

BS 8905:2011



BSI Standards Publication

Framework for the assessment of the sustainable use of materials – Guidance

bsi.

...making excellence a habit.
AVA Documents™
Document Sharing Hub

Publishing and copyright information

The BSI copyright notice displayed in this document indicates when the document was last issued.

© BSI 2011

ISBN 978 0 580 70453 6

ICS 03.100.99; 13.020.20

The following BSI references relate to the work on this standard:

Committee reference MI/1; SDS/1

Draft for comment 10/30216208 DC

Publication history

First published August 2011

Amendments issued since publication

Date	Text affected
------	---------------

Contents

Foreword *ii*

Introduction *1*

1	Scope	1
2	Terms and definitions	2
3	Sustainability and materials	4
4	Framework for a sustainability assessment of material	5
5	Phase 1: Scoping (see Figure 2)	7
6	Phase 2: Data collection and assessment (see Figure 3)	9
7	Phase 3: Reporting (see Figure 4)	12

Annexes

Annex A (informative)	Social aspect of sustainability	14
Annex B (informative)	Environmental aspect of sustainability	18
Annex C (informative)	Economic aspect of sustainability	21
Annex D (informative)	Sustainability assessment process	25
Annex E (informative)	Information management for the sustainable use of materials	26

Bibliography **30**

List of figures

Figure 1 – The sustainability assessment process for a material	6
Figure 2 – Phase 1: Scoping	7
Figure 3 – Phase 2: Data collection and assessment	9
Figure 4 – Phase 3: Reporting	12
Figure D.1 – Sustainability assessment process	25
Figure E.1 – Communication of material and information between the processes in the life cycle of a product	26
Figure E.2 – Framework for the conservation of digital information	29

Summary of pages

This document comprises a front cover, an inside front cover, pages i to ii, pages 1 to 32, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI and came into effect on 31 August 2011. It was prepared jointly by Technical Committees MI/1, *Materials Industries*, and SDS/1, *Sustainable development co-ordination*. A list of organizations represented on these committees can be obtained on request to their secretaries.

Information about this document

This British Standard builds on the guidance given in the other parts of the BS 8900 series of standards on sustainability and environmental management, with particular relevance to the use of materials through the supply chain.

Annex A of this British Standard discusses several methods and tools that are trade marked. In each case, information is given for the convenience of users of this standard and does not constitute an endorsement by BSI of the products named.

Use of this document

As a guide, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification or a code of practice and claims of compliance cannot be made to it.

Presentational conventions

The provisions in this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

Introduction

This British Standard provides a framework for the concepts, techniques, tools and methodologies that can be used to support decisions surrounding the sustainable use of materials.

Sustainable development is defined by BS 8900:2006 as “an enduring, balanced approach to economic activity, environmental responsibility and social progress”. Materials are an essential part of everyday life and the use of materials contributes to the quality of living standards: the houses that we live in, the food that we eat, the vehicles in which we travel and the way we communicate.

NOTE For the purposes of this British Standard, the terms “materials”, “components” and “products” are interchangeable, depending on where the user is in the supply chain and on the stage of the life cycle. In essence, a material is an input that is processed in some way, a component is an input that is assembled, and a product is the output. The product of one part of the supply chain can become a material or component of the next.

An expanding global population and increasing social need for an improved quality of life will create even higher demands on raw materials and natural resources. This framework recognizes that current levels of resource consumption related to materials exceed that which can be replaced by natural means, and as a consequence absolute sustainability is not currently attainable. This document sets out a framework to guide decision making in the sustainable use of materials in relative terms.

The sustainable use of materials seeks to attain positive social, environmental and economic contributions and to minimize negative impacts. The social, environmental and economic aspects form the basis of any sustainability assessment.

It is important to note that the evaluation of the three aspects can be subjective and will require the consideration of a number of stakeholder views. This will affect the complexity of the decision-making process, but will help to avoid decisions being taken on the basis of narrow or short-term views that could lead to undesirable consequences when considered in a broader and longer-term context.

A number of reference sources are included to support the evaluation of the three aspects of sustainability.

1 Scope

This British Standard provides a framework for the assessment of social, economic and environmental issues in the sustainable use of materials. The framework can be applied to all parts of the supply chain and is intended to support decision making about the sustainable use of any type of material.

This standard covers consideration of:

- a) the social, economic and environmental aspects throughout the material lifecycle, covering:
 - 1) sourcing of materials;
 - 2) conversion of materials into products;
 - 3) performance of a product over its functional lifetime;
 - 4) end of life of the product and either the reuse, remanufacture, recycling or disposal of the product; and
 - 5) end of life of a material and either the reuse, remanufacture, recycling or disposal of the material,

with particular emphasis on social performance in the use phase of a product life and environmental performance over the full life cycle, and taking into consideration the longer term and local economic issues;

- b) how to balance these aspects against stakeholder priorities in terms of sustainable development;
- c) guidance on the use of decision support tools to assess the relative sustainability of material choice; and
- d) the importance of data quality when carrying out a sustainability assessment.

NOTE This standard assumes that the project brief and material design options have been agreed prior to the use of the assessment framework.

The standard does not provide:

- i) comparisons between specific materials;
- ii) advice on the properties of materials and products; or
- iii) recommendations on specific software tools to support the evaluation and comparisons of social, economic and environmental aspects.

2 Terms and definitions

For the purpose of this British Standard the following terms and definitions apply.

2.1 component

part of an assembled product

2.2 base case

reference point from which the assessment of improvements or otherwise is made

2.3 end-of-life

life cycle stage where the product, component or material is no longer required or is unable to fulfil its purpose, at which point the product, component or material contained therein becomes available for reuse, recycling, recovery or disposal

NOTE 1 The product or component end-of-life scenario is likely to be determined by the designer on an application-by-application basis. When a product or component comes to the end of its useful life it does not necessarily mean that the materials it is composed of are at the end of their useful life. The sustainability assessment ought to take account of this.

NOTE 2 In sustainability terms design for end-of-life is important because good design could facilitate the reuse, recycling or recovery of components or materials contained in a product.

2.4 life cycle

consecutive and interlinked stages of a product system, from raw material sourcing and extraction, through production of materials, to the final product, and including product use, maintenance or service operation to end-of-life options

2.5 life cycle assessment (LCA)

technique for assessing the environmental aspects and potential impacts associated with a product, by:

- compiling an inventory of relevant inputs and outputs of a product system;

- evaluating the potential environmental impacts associated with those inputs and outputs;
- interpreting the results of the inventory analysis and impact assessment phases in relation to the objectives of the study

NOTE Typically, an LCA is associated with environmental assessments, but social LCA is now starting to be used.

2.6 life cycle thinking

process of considering the consecutive and interlinked stages of a product system, from raw material extraction, through production of materials, components to products, through product use, maintenance or service operation to end-of-life options

2.7 organization

group of people and facilities with an arrangement of responsibilities, authorities and relationships

EXAMPLES

Company, corporation, firm, enterprise, institution, charity, sole trader or association, or parts or combinations thereof.

NOTE 1 The arrangement is generally orderly.

NOTE 2 An organization can be public or private.

[BS EN ISO 9000:2005]

2.8 parameter

measurement or value relevant to the sustainability assessment

2.9 product system

system utilizing products or a range of individual products to provide a functional service

2.10 recovery

collection of products, components or materials with the intention of avoiding waste and with the purpose of reuse or recycling

2.11 recycle

action of reprocessing a product, component or material for use in a future product, component or material

2.12 reuse

operation by which a product, component or material can be used for the same functional purpose at end-of-life

2.13 sourcing

process of procuring materials, components or products

2.14 stakeholder

individual, group or organization with an interest in any decision or activity of an organization

[BS ISO 26000:2010]

2.15 supply chain

system of organizations and networks involved in the transformation of raw and end-of-life materials into a final product or product system

2.16 sustainability assessment

appraisal that compares the sustainability consequences of material choice against stakeholder priorities according to the boundary and scope of the intended study

2.17 use

utilizing a product in its intended purpose

3 Sustainability and materials

Through materials innovation, and by developing new and more effective material applications, the sustainability attributes and functionality of materials are continuously improving. Sustainability requires a balanced decision-making process that takes account of social, environmental and economic aspects (see Annex A, Annex B and Annex C). These three aspects of sustainability should be considered to be interdependent because a change in one aspect can impact on another. For example, trying to achieve an environmental improvement, such as reduced emissions of greenhouse gases, might also have an economic implication in regions where emissions trading has been introduced. When considering sustainable development, the benefits potentially attained through any improvements have to be weighted against the potentially negative impacts that could be caused by the consequences of making that improvement. This is assessed by carrying out a full sustainability assessment, and needs to be based upon life cycle thinking and provide information on benefits set against impacts.

4 Framework for a sustainability assessment of material

Having identified the material options meeting the design requirements and functional performance, these should be subjected to a sustainability assessment consisting of the following three phases.

Phase 1: Scoping

- Set the aims, objective and scope of the sustainability assessment
- Identify and engage with relevant stakeholder groups
- Develop a list of prioritized parameters for each of the three aspects of sustainability

Phase 2: Data collection and assessment

- For the base case and each alternative material design choice:
 - establish aims, objective and scope for each parameter assessment;
 - acquire data and check quality;
 - assess parameters;
 - validate results of each parameter and check sensitivity to assumptions;
 - combine parameters to assess overall sustainability;
 - analyse wider consequences of this design option (optional)
- Compare sustainability assessment for each material design choice against base case to make decision

Phase: 3 Reporting

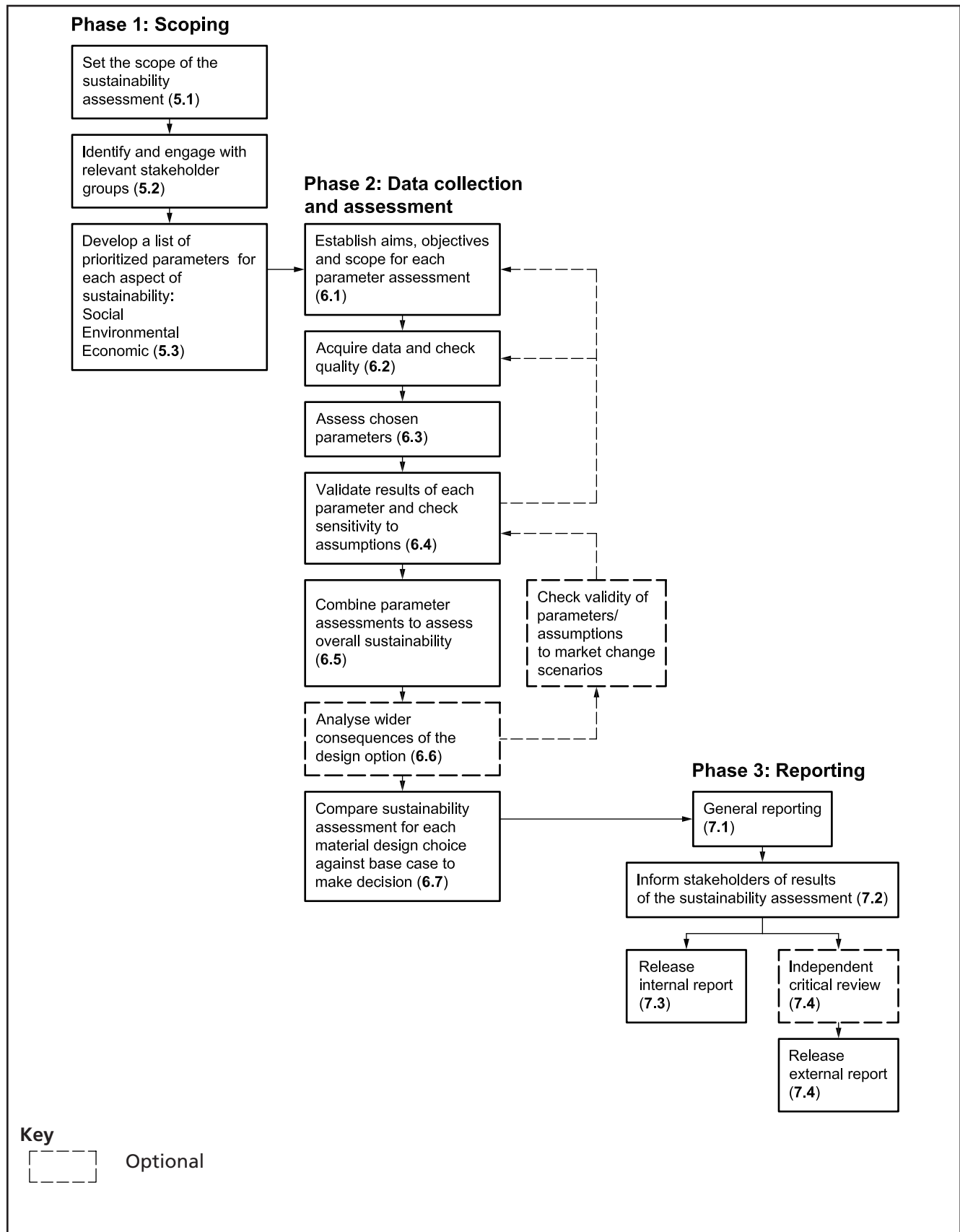
- General reporting
- Inform stakeholders of results of the sustainability assessment
- Release report to internal stakeholders
- Release final external report following an independent critical review

The framework involves an element of iteration, which further improves the rigour and inclusiveness of the assessment and provides assurance that the initial aims of the sustainability assessment can be met. Care should be taken to ensure that the transparency of any exclusions are considered in data collection and verification.

As a sustainability assessment can only be relative, a reference or base case should be defined for comparison with the alternative solutions to assess whether each alternative is more or less sustainable than a base case (e.g. an existing product, a benchmark or an aspirational goal).

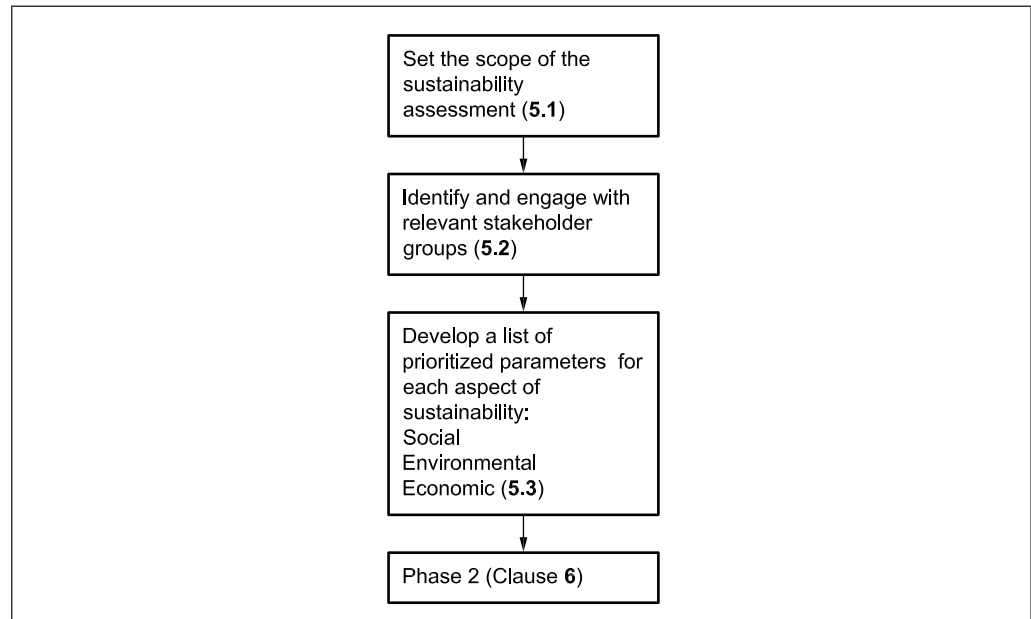
Figure 1 illustrates the phases of an effective sustainability assessment and Annex D (Figure D.1) demonstrates how comparative assessments of material choice may be conducted.

Figure 1 The sustainability assessment process for a material



5 Phase 1: Scoping (see Figure 2)

Figure 2 Phase 1: Scoping



5.1 Setting the aims, objective and scope of the sustainability assessment

It is critical to define the scope of the assessment and to check that this is aligned with the original aims. Scoping defines what is and what is not to be included in the assessment, and the user needs to check that the scoping definitions at each stage remain relevant and are sufficiently inclusive to achieve the desired aims and objectives. Without a well-drafted scope it is impossible to make a worthwhile comparative assessment.

The scope should clearly set out the following aspects of the assessment.

- The aim: the overall goal of the sustainability assessment.
- The objective: the deliverables needed to achieve that aim.
- The boundaries of the assessment: what is to be included and explicitly what is not (the life cycle stages, geographical coverage and end-of-life options).

A well-drafted scope will make subsequent phases of the assessment simpler and easier. If there is insufficient information to allow a scope to be well-drafted, then additional information should be sought where possible.

As successive steps in the assessment are performed it might be necessary to update the scope as any assumptions and data quality are validated.

The base case and proposed alternative material solutions should also be identified at this stage because it is useful to identify the key differences between each alternative and the base case.

5.2 Identifying and engaging with relevant stakeholder groups

A stakeholder engagement exercise should be carried out to identify and understand the key issues associated with the assessment and thereby ensure that the assessment is aligned with the needs of key stakeholders. The aim is to avoid decisions being made without taking due consideration of the views of key stakeholders, and thereby increase the likelihood of success regarding the viability of the decision.

The key stakeholders of the assessment need to be identified, their opinions sought and their priorities identified. Stakeholders should be selected on a case-by-case basis, and may be internal or external. Consultation may range from the simple, as where only the designer's views are sought, to the complex, where a range of interested parties with differing views are involved.

The organization should consider engagement with a wide range of stakeholders so that priorities are identified and potential benefits and concerns taken into consideration. Engaging stakeholders is an important stage in prioritizing the three aspects of sustainability, and ensures an awareness of the key areas of concern and interest.

Further guidance on stakeholder engagement can be found in BS 8900:2006, 4.2, and BS ISO 26000:2010, 5.3 and 5.4.

5.3 Developing a list of prioritized parameters for each aspect of sustainability

The stakeholder engagement process should guide the selection of the relevant sustainability parameters against which the performance of the material options is to be measured. Examples of sustainability parameters could include health and safety, comfort, dust, noise, fossil fuel use and employment, and each of these could fall within more than one aspect; hence there can be interdependence between some sustainability parameters.

A prioritized list will assist the decision making when interpreting the results of the sustainability assessment.

Where different stakeholders have indicated different priorities, a judgement needs to be made as to the relative importance of each parameter. In this case it might be necessary to introduce a weighting scheme to take into account the relative importance of each parameter and stakeholder.