

B1.2 Annual non-renewable primary energy used for facility operations				
Intent	*To minimize the amount of non-renewable energy (not including on-site renewable energy) used annually for building operations, commensurate with functional needs.*	Applicable phases (Active if green)		
Indicator	MJ of delivered energy per m2 of net area, including fuel and electrical use, as predicted by means of an acceptable method or tool.		Dsn	Ops.
Information sources	See IEA.org for data and case studies.	●	●	●
Applicable project type	Any occupancy except for Open Space			M
Assessment method	During early design stages a screening tool may be used, but in later stages an hour-by-hour simulation program should be used. Benchmarks for Ops should be derived from operational data for the relevant occupancy types, after a period of occupancy of at least one year. Note that benchmarks should be set using Delivered energy data, since this is what is commonly available. SBTool applies a conversion factor to these values to convert them to primary energy for the Results.			
Applicable Standards	a			
	b			
	c			
	d			
Information Submittals	e			
	f			
Occupancy 1	Apartment	Elec. MJ/m2 per yr	Total MJ/m2 per yr	Score
Negative	MJ of delivered non-renewable energy per m2 of net area used for operations, as predicted by means of an acceptable method or tool.	330	860	-1
Acceptable practice		300	800	0
Good Practice		210	620	3
Best Practice		150	500	5
Occupancy 2	Retail	Elec. MJ/m2 per yr	MJ/m2 per yr.	Score
Negative	MJ of delivered non-renewable energy per m2 of net area used for operations, as predicted by means of an acceptable method or tool.	2180	3300	-1
Acceptable practice		2000	3000	0
Good Practice		1460	2100	3
Best Practice		1100	1500	5
Occupancy 3	Indoor parking	Elec. MJ/m2 per yr	MJ/m2 per yr.	Score
Negative	MJ of delivered non-renewable energy per m2 of net area used for operations, as predicted by means of an acceptable method or tool.	52	164	-1
Acceptable practice		50	150	0
Good Practice		44	108	3
Best Practice		40	80	5

Figure 6: The same parameter shown in the *SBT07-C Evaluation* file.



C1.2 Annual GHG emissions from all energy used for facility operations.		Active	75.0%	
Intent	*To minimize the amount of CO2-equivalent emissions from all energy used for annual building operations.*	Applicable Phases (active if green)		
Indicator	Annual CO2-equivalent emissions per Kg. per m2 of net area, as determined by an hour-by-hour simulation program and calculations based on regional fuel emission values.	Dsn	0	Ops.
Information sources	Annual CO2-equivalent emissions per Kg. per m2 of net area, as determined by an hour-by-hour simulation program and calculations based on regional fuel emission values. Values in the UK BREEAM system range from 167 to 30 kgCO2/m2 for Residential, 250 to 20 kgCO2/m2 for Office and about 48 to 17 kgCO2/m2 for Schools. Emissions for Residential taken from average Canadian building stock values for 1999 (NRCan data).	Apartment	Retail	Indoor parking
		kg CO2 / GJ energy		55
Applicable project type	All occupancies except open space			
Relevant Context information				
Assessment method	The use of an hour-by-hour simulation tool, as required for B1.2, will produce annual energy consumption results. These data are combined by SBTool with emission data (see Emissions worksheet) to produce estimates of operating emissions.			
Applicable standards	a			
	b			
	c			
		Apartment	Retail	Indoor parking
Design or Operating data	Assumed kg. of CO2 per GJ of delivered operating energy	55		
	Annual primary operating energy, MJ/m2 (see Trg B1.2)	750	2,485	214
	Annual CO2 emissions, kg.	186,378	512,468	25,848
	Net area above and below grade, m2	4,520	3,750	2,200
	Annual CO2 emissions per unit net area per occupancy, kg/m2	41.2	136.7	11.7
	Annual CO2 emissions per unit net area, total project, kg/m2	69.2		
Submittal requirements	d			
	e			
	f			
Occupancy 1	**Apartment**			
Designer's notes		Kg/m2*yr	Score	Wtd. Score
Designer's target value		40.0	1.2	**0.91**
Actual performance as per contract documents		41.2	0.8	**0.63**
Negative	Based on the results of an hour-by-hour simulation program and regional fuel emission values, the amount of CO2-equivalent emissions from primary non-renewable energy used for annual operations of the occupancy is predicted to be :	47	1.2	-1
Acceptable practice		44		0
Good Practice		34		3
Best Practice		28		5
C1.2 Annual GHG emissions from all energy used for facility operations.		(b)		
Occupancy 2	**Retail**			
Designer's notes		Kg/m2*yr	Score	Wtd. Score
Designer's target value		80.0	5.0	**3.75**
Actual performance as per contract documents		137	1.7	**1.29**
Negative	Based on the results of an hour-by-hour simulation program and regional fuel emission values, the amount of CO2-equivalent emissions from primary non-renewable energy used for annual operations of the occupancy is predicted to be :	182	5.0	-1
Acceptable practice		165		0
Good Practice		116		3
Best Practice		83		5
Occupancy 3	**Indoor parking**			
Designer's notes		Kg/m2*yr	Score	Wtd. Score
Designer's target value		6.0	2.9	**2.19**
Update blue box	DetailSpec	11.7	-1.0	**-0.75**
Negative	Based on the results of an hour-by-hour simulation program and regional fuel emission values, the amount of CO2-equivalent emissions from primary non-renewable energy used for annual operations of the occupancy is predicted to be :	9	2.9	-1
Acceptable practice		8		0
Good Practice		6		3
Best Practice		4		5
Total Project	**Total Project**			
			Score	Wtd. Score
Designer's target value	Population-weighted Total Building score		3.3	**2.47**
Actual performance as per contract documents	Population-weighted Total Building score		1.3	**0.97**

Text-based parameters, such as this one shown in Figure 7, are used for more subjective performance aspects and are provided with (changeable) default text benchmark statements that attempt to describe a range of conditions from negative (-1) to Best Practice (+5). The example immediately below shows the self-assessment version located in SBT07-C Evaluation file. The statement that most closely agrees with the actual condition is selected by clicking on the blue selection box..

E3.1 Provision and operation of an effective facility management control system.		Active	42.9%	
Intent	*To ensure that a building management control system is provided to maximize the operational efficiency of building systems, such as HVAC, lighting and vertical transportation systems.*	Applicable Phases (active if green)		
Indicator	The presence of a computerized building management control system whose capability is consistent with the complexity of building systems.	Dsn	0	Ops.
Information sources	0	Active occupancies		
Applicable project type	0	Apartment	Retail	Indoor parking
Relevant Context information				
Assessment method	Review of contract documents and specifications of proposed system(s).			
Applicable standards	a			
	b			
	c			
Design or Operating data		Apartment	Retail	Indoor parking
	Scope of building management control system	Heat & cool	Heat, cool & lights	Heat only
	Type of building management control system	Digital	Digital	Digital
	Number of control points (DDC only)	90	200	6
Submittal requirements	d			
	e			
	f			
Total Project	**Total Project**			
			Score	Wtd. Score
Designer's target value		4.0	4.0	**1.71**
Actual performance as per contract documents	The building has a management control system capable of ensuring that building technical systems operate at close to peak efficiency during normal operating conditions, and the system provides partial monitoring of system operations.		3.0	**1.29**
Negative	The building has no management control system capable of ensuring the efficient operation of building technical systems.			-1
Acceptable practice	The building has a management control system capable of ensuring normal operation of building technical systems.			0
Good Practice	The building has a management control system capable of ensuring that building technical systems operate at close to peak efficiency during normal operating conditions, and the system provides partial monitoring of system operations.			3
Best Practice	The building has a management control system capable of ensuring that building technical systems operate at peak efficiency during all operating conditions, and the system provides full monitoring of system operations, as well as diagnostic reporting.			5

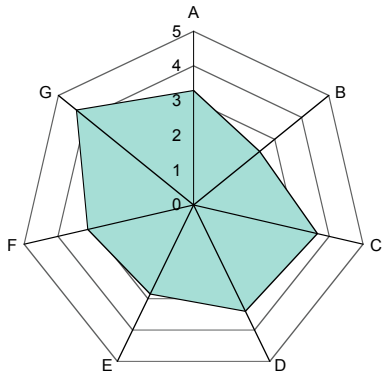
Figure 7, left: Note the weighting value shown and design data inserted, in this case by selecting standard values with blue click boxes. The main blue click box is used to select the most appropriate condition description.

Design target scores for ERP project, Ottawa, Canada

Predicted performance results based on information available during Design Phase	*Active Phase (set in Region file)*	**Design Phase**

Relative Performance Results

0 = Acceptable Practice; 3 = Good Practice; 5 = Best Practice



Performance Issue Areas

Design Phase scores indicate Potential Performance as predicted by an assessment of building features and plans for construction and operation that are developed during the design process.

Project Information

This is a Renovation project with a total gross area of 7000 m2. It has an estimated lifespan of 75 years, and contains the following occupancies: Apartment and Retail and is located in Ottawa, Canada. The assessment is valid for the Design Phase.

Assumed life span is 75 years, and monetary units are in CD	Amortization rate for embodied energy of existing materials is set at 2 %		
The project contains 20 apartment units	Design target scores		
With current context and building data, the number of active low-level parameters is:	**113**	Max. potential low-level parameters:	**117**
The number of active low-level mandatory parameters with a score of less than 3 is:	**3**	Active low-level mandatory parameters:	**10**

To see a full list of Issues, Categories and Criteria, go to the Issues worksheet.	Active Weights	Weighted scores
A Site Selection, Project Planning and Development	8%	**3.3**
B Energy and Resource Consumption	22%	**2.4**
C Environmental Loadings	26%	**3.7**
D Indoor Environmental Quality	22%	**3.4**
E Service Quality	16%	**2.9**
F Social and Economic aspects	5%	**3.1**

Absolute Performa

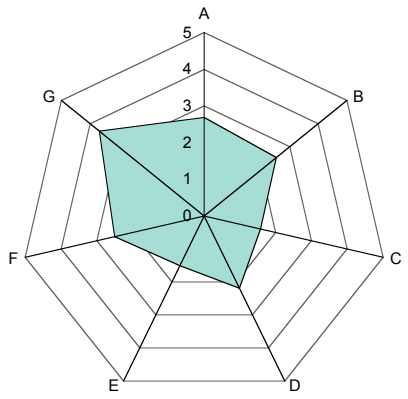
	These data are based on the Self-Assessmen
1	Total net consumption of primary embodied e
2	Net annualized consumption of embodied ene
3	Net annual consumption of delivered energy f
4	Net annual consumption of primary non-renev
5	Net annual consumption of primary non-renev
6	Net annual consumption of primary non-renev
7	Net annualized primary embodied energy and
8	Total on-site renewable energy used for opera
9	Net annual consumption of potable water for b
10	Annual use of grey water and rainwater for bu
11	Net annual GHG emissions from building ope
12	Total present value of 25-year life-cycle cost f
13	Proportion of gross area of existing structure(
14	Proportion of gross area of project provided b

Self-Assessment Scores for ERP project, Ottawa, Canada

Predicted performance results based on information available during Design Phase	*Active Phase (set in Region file)*	**Design Phase**

Relative Performance Results

0 = Acceptable Practice; 3 = Good Practice; 5 = Best Practice



Performance Issue Areas

Design Phase scores indicate Potential Performance as predicted by an assessment of building features and plans for construction and operation that are developed during the design process.

Project Information

This is a Renovation project with a total gross area of 7000 m2. It has an estimated lifespan of 75 years, and contains the following occupancies: Apartment and Retail and is located in Ottawa, Canada. The assessment is valid for the Design Phase.

Assumed life span is 75 years, and monetary units are in CD	Amortization rate for embodied energy of existing materials is set at 2 %		
The project contains 20 apartment units	Self-Assessment Scores		
With current context and building data, the number of active low-level parameters is:	**113**	Max. potential low-level parameters:	**117**
The number of active low-level mandatory parameters with a score of less than 3 is:	**3**	Active low-level mandatory parameters:	**10**

To see a full list of Issues, Categories and Criteria, go to the Issues worksheet.	Active Weights	Weighted scores
A Site Selection, Project Planning and Development	8%	**2.7**
B Energy and Resource Consumption	22%	**2.5**
C Environmental Loadings	26%	**1.6**
D Indoor Environmental Quality	22%	**2.2**
E Service Quality	16%	**1.5**
F Social and Economic aspects	5%	**2.5**
G Cultural and Perceptual Aspects	3%	**3.7**
Total weighted building score		**2.1**

Absolute Performance Results

	These data are based on the Self-Assessment values	By area	By area & occupancy	
1	Total net consumption of primary embodied energy for structure and envelope, GJ/m2	22	27	GJ/m²*maph
2	Net annualized consumption of embodied energy for envelope and structure, MJ/m2*yr.	296	361	MJ/m²*maph
3	Net annual consumption of delivered energy for building operations, MJ/m2*year	617	751	MJ/m²*maph
4	Net annual consumption of primary non-renewable energy for building operations, MJ/m2*yr.	1258	1533	MJ/m²*maph
5	Net annual consumption of primary non-renewable energy per dwelling unit in project, MJ/m2*yr.	63	77	MJ/m²*maph
6	Net annual consumption of primary non-renewable energy per dwelling unit in residential element, MJ/m2*yr.	63	77	MJ/m²*maph
7	Net annualized primary embodied energy and annual operating primary energy, MJ/m2*yr.	1554	1893	MJ/m²*maph
8	Total on-site renewable energy used for operations, MJ/m2*yr.	90	109	MJ/m²*maph
9	Net annual consumption of potable water for building operations, m3 / m2 * year	0.3	0.3	m³/m²*maph
10	Annual use of grey water and rainwater for building operations, m3 / m2 * year	18	22	m³/m²*maph
11	Net annual GHG emissions from building operations, kg. CO2 equivalent per year	69	84	kg/m²*maph
12	Total present value of 25-year life-cycle cost fot total project, CD per m2.	8,886		
13	Proportion of gross area of existing structure(s) re-used in the new project, percent	64%		
14	Proportion of gross area of project provided by re-use of existing structure(s), percent	63%		

Figures 8 &9

Results can be seen in two forms: Target and Self-Assessment values are shown in the Results worksheet of the SBT07-C Evaluation file. Note that absolute results are also shown