

# Responsibly Sourced Materials in a Circular Built Environment Project Template

The Sustainable Buildings and Construction Programme (SBC) aims at improving the knowledge of sustainable construction and to support and mainstream sustainable building solutions. Through the programme, all major sustainable construction activities can be brought together under the same umbrella. The work involves sharing good practices, launching implementation projects, creating cooperation networks and committing actors around the world to sustainable construction. The purpose of this template is to capture, report and publish case studies related to circular economy in the built environment for the purpose of knowledge and information sharing including cross collaboration.

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The SBC Programme is one of six programmes under the One Planet Network (UN 10YFP).



**One planet**  
build with care

Please give us more information on the project.

1. Title of project (e.g. Circular Economy Ownership Models: A view from South Africa Industry). \*

Building Materials Environmental Guide (BMEG)

2. Region(s) of project \*

- Africa
- Asia/Pacific
- Europe and Central Asia
- Latin America
- Middle East
- North America
- Central America
- Caribbean
- Global/All regions

3. Country/countries of project(s). (e.g. South Africa) \*

N/A

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4. Your name \*

Missaka Hettiarachchi

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5. Your organisation \*

Environment and Disaster Management (EDM), World Wildlife Fund (WWF)

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6. Other than the SBC Programme, is this project related to any of the other 10YFP/One Planet Network Programmes? \*

- Sustainable Tourism Programme
- Consumer Information for SCP
- Sustainable Food Systems
- Sustainable Lifestyles and Education
- Sustainable Public Procurement
- Not related

7. If this case study is related to any other program, please list the program. \*

None

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8. Overview/Summary (1000 characters). (e.g. Waste materials are not remanufactured, reused or recycled successfully. This study focuses on the South African industry's view on composite waste. The study found that cost reduction was a major driver and sustainer for recycling of composites). \*

Building Materials Environmental Guide (BMEG) [Second Edition] is a guideline to help construction industry professionals (engineers, architects, procurement officers, and technical officers) to understand the environmental and social impacts of common building materials at various stages of their life cycle. It also provide better practices to manage those impacts. Some quantitative properties such as embedded energy, carbon foot print and thermal properties are also provided. BMEG is not intended to be a technical manual; the users should seek further expert advice and engagement to actually implement the better practices. BMEG was first prepared by WWF to guide the reconstruction work of the 2015 Nepal earthquake. It has also been adopted nationally as a government document in Sri Lanka. The first edition for global use was published by WWF in 2017. The current 2nd Edition was jointly developed by WWF and the Northwestern University (USA) and published in 2021.

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## 9. Keywords \*

- Policies promoting circularity
- Construction and demolition waste management
- Design for disassembly, reuse and easy to recycle
- Adaptability, flexibility and refurbishment of buildings and neighbourhoods
- Sharing and multi-use of spaces
- Use of reused or recycled content in new products and buildings
- Circular water
- Circular energy
- Financing circular processes
- Reconstruction

9.1 If the keywords above are not adequate, please specify other keywords. \*

none

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## 10. Life Cycle Phase(s) \*

- (re-)Manufacturing of building materials
- (re-)Design
- (re-)Build
- (re-)Use
- (re-)Purpose
- Dismantling

11. What do you want other people to know about your project? (e.g. To develop appropriate national models for circular economy, it is important to reduce cost for recycling composites to encourage South African companies to transition towards circular economy). \*

Proper selection, sourcing and use of building material, plays a key role in circular built environment. It not only contributes to material efficiency and managing direct environmental impacts, but also improving energy and water efficiency when the whole project cycle is considered. For this, it is important to understand what material related decisions are made during different stages of the project cycle and what are the environmental impacts of materials at different stages of life cycle. Providing this information is the main aim of BMEG.

The current version, BMEG 2nd Edition, covers 50 common and specialised building materials and provides:

1. information on their environmental impacts at the different stages of their life cycle
  2. environmentally responsible alternatives
  3. better practices of sourcing, use and disposal (including recycling)
  4. Information on material properties, carbon and energy footprints, recyclability.
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12. What is the aim of the project (50 words/350 characters)?(e.g. To identify the drivers and sustainers for the South African industry to consider reuse and recycling of production waste materials). \*

Providing information related to environmentally responsible selection, sourcing and use of building material in a simple and concise format to construction industry professionals (engineers, architects, project mangers, procurement specialists, health and safety officers and technicians).

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13. Explain what is special/unique about this case? (1000 characters) (e.g. This case study focuses solely on composites. Apart from the general reuses of recycled composites in a circular economy, it is also a good strategy to avoid or reduce high energy demand linked with the production of raw materials). \*

There is a huge amount of useful and accessible information available on environmental aspects of building materials, but not in one place. In the time and resource stressed setting of building projects, it is extremely difficult for constructions professionals to gather the right level of information to make environmentally responsible decisions on building materials (selection, sourcing and use). The uniqueness of BMEG is in providing information on different environmental aspects of common building materials in simple and concise format. The format was developed by combining the construction project cycle with the material life cycle and also to address the diverse view points of different construction professions.

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14. Year of delivery or ongoing?(e.g. 2018 or ongoing). \*

since 2016 and ongoing

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15. What did the project achieve (1000 characters)? Please give an example.(e.g. The study identified that a large number of companies in the South African industry experience a small percentage of composite production scrap material and that quality assurance of recycle and product certification for the composites was a major barrier.With these key identifications, the SA industry can conduct future research on how to overcome this barrier and would ensure the use of materials more efficiently to reduce production costs).

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The first version of BMEG was published by WWF-Nepal with the endorsement of Nepal Government, as a guideline for reconstruction and humanitarian agencies involved in the earthquake (2015) reconstruction process. In 2017 a global generic version was published and had been electronically distributed widely. In 2018, Construction Industry Development Authority, Sri Lanka adapted the generic version as a government guideline for the construction industry in general. Currently a BEMG version is being prepared for Mozambique to be used in the Cyclone Idai (2019) reconstruction process. WWF-Northwestern University (NU) collaborative project to improve BMEG developed the current more comprehensive version, which provides both quantitative and descriptive information on different environmental aspects.

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16. Who was involved/who were your stakeholders, and what was their contribution?Please list the entire supply chain of stakeholders/actors.(e.g. Directors and senior managers in South African composite material users sector). \*

Northwestern University - USA

World Wildlife Fund (WWF) - Nepal

Hariyo Ban Program - Nepal

Department of Building Construction and Urban Development, Government of Nepal

Construction Industry Development Authority - Sri Lanka

University of Moratuwa - Sri Lanka

World Wildlife Fund - Mozambique

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17. What were the output(s)/outcome(s)? Please list examples of any outcomes achieved. (e.g. A purely theoretical study, but outcomes are: 1. Identification of cost reduction as the biggest driver. 2. Sustainers for a circular economy cannot be assumed from a global perspective but have to consider the local environment. 3. The different ownership models could be assessed though detailed knowledge of the supply chain and composite volumes. 4. The need for quality assurance of recycle and to certify products incorporating recycle composites. 5. A large number of companies experience a relatively small percentage of composite production scrap material). \*

1. Building Material Selection and Use - An Environmental Guide (Nepal) - 2016
  2. Building Materials Environmental Guide (Global Edition 1) - 2017
  3. Environmental Guide for Construction Materials and Products (Sri Lanka) - 2017
  4. Building Materials Environmental Guide (Mozambique) - 2019
  5. Building Materials Environmental Guide (Global Edition 2) - 2021
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18. Is the project replicable? If yes, how? (1000 characters)(e.g. Yes, with the application of similar cost reduction methods in different countries). \*

Yes. The BMEG was designed from the beginning to be replicated in different national and local contexts. It has already been replicated in number of different countries.

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19. Is the project scalable? If so, please explain (1000 characters)?(e.g. Yes, it has not been implemented in South Africa yet as this is a purely theoretical study). \*

Yes, the format of BMEG can be easily adapted to suit different scales of application. For example, national level document will include comprehensive information on impacts and references to regulations. The same document can then be adapted to local level or even a project, adding more specific information relevant to that case and may focus more on better practices. It can also be adapted to teaching and training by including more technical and scientific information (eg. material properties, carbon foot print, embodied energy etc. of materials).

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20. What are the 3 main challenges (1000 characters) you encountered? And why?(e.g. Quality assurance of recycle and to certify products incorporating recycle composites,no consensus in the survey of composite manufacturing companies, government, local authority, product retailers/distributors, end users or third parties, should take responsibility for managing end-of-life product waste. Lack of QA for recycle and product certification incorporating recycle composites was a hindrance). \*

1. Developing a simple and concise enough format for to deliver all the relevant information for the busy industry practitioners.
2. Delivering information related to environmental impacts and better practices in a manner conducive to construction professionals.
3. Covering technical, environmental and social aspects related to building material.
4. Striking the right balance of quantitative and qualitative data.

21. What are the 3 main successes (1000 characters) of this study? And why?(e.g. 1. Circularity can be progressed in SA. 2. Identification of cost reduction as a driver and sustainer for CE. 3. Quality assurance for recycle and product certification). \*

1. Being able to reach ground level practitioners in number local contexts
2. Being able to address diverse construction industry disciplines
3. Developing a very flexible guideline format - easily adaptable and explicable

22. Please indicate the cost of the project in USD. \*

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23. Would you like to add any other relevant information (1120 characters)?(e.g. While this study is purely theoretical, it mainly identified the drivers and sustainers in CE for composite material users and also elements that would encourage the adoption of CE in South Africa). \*

none

24. Are there any additional sources or websites for this project? If yes, please state. \*

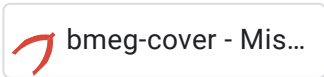
<http://envirodm.org/>



25. Has this project been verified? If yes, please state. If verification is ongoing, please indicate how long this may take.(e.g. Journal paper through RMIT University online library recources. Verified by one of the authors, namely Al Amin Mohamed Sultan). \*

N/A

26. Please upload any relevant images for the project. Please acknowledge credits for the photographer or source of images.



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