

## **Project: Working and Learning in the World of Cradle-to-Cradle Report Workshops**

### **Preamble**

We developed our understanding of the Cradle to Cradle® design concept out of the writings of Prof. Michael Braungart and William Mc Donough. Also we gained special insights out of the lecture of Prof. Braungart, held at the Coburg Connecting Conference 2010:

#### *Citations*

*„My concern is comprehensive quality and comprehensive beauty: A product that makes people sick and doesn't go back into the cycle of nature is simply primitive and cannot be beautiful.“*

*„Against the background of current happening social changes the Cradle to Cradle® design concept is a model for industrial processes where all material circulates in closed biological or technical cycles. This creates a massive problem for today's designers who consider themselves more as prettyfier.“*

*„The profession of a designer will be one of the most important in the 21st century developing a comprehensive will on quality and design. Through this he has little to do with the designer of the 20th century who was or still is more the prettifier.“*

Our target is to develop a teaching concept that enables designers to work according to the Cradle to Cradle® design concept.

Beside practical exercises we discussed in our workshops on the following topics:

- Material – health,
- Waste = nutrient,
- Use of renewable energy,
- Responsibility to water
- Diversity
- Social responsibility
- Land consumption
- Air consumption – air pollution

### **1. Material - Health** (biological tolerance)

The Cradle to Cradle® design concept demands material, either as technical or as biological nutrients, that is safe and healthy for people and environment. (See biological and technical cycles - we don't respond on the extreme values in this report.)

**Excursus:**

*Introduction into material valuation and classification according to W. Mc Donough and M. Braungart.*

*For the certification of a certain level the product and manufacturing processes need to fulfill all criteria on that certain level in all categories. Depending on the results of measurement of the harmful substances the material is rated and classified.*

**Citation:**

*„In cooperation with the manufacturers an suppliers every product is parted into its chemical components. These components are measured according to 19 criteria for human health and environment and get a rating of toxicity in red, yellow or green. Opposite to other programs that only measure the harmful chemicals emitted by the product in total, the Cradle to Cradle Certified CM Process-System investigates the toxicity of every component.“*

<b>GREEN</b>	Little to no danger linked with this substance. Preferred for the use in the intended application.
<b>YELLOW</b>	Low to moderate risk linked with this substance. Acceptable for further use unless a green alternative is available.
<b>RED</b>	High danger and risks linked to the use of this substance. Development of a strategy for decontamination necessary.
<b>GREY</b>	Uncompleted data. Cannot be characterized.

**Cradle to Cradle® -Toxicity Evaluation for Chemicals**  
(according to McDonough und Braungart)

**2. Waste is nutrient**

The Cradle to Cradle® design concept avoids dissipation and demands the recyclability of the products to use the material for further utilization. The central requirement is to design and construct the products that way for to can be separated within the recycling process in their technical and biological components, to use them as technical or biological nutrients for future life cycles.

The recyclability of all material is the particular challenge of the Cradle to Cradle® design concept, thus a special focus is put on this during the workshops.

**Excursus:**

*Designing and Constructing for Recycling!*

*This is the central problem for all engineers and designers.*

*Citation Wikipedia:*

*„With the **Design for Recycling** already before manufacturing and use of a product it is thought on the later disposal or better on the later recycling. The qualification of a product for a later recycling is determined on a high rate from the design engineer. Header to be named are: sorting accuracy, qualification for disassembling, repairability.“*

*For this the VDI (Association of German Engineers) has developed rules and standards: VDI Guideline 2243 – **Recycling oriented Product Development**.*

*The following criteria of this guideline were discussed in the workshops:*

- *modular design*
- *removable composition*
- *identification of material*
- *avoiding of harmful or dangerous substances*
- *reduction of diversity of material*
- *reduction of input of material (lightweight construction)*
- *coatings*
- *number and diversity of connecting elements*
- *standardized disassembly facilities*
- *nondestructive detachable links*
- *avoiding of permanent connecting types*

### **3. Use of renewable Energy:**

It is not only that future production processes have to be optimized according the rules of energy efficiency (safe).

**Energy effectivity** comes to the fore, the use of solar energy, wind, geothermal energy or other renewable sources of energy for all processes. The savings by energy efficiency can be invested to develop non-fossil sources.

#### **Excursus:**

*Why saving power? - There is enough power! Solar energy – exploited intelligently – is sufficient for all and everything. Besides we gain climate protection by reduction of greenhouse gases.*

### **4. Responsibility to Water:**

Manufacturers and consumers are invited to consider water as food for all creatures. With the Cradle to Cradle® design concept water leaves an enterprise cleaner as it was provided - protection of tap water

### **5. Diversity**

To respect and support diversity is one of the central principles of the Cradle to Cradle® design concept.

(This topic is not sufficient elaborated and was discussed just marginally!)

## 6. Social Responsibility

Within the workshops it was illustrated that every enterprise and organization has to create its manufacturing and business processes the way to nourish and respect and support the health, safety and the rights of all humans and other creatures.

To this exercises with the Triple Concept (Sustainability Triangle) were conducted in the workshops.

## 7. Land Consumption

The topic land consumption was just briefly mentioned in the workshops. A consolidation of this problem need to be elaborated and will be introduced in a future teaching concept.

However the subject „Ecological Footprint“ was worked on, see below!

### ***Excursus:***

*The last areas of unspoiled nature disappear along even five years after the earth summit in Rio. Their cultivation means in most cases still destruction. Destruction is strongest there, where social problems predominate.*

*See: ECOLOGY: LAND DISPOSAL – visit on FOCUS Online:*

*[http://www.focus.de/wissen/natur/oekologielandverbrauch\\_aid\\_164562.html](http://www.focus.de/wissen/natur/oekologielandverbrauch_aid_164562.html)*

*Target:*

*Creation livable living spaces!*

*Buildup of salutary soil!*

*Reduction of land consumption!*

## **The ecological footprint!**

The development of products organized for mass flow in biological cycles don't cause harm in the environment. These products create benefits and thus produce a positive ecological footprint. This especially matters to the soil.

- Nutrient recovery and support of the nutrient cycles of other organism.
- Buildup of soil by biological nutrients
- Creation of living spaces for human and creatures

The ecological footprint was illustrated in correlation with the subject earth.

## **8. Air pollution (*air contaminant*)**

Air pollution is a part of the environmental pollution.

In the workshop aspects were discussed that are integral part of the Cradle to Cradle® design concept:

Energy production as well as production processes in industry!

Other important causes of the human-made air pollution, e.g. livestock breeding and transportation, were just indicated briefly.

## Outlook

**Within the future education and especially design education new contents need to be communicated to young people.**

For this the Cradle to Cradle<sup>®</sup> design concept offers many starting points that need to be elaborated to a systematical lesson. Unfortunately a lot of years will pass until the contents of the Cradle to Cradle<sup>®</sup> design concept will be released in official teaching concepts.

Thus it is necessary to develop now programs that built up on the Cradle-to-Cradle Project and are offered as training measure for students and junior employees as soon as possible.

**It is about a paradigm shift!**

Think different now – act different now!

A magic word in the mainstream discussion is:

Efficiency by savings!

- Saving of energy
- Saving of recourses
- Saving of consumption

But does this work, if simultaneously growth of economy is claimed? With this opposition, saving doesn't help. As more we save on one side, as more we spend on the other.

*Example:*

*We reduce fuel consumption per vehicle – the three-liter car is within arms reach!*

*But this success is more than swallowed by the excess on global registered vehicles.*

Can this be the right way?

Just a bit less bad cannot be good enough!

With the efficiency principle and all the saving we will not get further!

Man as consumer is insatiable.

Fine and useful products are not generated by reduction of harmful substances – less harmful cannot be the target!

**Target is quality by effectiveness!**

**Effectiveness vs. Efficiency**

Effectiveness = Do we do the right things?

Efficiency = Do we do the things right?

The ecological effectiveness is about to do the **right things!**

Of course the processes should be efficient!

Then we can leave a big ecological footprint with a clear conscious.

**The ecological oriented effectiveness is the mega goal.**

It is not about making bad things a bit less bad, but to make things totally different. Only then the efficiency takes effect, the minimization of the mass flow (save).

Precondition is the recreation of products, processes and services according the Cradle to Cradle® design concept.

It is about to organize the time of use and the plan of mass flow according the principle of circular flow economy, so that cyclic mass flows develop within that material can be used again and again. (See also technical and biological cycle)

**The plan is to generate products as technical or biological nutrients!**

To this we distinguish:

**Commodities** - comprise ideally material that can be recycled within the **biological cycle** – e.g. composting, biodegradation.

*Rule:*

*All substances ending up in the environment must be compostable and nontoxic.*

**Durables** – comprises material that can be recycled within the **technical cycle**.

*Rule:*

*All technical material becomes technical nutrient.*

**Products generated that way are safe for health and environment during and after use – and in addition profitable.**

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**INNOVA  
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