

CRADLE TO CRADLE®

Remaking the way we make things

The conventional approach of government and industry has been to minimize the environmental impacts of their activities by being “less bad” as products go from “Cradle to Grave”. This approach is often regarded as involving extra costs for stakeholders without many quantifiable benefits.

However, the Cradle to Cradle® Design Protocol has taken a fundamentally different approach that generates benefits for stakeholders by going beyond the “grave” and beyond conventional interpretations of “environment”.

Cradle to Cradle® is a design paradigm that focuses on innovation to enhance the quality of products so they are:

- more practical for the user
- healthier for everyone affected by the product
- beneficial for the economy and the environment.

Cradle to Cradle® (C2C) was developed in the 1990s by Michael Braungart, William McDonough et al., based on research at the Environmental Protection Encouragement Agency in Hamburg, Germany, for designing beneficial economic, social and environmental features into products, processes and systems. Cradle to Cradle® is primarily an entrepreneurial and innovation concept that starts by determining the intended benefits of a product or service instead of focusing on minimizing negative environmental impacts.

To enhance quality and add value for stakeholders, C2C promotes innovation partnerships along the entire chain of a product, including manufacturing, distribution, use, disassembly, recovery and reuse. By characterizing hundreds of products and thousands of materials for their human and environmental health attributes, as well as defining systems to safely and fully cycle materials into new products, C2C has already provided a practical yet inspirational scientific and business model for improving quality.

Extensive books, cover stories and documentary films have been published and broadcasted about C2C since the 1990s. The book *Cradle to Cradle* is well known and translated into at least a dozen languages.

Cradle to Cradle® can be divided into these categories that together make up the C2C Framework:

1. Philosophy e.g., a quality-based innovation platform for benefitting the economy, ecology and social equity.
2. Principles that are translated into measurable criteria.
3. Application tools.

The three principles of Cradle to Cradle®

Quality enhancement is achieved by focusing on three innovation principles:

- Waste = Food. Everything is designed to be a nutrient for something else.
- Use Current Solar Income. Energy that can be renewed as it is used.
- Celebrate Diversity. Species, Cultural, and Innovation Diversity.

Biosphere and Technosphere

To apply those principles, Cradle to Cradle® focuses on optimizing the intended use of a product. It distinguishes between two main intended pathways that products follow: consumption pathways where products are designed to safely enter biological systems, and service pathways where products safely enter technical systems to be part of new future product generations.

Products for consumption are designed so that degradation by-products generated during their use (e.g. abrasion or dilution in air, water or soil) can support the biological systems they enter. Biological resources can be renewed through agriculture or reforestation leading to next generations of products. Examples of consumption products are: biodegradable textiles, cosmetics or vehicle brake pads that wear out.

Products for service are designed to be chemically stable during use and get dismantled into material resources, known as 'technical nutrients' after they have fulfilled their function. The ingredients in these renewed technical nutrients are carefully defined so they can serve as resources for the production of next generations of service products. Examples of service products are electronic appliances and cars.

