

# World Economic Forum Young Global Leaders Taskforce

## Cradle to Cradle and Evolutionary Business Models

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Position Paper  
Davos 2011

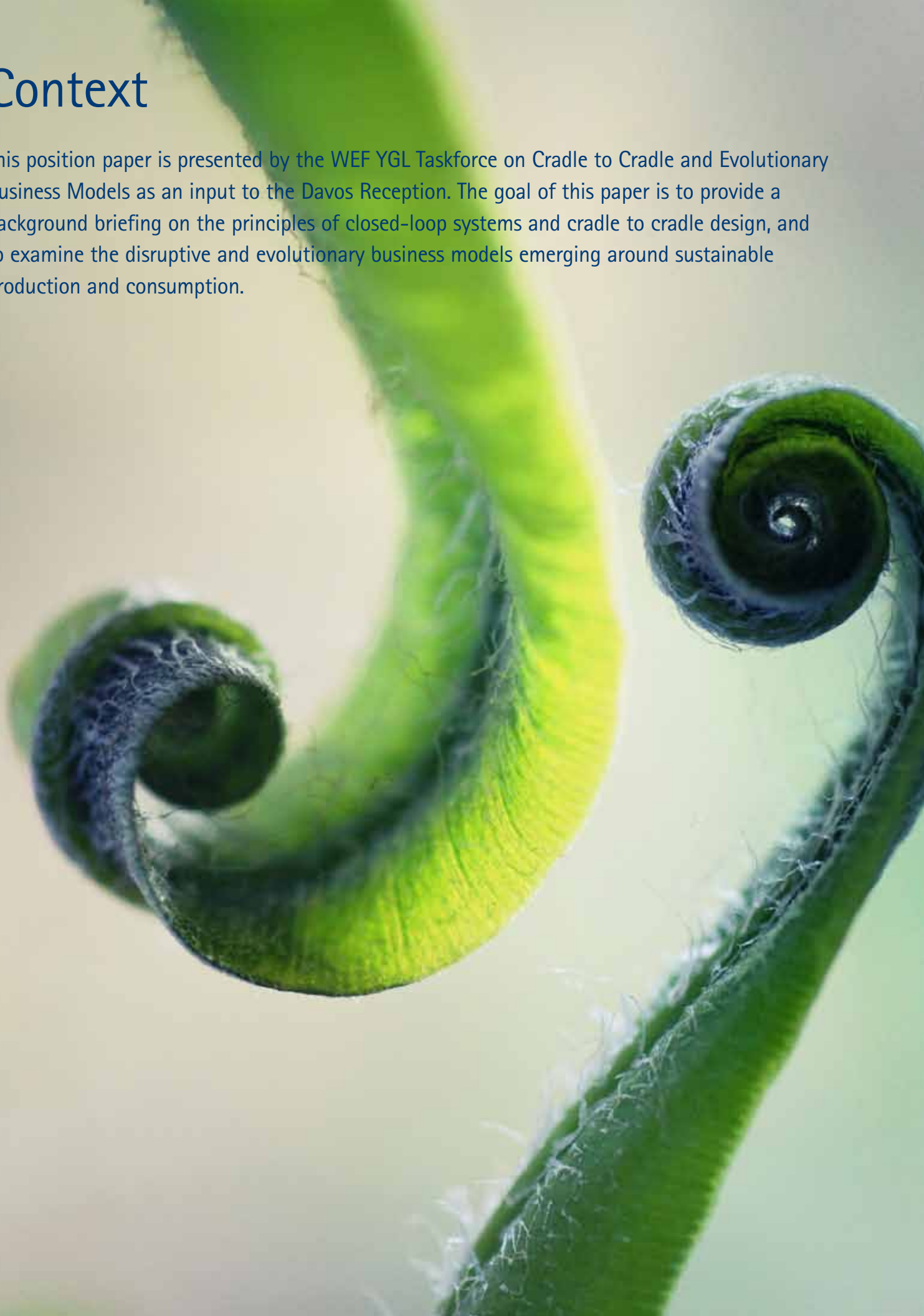


An Initiative of



# Context

This position paper is presented by the WEF YGL Taskforce on Cradle to Cradle and Evolutionary Business Models as an input to the Davos Reception. The goal of this paper is to provide a background briefing on the principles of closed-loop systems and cradle to cradle design, and to examine the disruptive and evolutionary business models emerging around sustainable production and consumption.



# Background

Emerging evolutionary business models, centered on sustainable production and consumption, represent a fundamental re-imagining of design and the industrial process with potentially profound implications for businesses and industries. Today's global production and consumption model is a legacy of the Industrial Revolution, the overriding goal of which was quick and cheap product development and delivery. In today's consumer society, more than 90 percent of consumer products end up in waste disposal within six months. Concepts such as Cradle to Cradle® design, first articulated by architect William McDonough and chemist Michael Braungart in their 2002 book, *Cradle to Cradle: Remaking the Way We Make Things*, represent a formal attempt to end this culture of disposal—concurrently helping to manage climate change and optimize manufacturing processes. In effect, these efforts represent a fundamental shift from a linear, "cradle-to-grave" approach to a new paradigm of 'eco-effectiveness' within which lies a closed-loop cycle of production and consumption.

This new model of production and consumption is based on less dependence on raw materials and energy inputs, as well as the dramatic reduction or even elimination of waste at every stage of the product lifecycle. Leading companies have already made great strides in this area—realizing that it provides not only environmental benefits but significant service, market and financial advantages. Examples include Shaw Carpets, Centria (building materials), Steelcase and Herman Miller (furniture), all of which are redesigning their business models to minimize inefficiency; reduce costs in logistics, materials and packaging; and generate new sustainability-oriented revenue streams. The achievements of these corporate innovators are paving the way for a production and consumption revolution—a closed-loop environment with potentially huge economic, brand and environmental-improvement opportunities.

## The Case for Change

The Department of the Environment in the UK estimates that two billion tons of waste products are generated in the European Union each year: one third from agriculture and forestry, one third from construction and demolition, and the remainder from mining and quarrying, manufacturing, municipal waste and energy production.<sup>2</sup>

The predominant form of waste management is disposal to landfill: in 2004, a survey of waste management in the European Union found that eight countries rely on landfill for more than 50 percent of their waste disposal,

and five countries use incineration to meet more than a third of their waste management needs. Only a few EU countries rely on recycling as their primary waste management solution.<sup>3</sup> The United States recycles about 28 percent of its waste.<sup>4</sup>

Natural resource constraints are driving companies to seek alternatives to traditional production and manufacturing processes. Dwindling supplies, the increasing cost of raw materials, and the likelihood of more tariffs and regulations are all prompting businesses to innovate. Recycling and reusing natural resources has long been a source of significant cost savings, and

the growing environmental imperative is now increasing companies' desire to find and embed new ways to reduce their need for finite resources.

Measuring, understanding and subsequently minimizing resource consumption and waste is critical to the success of a sustainable business model. It is an extraordinarily difficult task. However, more and more businesses are recognizing that these moves also represent a major business opportunity: an opportunity to do well while doing good.

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Cradle to Cradle ® is a registered trademark of MBDC

1 World Economic Forum: Driving Sustainable Consumption, Closed Loop Systems Overview Briefing, 2009, <http://www.weforum.org/pdf/sustainableconsumption/DSC%20Overview%20Briefing%20-%20Closed%20Loop%20Systems.pdf>

2 Estimated Total ,2010, <http://www.defra.gov.uk/evidence/statistics/environment/waste/kf/wrkf13.htm>

3 Waste Management in the European Union, 2004, <http://news.bbc.co.uk/1/hi/world/europe/4620041.stm#map>

4 [http://www.environment-green.com/More\\_Recycling\\_Facts\\_and\\_Statistics.html](http://www.environment-green.com/More_Recycling_Facts_and_Statistics.html)

## Toward a Closed-Loop Economy

New concepts of sustainable production and consumption are a significant departure from traditional business models. Businesses will need to adjust their mindsets and strategic approaches: moving forward from a goal of eco-efficiency (seeking to minimize and mitigate the environmental impact of their operations) to a new mindset of eco-effectiveness (embedding sustainability to assess and manage impacts throughout and beyond traditional value chains). If "design is the first signal of human intention,"<sup>5</sup> new approaches could signal companies' intentions to move beyond eco-efficiency to embrace sustainability as the basis of innovation, reputation and genuine competitive advantage.

Closing the loop of production and consumption could have a significant impact on traditional value chains and the business models of companies. Entities that previously operated within chains of point-to-point relationships—with suppliers at one end and customers at the other—could find their operations spreading throughout newly-connected loops. At a macro level, companies adopting closed-loop principles will begin to move from being product vendors to becoming service providers—taking raw materials already within the economic loop and repurposing them to fit customers' changing needs.

From a greater involvement in the recycling and repurposing of raw materials, to building relationships with individual consumers and business-to-business customers, closed-loop systems will place new demands on established business models and require new capabilities at every level.

## Implications for Business: Sustainable Business Models

At the heart of the move toward closed-loop systems sits Cradle to Cradle, a design philosophy that seeks to move beyond eco-efficiency (the reduction of waste and valuable raw materials) to eco-effectiveness (a state in which all positive environmental, economic and social impacts are maximized). As explained by MBDC (the organisation responsible for formalizing the Cradle to Cradle paradigm), products are developed for closed-loop systems in which every ingredient is biodegradable or fully recyclable, and business operations are powered by renewable energy with a focus on respecting people and ecosystems.<sup>6</sup> The Cradle to Cradle approach assesses products according to five key factors: impact on human and environmental health, recyclability, renewable energy usage, water stewardship and social responsibility. By moving the design focus from 'fixing' current business models to redesigning or recreating them, businesses can better utilize local materials, phase out waste and leverage nature's design principles. This new paradigm also can reduce energy requirements and encourage the diversification of energy supplies—both vital requisites for any resilient and effective system that helps business and nature to thrive.

In its white paper, "Sustainable Business: Minimization vs. Optimization," MBDC proposes "a larger, more positive vision of commerce, redirecting decision-making from trying to minimize the effects of inherently unsustainable activities to envisioning and pursuing wholly sustainable goals."<sup>7</sup>

To reach this goal, MBDC's focus is on "optimizing strategies": designing business models that "seek to optimize, rather than simply limit, the ecological and social impacts of business."

The widespread transition to closed-loop systems, through the adoption of these optimizing strategies, could have any number of disruptive impacts on traditional business models. These impacts could apply not only to companies' product development approaches and packaging designs, but to manufacturing, supply chain management, performance management, stakeholder relationships and corporate strategy.

### Strategy

Closed-loop economics will call for a re-examination of company strategy. Consumer goods companies, for example, will need to go beyond their roles as value-adding intermediaries between raw material suppliers and end consumers, and instead broaden their reach into new sectors of the economic loop. In addition to buying raw materials, manufacturing products and selling them to retailers or end consumers, consumer goods companies will have to take responsibility for the impact of their products at every stage—from production and manufacture to consumption and recycling. This extended reach will require companies to manage larger and more complex networks of relationships—expanding from the traditional supplier-customer dynamic to more active management of the whole-life impact of their products.

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5 William McDonough, author of "Cradle to Cradle."

6 McDonough Braungart Design Chemistry Brochure, 2010, [www.mdbc.com](http://www.mdbc.com)

7 Sustainable Business: Minimization vs. Optimization, McDonough Braungart Design Chemistry, February 2010



## Product Design & Innovation

Adopting new principles will require a new approach from product designers: eliminating the concept of waste and assessing the whole-life impact of all materials used in the manufacturing and packaging of a product.

Implementing these new approaches to design will require not only a technical assessment and evaluation process for every material used (and the integration of environmental metrics into the design process) but also a shift in mindset toward “designing for disassembly.” This is the essence of a closed-loop philosophy: recovering and reformulating every material at the end of its useful life.

A good example is The Timberland Company’s new range of “Earthkeepers 2.0” boots. These products were conceived with closed-loop principles in mind and designed to be disassembled for recycling at the end of their useful life. The new design reduces the carbon impact of a typical production run of 40,000 boots by 500 metric tons—roughly the same amount as the impact of all the energy and heating used in a three-month period at Timberland’s New Hampshire headquarters. The design also uses 200 percent more recycled or renewable materials. Up to 80 percent of the materials from the boot can now be recycled or reused at the end of the boot’s first life.

The Timberland Company’s Earthkeepers initiative demanded a new approach from product designers. Previously, designers were required to complete a separate “environmental scorecard” for their new products at each prototype stage. Such a process

created additional administrative work for designers, and divorced environmental considerations from the mainstream design process. Today, environmental metrics have been integrated into the main design platform, providing real-time information to designers as they select materials. Software produces a total measure of the environmental impact of the designs and provides a score on Timberland’s “Green Index.” In this way, Timberland encourages its designers to consider the whole-life impact of the materials they select. The company has thoroughly embedded these concerns in designers’ day-to-day operations. It also can promote product to consumers using dramatically enhanced environmental performance as a leverage point.

## Supply Chain Management & Logistics

New approaches to production and manufacturing demand greater knowledge and understanding of the supply chain. Companies adopting cradle to cradle principles take responsibility for all the ingredients and materials that form their products, and they also must recognise the impact of components and end products on human health and the environment. Lastly, because they are managing a two-way flow of materials (to consumers and later back to the company or a recycling third party at the end of the item’s useful life), companies must institute an efficient system of forward and reverse logistics.

Mobile device manufacturer Nokia has a “Take Back” scheme that incentivizes customers in 85 countries to return and recycle old phones. Mobile phones contain a number of valuable materials, such as copper, iron and aluminum; and

up to 80 percent of each handset can be recovered and reused. Customers are encouraged to dispose of their obsolete devices, batteries and accessories in a safe and environmentally friendly way at designated recycling bins in any of the 5,000 Nokia service points around the world. In China, the company has already recycled more than 55 tons of obsolete materials—the equivalent of about 550,000 devices. In 2007, through collection schemes mandated by the European Union’s Waste Electrical and Electronic Equipment (WEEE) Directive, Nokia contributed to the management and recycling of 17,000 tons of electronics waste.

The recent study, “A New Era of Sustainability,” conducted by Accenture and the UN Global Compact, highlighted the challenges that CEOs face when seeking to embed environmental and social responsibility cultures within their companies. CEOs identified “integration of sustainability through the supply chain” as one of their greatest challenges.<sup>8</sup> In particular, the consumer goods industry—whose supply chains are typically large and complex and span multiple geographies—must often reengineer their supplier relationships to incorporate environmental, social and governance (ESG) considerations.

Moving toward a closed-loop system (both in their approach to raw materials incorporation and in their customer relationships) could dramatically alter companies’ approaches to supply chain management. Senior leaders may need to think anew about the relevance of many traditional processes to the new approach.

## Customer and Stakeholder Relationships

To drive more positive ecological and social outcomes, companies' adoption of new business models will demand closer engagement with a wider set of stakeholders. Benefiting environments, people and even entire societies will require closer partnerships with governments and regulators, as well as with NGOs.

Even at a more traditional level (e.g., interactions with customers and suppliers), the introduction of new principles will alter relationship dynamics. As companies are forced to pay closer attention to the activities of their suppliers and develop a deeper understanding of their supply chains,

the bond with suppliers will likely become deeper and more sophisticated, with quality and price being only two of many important determinants.

Concurrently, as manufacturing processes adopt a closed-loop approach, new types of customer relationships may follow. More product leasing, for example, might allow companies to tie customers into their own closed-loop systems, with products not purchased and disposed of, but leased with return and replacement assured. A shift toward closed-loop purchasing behaviours might also be accompanied by a fundamental change in how companies approach their customers, resulting in more long-term loyalty and the removal of many product-switching temptations.

## People and Performance

The successful implementation of closed-loop principles will require education and engagement of key people, as well as the ability to measure, track and report progress. Training programs and advanced performance management structures will have to evolve to encompass a wider range of objectives and provide the knowledge, attitudes and behaviours needed to embed closed-loop principles throughout an organisation. Moving beyond efficiency and toward a new Cradle to Cradle approach to design and manufacturing, employee engagement will be critical. Talent and buy-in will be key contributors to the success of any closed-loop initiative.

# Looking to the Future: Evolutionary Business Models and the Production and Consumption Revolution

The adoption of new principles for production and consumption has the potential to reshape business models and create valuable opportunities for those companies who can harness the advantages it can bring. An understanding of the impacts and disruptions of a closed-loop approach could bring a source of competitive advantage in a more sustainable industry—but will depend on companies' ability to effectively manage change, measure, track and communicate the advantages of their approach, and shape the external environment necessary for new evolutionary business models to thrive.

As the Taskforce builds on the work of the last year and today's event, we would greatly appreciate any feedback, comments and contributions to this paper, as well as expressions of interest from those keen to play an active role in the development of the Taskforce.

# Key Questions for Taskforce Members and YGL Participants:

- What impacts might the adoption of the Cradle to Cradle principles, closed-loop system and evolutionary business models have on my business and industry?
- How might these innovations result in additional competitive advantage for my organisation? What capabilities do we need to manage this change and turn it to our advantage?
- How could our businesses . . .
  - Measure the impact of Cradle to Cradle principles and closed-loop systems?
  - Communicate this impact to investors and analysts?
  - Stimulate and shape consumer/customer demand?
  - Shape or respond to a regulatory environment conducive to Cradle to Cradle and evolutionary business models?
- What could I do to become involved in the World Economic Forum and YGL Taskforce in a practical way?

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