ASBP RESPONSE

BREEAM 2014 CONSULTATION

(Final Version – 06/08/2013)

Contents

Background to this document

BRE Global has begun the process of updating BREEAM UK New Construction 2011 with a plan to launch the updated 2014 version of the scheme early next year.

The Alliance for Sustainable Building Products (ASBP) has coordinated this response to the current open consultation on BREEAM which closes on 9th August 2013. The ASBP believe that BREEAM is not encouraging best practice in the specification and use of products and materials. This response was initiated after discussions at an environmental product declaration (EPD) event organised by the ASBP and PE International held on 3rd July 2013. Jane Anderson of PE International prepared the initial draft.

The focus for this submission is on the missed opportunity for substantial sustainability gains from better product and material choices. It is not focused on other important issues such as, for example, post occupancy evaluation. Whilst extremely relevant to product and material choices the issue of responsible sourcing (and the use of BES 6001) is beyond the scope of this current response.

This response is also not considering the mechanisms by which credits are achieved for products and materials as this is the subject of other ASBP outputs (See summary of the ASBP Green Guide critique in Appendix A).

Summary of feedback

The ASBP response to the BREEAM 2014 consultation was sent to approximately 800 recipients on the ASBP database. A total of 25 responses were received.

There was overwhelming agreement from the responses received that BREEAM is not sufficiently influencing product and material choices.

The reasons given for this lack of influence are that the credits available in the materials section do not adequately reflect the potential gains from better product and material choices and as the credits are generally considered to be 'hard to get' there is an inevitable focus on easier credits. **One solution proposed would be to increase available credits for materials and make certain aspects of the materials section mandatory.**

It was also pointed out by one respondent that there are already strong drivers for reduced energy in use – from the market (e.g. lower energy bills) and from legislation (e.g. part L of the Building Regulations). BREEAM should therefore focus on the more difficult issues for which there are no such drivers, such as how to better use material resources.

There was also strong support for the suggestion that BREEAM should move more rapidly to a 'second generation' tool based upon life cycle methodology where the real impacts of the different life cycle stages can be understood and quantified. This would enable available credits better align to the size of the potential sustainability gains. However, it was also suggested that a move to a purely life cycle approach could lead to an over focus on the elements with the highest embodied impact (such as the structure) and a relative lack of attention to other important areas – such as waste, toxicity and health.

Although this submission is not focused upon how credits for products and materials are achieved, there is widespread dissatisfaction expressed about the use of the Green Guide to Specification (see separate ASBP critique of the Green Guide to Specification in Appendix A). However, opinions surrounding the use of the Green Guide expose a tension between, on the one hand, the desire to make materials credits easier to get and on the other hand, the complexity of embodied impact. A move towards a 'second generation' tool based on life cycle methodology would seem to make the Green Guide redundant as life cycle tools require real data not generic ratings.

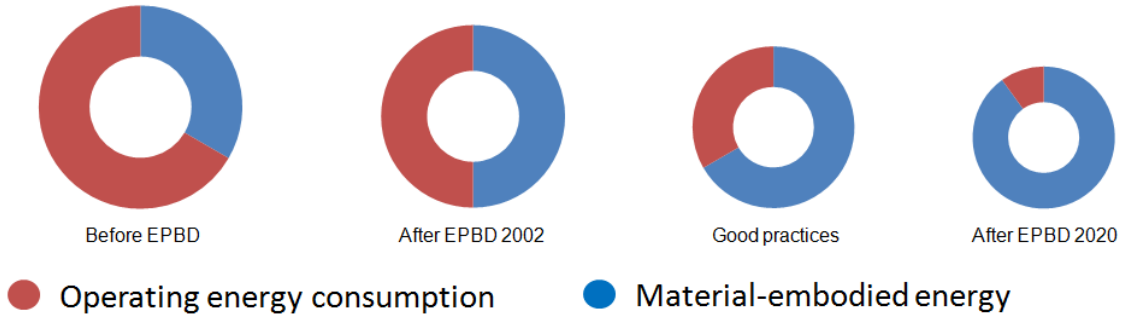
BREEAM 2014

Balance between material and energy credits

BREEAM has hardly altered the balance of materials and energy credits over the last 10 years, and as we understand it, is not proposing to do so in the 2014 revision. In BREEAM 2002 and 2006, materials credits had 10% of the weighting, and energy 14%, in BREEAM 2008 and BREEAM 2011, there was a slight change, to materials with 12.5% and energy 19%.

Yet as we move towards zero carbon buildings, with forthcoming Part L revision moving us ever closer to the 2019 target for commercial buildings, materials will become increasingly important compared to the impacts of building energy consumption. As shown in the diagram below from WGBC, the balance of materials and energy impacts has altered dramatically from 2002 to the current day, where BREEAM accredited buildings must be exhibiting good practices. A rebalancing of the materials credits is vital if the leading players in construction are to be prepared for the reality of materials impacts in 2019.

Figure 1: Lifetime CO2 emissions of new European Buildings (credit: WGBC)



BREEAM and CEN/TC 350

BREEAM was the forerunner of all the environmental building assessment schemes– but now it appears that the leading first generation building assessment scheme may fail to make the leap into the new second generation tools, which put building life cycle assessment at the heart of their evaluations.

The TC350 standards – the suite of sustainability standards developed as a result of a mandate from the European Commission, to provide an agreed method of assessing the environmental impacts of our buildings and construction products, setting out an approach to evaluate a wide-ranging list of impacts across the full building life cycle. Impacts are clearly reported in the life cycle stage where

they occur, so it is possible, reviewing a TC350 assessment, to fully understand the differing importance of the impacts from:

- the manufacture of construction products,
- their transport,
- the operation of the construction site
- the manufacture and disposal of products wasted during construction
- the operation of the building – the energy and water used over its life-time
- maintenance over the lifetime
- refurbishment
- demolition and the ongoing waste treatment and disposal and
- the potential benefits of recycling, reuse and energy recovery from waste during life and end of life.

TC350 does not require that a building assessment scheme, such as BREEAM, takes account of all the impacts reported in a TC350 evaluation, nor that the impacts from each life cycle stage are considered identically. But a building assessment scheme which aims to be consistent with the TC350 standards should make its assessment on the basis of such an assessment. This follows the approach of the second generation building assessment schemes which are starting to make BREEAM look increasingly old fashioned.

Building certification types

First generation
(check-list format)

1. The project is evaluated by contrasting it to criteria of good practices.
2. Global points or "ecopoints" are awarded that summarise different impacts.
3. The evaluation of specific impacts is not apparent to the user.
4. The system does not provide quantified data of the environmental impact.
5. The rating is done by scoring points, occasionally there are references.

Second generation
(summarised LCA format)

1. The project is evaluated through modeling its' performance.
2. Impact indicators are used with objective magnitudes.
3. The evaluation of specific impacts is apparent to the user.
4. The system does provide quantified data of the environmental impact.
5. The rating is done by comparing impacts to a reference and through a point system.

World GBC have proposed the checklist above to identify the differences between first and second generation tools. But perhaps it is easiest to consider this by looking at the way BREEAM and DGNB, an example of a second generation building certification scheme, consider building materials and building operation.

BREEAM has completely separate credits to evaluate the regulated energy consumption of the building and the impact of the key construction elements and insulation that are used. Around 9.5% of BREEAM credits are awarded based on the amount of regulated CO_2 emissions per annum, with a further 9.5% of credits available for using low energy external lighting, installing zero carbon technology and using energy monitoring etc. For materials, 5.2% of credits are awarded using the Green Guide to evaluate the impact of the key building elements, and around 1% each for the impact of the insulation and hard landscaping elements.

In contrast, DGNB requires each building to evaluate a building LCA over a 50 year life. This takes into account all materials use (including for building sub- and super-structure, building services and building fit-out) and also considers the impacts of regulated energy use over the same lifetime. The results for seven environmental indicators are then compared to benchmarks developed with German Government support, to evaluate 13% of the DGNB credits.

The first generation inconsistencies within BREEAM start to become much more obvious however when you look at the detail of the credits as shown in the following examples

Example 1: Credits for materials relative to waste

A review of the credits available in BREEAM in relation to materials and construction waste shows a distinct mismatch with the likely impacts.

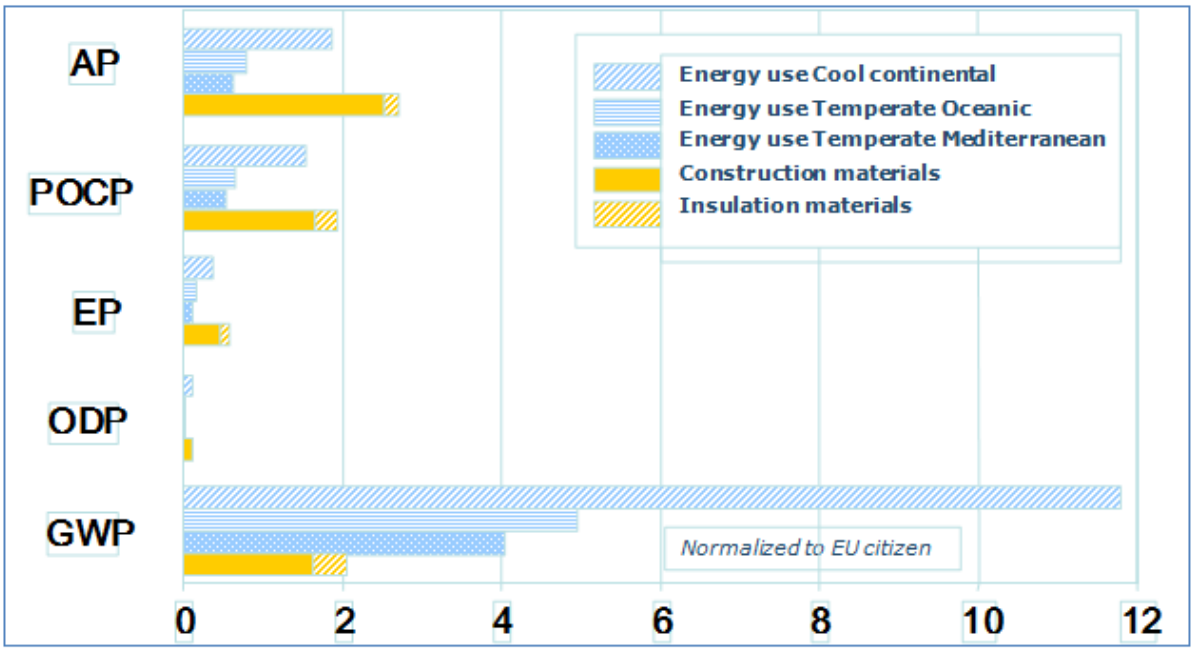
Credit	Description	% credits
WST 01	Construction waste management: Construction resource efficiency	3.2%
	Construction waste management: Diversion of resources from landfill	1.1%
		4.30%
MAT 01	Life cycle impacts	5.2%
MAT 02	Hard landscaping and boundary protection	1.0%
MAT 04	Insulation: life cycle impacts	1.05%
		7.25%

The impacts of construction waste arise from the unnecessary manufacture, transport and disposal of the waste material. Most evaluations assume a maximum wastage rate of around 10%, often less. So the impacts of construction waste should be no more than 10% of the cradle to gate impacts of construction. As MAT 01 takes account the full life cycle of the building, including refurbishment and replacement of facades and windows for example, then construction waste becomes even less than 10% of the embodied impacts. Yet BREEAM gives construction waste and its management 4.3% of credits compared to 7.25% available for embodied impact, giving waste an importance that it doesn't deserve in impact terms.

Example 2: Credits for Insulation relative to other product categories

There are an increasing number of studies which quantify the embodied impact of the different building materials within construction. These studies show that insulation has relatively low embodied impact compared to that of other building materials (due to its relatively low density). For

example, BRE study[1] evaluating the impact of insulation within a highly insulated new build house in different European regions is shown below.



As can be seen, the embodied impact of the insulation (GWP) is at most 20% of the impact of the materials. Yet BREEAM has 1.1% of credits for the embodied impact of insulation, and 1.1% for its responsible sourcing, irrespective of the level of insulation, giving it undue importance relative to other products and materials.

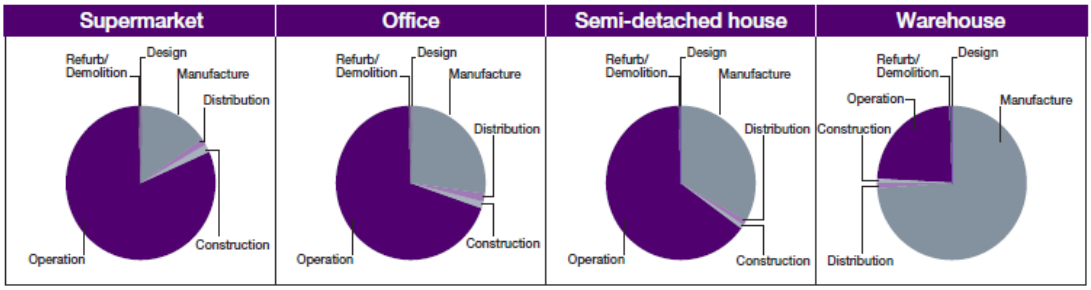
Credit	Description	% credits
MAT 01	Life cycle impacts	5.2%
MAT 02	Hard landscaping and boundary protection	1.0%
MAT 04	Insulation: life cycle impacts	1.05%
		7.25%

Example 3: Credits for materials relative to site operation

Site operation is similarly inconsistently evaluated. As demonstrated by the RICS graphic below, carbon impacts from construction and distribution are relatively small in comparison to the carbon impact from manufacture of the materials.

[1] http://www.pu-europe.eu/site/fileadmin/PU_Europe_files_2010/PU_10-199_PU_Europe_presentation_on_the_results_of_the_LCC_LCA_study__BRE____S_Kotaji__Prague__1_July_2010_.ppt

Figure 2: Carbon Impacts of new building life cycles[2]



Yet looking at the credits available within BREEAM, on-site construction impacts are given much greater degree of importance than the impact data suggests it warrants.

Credit	Description	% credits
MAN 03	Construction site impacts: energy	0.5%
	Construction site impacts: water	0.5%
MAN 03	Construction site impacts: waste and transport	0.5%
		1.50%
MAT 01	Life cycle impacts	5.2%
MAT 02	Hard landscaping and boundary protection	1.0%
MAT 04	Insulation: life cycle impacts	1.05%
		7.25%

Conclusions and recommendations

BREEAM is not encouraging better decision making in the selection of products and materials and in the approach to the use of resources in general.

BREEAM should pay greater attention to those aspects for which there are few existing drivers – such as in the specification and use of products and materials.

BREEAM should accelerate the transition to a 'second generation' life cycle approach.

BREEAM should increase the proportion of credits available for materials and consider having a mandatory element.

[2] https://consultations.rics.org/gf2.ti/-/290626/948493.jpg/pjpeg/-/Fig4.jpg

Response supporters

This response to the BREEAM 2014 consultation is endorsed by the following :

PE International – Jane Anderson
Modece Architects – Ralph Carpenter
Rounded Developments – Peter Draper
Dr Tom Woolley
Natural Building Technologies - Neil May
Wiehag GmbH - John Spittle
Circular Ecology – Craig Jones
Durisol - David Winduss
Asif Din Architectural Design – Asif Din
Ecological Building Systems – Penny Randall
Glasgow Caledonian University – Dr Keith Baker
BAM – Jesse Putzel
Grigoriou Interiors Ltd – Elina Grigoriou
Cullinan Studios – Brendan Sexton

Appendix A

Critique of The BRE Green Guide to Specification

This document is a summary of the key shortcomings of the BRE Green Guide to Specification (Green Guide) and its use as a planning instrument as well as a means of gaining credits under the BREEAM and the Code for Sustainable Homes. The summary has been prepared by the Alliance for Sustainable Building Products (ASBP) as a means of informing the output from the Green Building Guidance Task Group set up by the UKGBC. The main purpose of providing this critique is to suggest how the UKGBC could help to accelerate sustainability advances within the construction products sector

Most of the problems highlighted in this critique would be overcome through the development and use of appropriate Building Information Management (BIM) metrics, and thereby point to the importance of encouraging their development and use.

INTRODUCTION

The purpose of the Green Guide is to provide a credible and easy-to-use assessment tool to measure the environmental impact of construction products, materials and elements. This information is then fed into overall project assessment systems such as BREEAM and the Code for Sustainable Homes. In the context of the current consultation, the shortcomings with the Green Guide are summarised below.

LACK OF CHOICE

The UKGBC wishes to signpost construction practitioners to appropriate metrics to measure sustainability. This is an important and valuable function and will help to embed sustainability within organisations. However, this potential benefit can only be realised if the assessment metrics are recognised in a meaningful way. Currently product manufacturers can only gain credits to help support specification through the Green Guide and its use within BREEAM and the CfSH. Within this

context, the BRE is the only gateway. The construction products sector would be better served by creating more choice and ensuring a more competitive environment.

TRANSPARENCY

None of the data used to generate Green Guide ratings is open to public scrutiny. The principle of transparency is a central theme of international LCA standards (ISO 14040). It is common practice to 'black box' sensitive information but not the entire data set. As the UKGBC Task Group have indicated, the principle of transparency is critical to foster trust and learning.

GENERIC APPROACH

LCA standards state that primary data should be used when available. The generic ratings developed in the Green Guide use aggregated (industry average) data. However, it is clear that similar products can have widely different impacts depending on such issues as the origin of the raw materials, the production method or the location of the factory. The generic environmental profile provides no means of distinguishing between best and worst practice and thereby discourages manufacturers from innovating to reduce impacts.

METHODOLOGY (LCA from cradle to grave)

The UKGBC Task Group rightly points out that environmental assessment of products should be cradle to grave. The Green Guide uses an LCA approach to measure product impact from cradle to grave. However serious questions remain as to whether LCA is the most appropriate tool to measure the complete product life cycle. For example, the impacts associated with product manufacture are real and quantifiable, whereas there are substantial uncertainties for the impacts from gate to grave - such as distance to site, durability (maintenance and replacement frequency) and end of life scenario. Assumptions made about impacts after the factory gate can mask the production impacts The development of product specific EPDs which can feed into a BIM will help to correct this problem but only provided that the BREEAM / Green Guide system is not the only allowable metric.

METHODOLOGY (Peer Review)

The BRE Environmental Profiles Methodology (used to generate Green Guide ratings) is a peer reviewed LCA methodology. However, the approach of using industry average data, the method of black boxing data and presenting only summary ratings and the method of using a single rating to describe environmental performance are all methods particular to the Green Guide which would not have been subject to peer review and do not meet the requirements of international standards.

METHODOLOGY (Elemental Profiles)

The aggregation of building materials into building elements has many problems. Firstly it is not possible to determine the impact of products within an element. Secondly, building elements are multi-functional (thermal conductivity, thermal mass, acoustic, structural etc) and this complexity cannot be reflected within a simple comparable functional unit. Thirdly, the elemental approach cannot describe the relationship between embodied impact and impact in use. The problems of the Elemental Profiles approach would be overcome by the use of an appropriate BIM tool where real product impact data (from for example an EPD) is provided and used.

METHODOLOGY (Scope)

In purely LCA based assessment methodologies such as the Green Guide many important sustainability impacts are not considered – such as the sustainability of the raw materials, the impact of the product on human health in use, the wider social and economic impacts.

METHODOLOGY (Sequestered Carbon)

A recent report commissioned by ASBP (Sadler & Robson, 2011) reveals that the carbon store created from aggregated temporary sources (products) is extremely significant. In taking a 160 year after installation snap-shot view, the BRE Environmental Profiles Methodology assumes that almost all the carbon has been released back to the atmosphere and therefore allocates no benefit. Furthermore energy recovered at end of product life is not allocated back to the product. In short the BRE environmental profiles methodology allocates no benefit to carbon storage and no benefit to end of life energy recovery and is thus extremely unfavourable to biogenic products and materials.

Sadler, & Robson. (2011). *Bio-Renewable building materials as a climate change mitigation strategy.* ASBP.