

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). *

REVERSIBLE EXPERIENCE MODULES (REMS)

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) *

BELGIUM (Brussels, Westerlo), NETHERLANDS (Amsterdam, Eindhoven), UNITED KINGDOM (London, Watford)

4. Your name *

Teodora Capelle

5. Your organisation *

Brussels Environment, Belgium

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. *

Project BAMB – Buildings As Material Banks funded by H2020-EU.3.5.4 programme: Enabling the transition towards a green economy and society through eco-innovation

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). *

Developed by EPEA Netherlands, the Reversible Experience Modules (REMs) form a traveling interactive exhibition on circular building, which displays 70 products and systems designed for reuse, recovery, and recycling in circular buildings. Each material and product inside the REMs exhibition is available on the market and labelled with a Materials Passport. Visitors of the exhibit can manipulate the products and gain direct access to the online Materials Passport data for each by scanning the product's QR code with their phone.

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. *

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). *

The REMs project highlights the importance of material passports. They provide data that helps prevent waste, improve resource productivity, and reduce emissions.

The exhibition provides tangible means for professionals from the built environment to interact and discover the integration of the passports, healthy materials, and reversible design. The team has tested the understanding of the passports as a source of valuable interchangeable data to be used within different construction phases.

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). *

Promote the benefits and the use of Materials Passports by providing direct access to the Materials Passports Platform through the different construction products displayed in the exhibition.

Improve and test the upscaling potential of a transformable and adaptable kit-of-parts exhibition module.

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). *

Based on the experience in other industries, digitalisation is expected to drive innovative disruption in the construction industry. By exploring the relationship between physical products and the related digital data, REMs, the largest traveling exhibition on circular building materials in Europe, supports the prospect of the development of new business models, potential new players, and new market opportunities.

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

2018

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). *

The pilot has been assembled and disassembled six times with almost no waste production. A small set up was presented at Brussels Environment HQ, early 2018. The first full-size construction was presented at Ecobuild, in London in March 2018. In spring 2018, it travelled to Watford, UK and Building Holland. The set up was redesigned for the Dutch Design Week in Eindhoven, just before arriving in Westerlo, Belgium. The exhibition gathered insightful feedback for the improvement of the BAMB passports ICT platform.

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). *

The project is developed by EPEA Netherlands. The exhibition attracted a large number of visitors: architects, contractors, suppliers, building owners, project developers, and dismantlers.

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. Improvement of the BAMB passports ICT platform.
2. Development of solutions to link the data from the ICT platform with the physical material or element (QR Codes, etc.)
3. Reversible Design solutions: The structure itself was designed and built applying a reversible building design approach. The assembly, disassembly and relocation of the exhibition (six times during one year), showcased the reversibility of the whole setup and its adaptability to different configurations.

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 REMs highlights cross-sectoral opportunities. Being an exhibition module, it uses modularity and reversible construction systems conceived for optimised multiple uses.

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 solutions developed can readily be transferred from exhibition setups to other construction sectors, e.g. partition walls for residential, commercial or health facilities, or temporary setups.

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. Need for additional staff to guide the assembly and disassembly
2. During some fairs the 'breakdown' time is significantly shorter than the build-up time. This does not work well for stands that need to be disassembled, where roughly the same amount of time is required to disassemble the exhibition as the time required building it up. This will need to change when reversible design will more and more become the norm.
3. Visualizations have been developed to showcase the products and their relevance for a circular economy.

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. The exhibition visited highly interesting locations. Expectations were exceeded, by visiting locations such as Ecobuild and Building Holland, and being present in the main building during the Dutch Design Week.
2. The exhibition while being presented at BRE's offices was subjected to thorough VOC testing (material health) and as should be expected no issues were found.
3. The assembly and disassembly occurred smoothly, with only some damages requiring repairs or replacements throughout the events up to this point.

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

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). *

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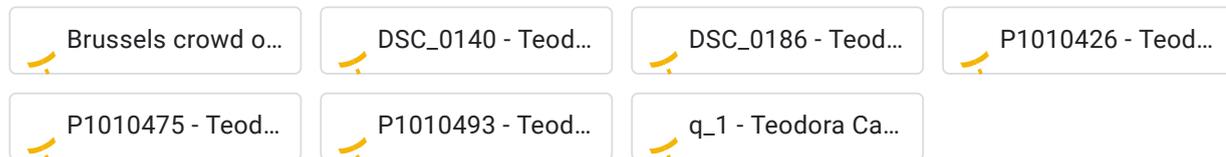
24. Are there any additional sources or websites for this project? If yes, please state. *

<https://www.bamb2020.eu/wp-content/uploads/2019/03/20190228-BAMB-D14.pdf>

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 resources. Verified by one of the authors, namely Al Amin Mohamed Sultan). *

Yes, the project was checked by different public organisations: BE Brussels Environment, TUM Technische Universität München, EC European Commission

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



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