

Summary of the study
“Sustainable building from an
environmental perspective,
material use and Cradle to
Cradle. A study of
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General

The attention for Cradle to Cradle (C2C), a concept launched by Michael Braungart and William McDonough, has increased consistently in the Netherlands and Belgium since the fall of 2006. In the Netherlands, this soon led to a large number of initiatives and projects concretizing C2C in actual products and enacting the philosophy described in the book “Cradle to Cradle: Remaking the Way We Make Things” (2002). In Flanders, OVAM and VITO took on a role as frontrunners in the debate on the added value of C2C. Both organizations are also involved in the C2C Network Interreg Project exploring examples of C2C projects in different EU regions and providing a platform for exchange of ideas and experiences. Key questions raised within the study “Sustainable building from an environmental perspective, material use and Cradle to Cradle. A study of approaches on a project level”, are:

- ▶ How are building practitioners today dealing with the C2C principles, both on a building product level, as on a building and district level. And what role does the C2C certification process play in C2C building practice today?
- ▶ What are the opportunities and limitations related to the implementation of C2C in policy and sustainable building practice in Flanders today?

The report of this study contains five chapters. The first chapter focuses on the description of the ‘Cradle to Cradle’ concept and the state of affairs in 2010, specifically focusing on recent developments in building practice. In the second chapter focus lies on the C2C certification process. A comparison is made between the C2C certification system and other influential environmental product labels and classification schemes (EU Ecolabel, FSC, Natureplus, the NIBE Environmental Classification of Building Products and the BRE Environmental Profiles). In chapter 3, a critical study is undertaken of seven C2C certified building products and one Belgian product currently undergoing the certification process. In the fourth chapter, focus is widened in an analyses of C2C projects on a building and district level, both in Belgium and abroad. Namely, the Dutch Institute for Ecology NIOO at Wageningen (NL), the Bionorica headquarters at Neumarkt (DE) and Park 2020 at Haarlemmermeer (NL). In Flanders, the case Tweewaters in Leuven is examined. In chapter five, building upon the findings from previous chapters and from a stakeholder consultation workshop, main conclusions are drawn and feasible policy measures are formulated.

How are building practitioners today dealing with the C2C principles, both on a building product level, as on a building and district level. What role does the C2C certification process play in C2C building practice?

Cradle to cradle (C2C) is a design paradigm principally striving towards closed cycles for material resources. Materials are separated into biological and technical nutrients re-circulating in continuous loops. Energy for these processes is delivered by renewable energy sources. By stressing the importance of local production and diversity, innovation is stimulated. The design paradigm aims to lead to healthy building materials delivering a positive contribution to society and to the environment during their use. The C2C principles were translated by their founding fathers into a certification system for products. The C2C certification system makes a distinction between 4 certification levels (basic, silver, gold and platinum), the latter being most closely related to the actual C2C principles. The translation of the C2C principles into building practice is to be examined for different levels and scales: namely on a building product and building element level, on a building and district level and for policy making.

Only a very limited amount of **building products** available on the Belgian building market have (yet) obtained a C2C certificate. Product manufacturers consulted find the procedure to obtain the C2C certificate to be long and costly. The certification process currently does not comply with the ISO-guidelines for environmental product labels (ISO 14020), due to the fact that independent third party control of the certification process is lacking. Recent developments, e.g. the launch of the C2C Products Innovation Institute (C2CPII), however, are increasing the transparency and objectivity of the certification process. Its specific focus, primarily on material composition, grants the C2C certificate its position amongst other environmental labels and classification systems. However, only for the Platinum level, actual closing of material cycles is required and the C2C principles are truly achieved. Based on the current characteristics of the certificate and certification process, there are no arguments for policy makers to favor the C2C certificate above other environmental labels and classification systems for building materials. On the other hand, it is to be stipulate that the C2C principles and the certification process encourage product manufacturers to conceive and develop innovative products and to transition from product optimization towards product re-thinking. The C2C building projects examined within this study, however, reveal significant impediments for the actual closure of material loops and for the actual reclaim of resources stemming from used building materials (both C2C certified and others). Building materials cannot, in many cases, easily be de-construction or disassembled once mounted and applied within the building. As demonstrated in the building projects examined, the C2C principles however can lead to significant systemic innovations on a building product and building element level, e.g. in the form of product leasing agreements, alternative building methods and in the shift towards product service systems.


Attempts and contributions have been made to translate C2C towards **building practice**, e.g. in the manifesto "Cradle to Cradle in Architecture" (2009) and in the publication "Cradle to Cradle Criteria for the Built Environment" (2010) authored by Douglas Mulhall and Michael Braungart. As stated in this publication, a C2C building adds value and stimulates innovation and pleasure by measurably improving the quality of materials, biodiversity, air and water; by making use of renewable energy; by recyclability and possibilities for de-construction and disassembly; and by means of various practical functions improving quality of life for different parties involved. Although these 2 publications attempt to translate the C2C philosophy towards the building level, they do not provide a detailed manual or extensive methodology for the realization or evaluation of a C2C building. C2C therefore functions on a building level first and foremost as a framework for thought stimulating innovation. As a guiding concept on a **district level and for spatial planning practice**, it is clear that C2C does not provide guidance in dealing with specific spatial environmental challenges such as land use, density of infrastructure and buildings, accessibility and mobility challenges. This is not remarkable since the C2C principles originated from a vision on product development. Also, behavioral aspects (e.g. related to transportation) and mitigation scenarios are not taken into account. This stems from the fact that C2C presents a vision allowing unlimited consumption without negative environmental consequences and free from guilt. Lastly, C2C is not intended to provide solutions for the adaptation of our existing built environment, this however being the key challenge in EU building practice the upcoming decades, since 80% of our infrastructure in 2030 already exists today.

The translation of the C2C principles to the building and district level is clearly able to provide inspiration and motivation for the realization of (a niche of) exemplary projects of a high sustainability. More widespread environmental assessment schemes -labeled by the founding fathers of C2C as “eco-efficiency” instruments- such as LEED, BREEAM and the “Afwegingsinstrument Duurzaam Wonen en Bouwen in Vlaanderen” under development in Flanders, on the contrary, aim to gradually transform the entire building market towards more sustainable building practices. C2C and the concept of eco-effectiveness intend to provoke us into a significantly different design approach, aiming towards maximally beneficial buildings and districts, rather than towards the minimization of negative environmental impacts on ecosystems, human health and resource depletion.

What are the opportunities and limitations related to the implementation of C2C in policy and sustainable building practice in Flanders today?

The stakeholders consulted first and foremost support the idea to further introduce the C2C principles into common building practice, by integrating C2C in educational programs and by a general uptake of dissemination on the C2C concept. There exists a significant demand for information on best practices of C2C and for a clear description of the concept applied to the built environment. A key measure granted support by stakeholders is the development of a **Flemish/Belgian database with environmental profiles of building products**. This database is expected to meet the demand expressed by designers, architects and other parties involved for objective, scientifically based information on environmental characteristics of building products. Government agencies can take on an active role stimulating the realization of demonstration projects. However, consulted stakeholders decline policy measures that impose new regulations/criteria or launch additional financial incentive mechanisms (e.g. recycling certificates). This is due to the status of C2C compared to other -equally valuable and more established- concepts and systems, and secondly due to that fact that these measures are feared to impose restrictions on the sector.

C2C offers an innovative framework for thought, deserving its place in the envisioning process and transition towards sustainable building and living. Stakeholder however express that it is to be placed alongside other visions, concepts, tools and methodologies. C2C can, from that perspective, enforce and elaborate existing initiatives, such as the DuWoBo transition arena.



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