Advanced training-program:

Training E
Cradle to Cradle in SMEs

0. Content

1. Qualification needs SMEs

Large enterprises are often already facing ecological production, circular economy and sustainability for a long time or are beginning to be aware of these topics. However, the engagement of SMEs with these issues often lacks due to insufficient knowledge about strategies and measures of implementation or simply financial resources.

During special seminars for SMEs, this knowledge gap is to be closed by measures adjusted to the SMEs conditions and needs.

General Learning Outcomes

After the training, the participating SMEs should be aware of the huge amount of possibilities circular economy could offer them. Especially profound knowledge about the Cradle to Cradle (C2C) design and the feasibility of its implementation should be gained eventually.

Teaching Unit 1: Strengthening awareness

Small and medium-sized enterprises are often struggling with fulfilling the demands on the market in order to continue with their existence and work. Hence, there is seldom time and capacity for overthinking their strategies and ways of production.

C2C includes a circular economy with a 100% recycling rate of all produced goods.

The participating SMEs should at the end of the seminar be aware of the innovative and important solutions of Cradle to Cradle. It is important that the training seminars are coordinated with the specific needs which are different for every SME. Enterprises are

affected by C2C in various ways and thus, the possibilities for a successful implementation differ from SME to SME.

According to the C2C concept itself, an implementation of a comprehensive quality concept by knowing the exact composition of products/materials/ingredients and the subsequent input into (recycling) systems is fundamental.

In order to make a potential C2C implementation possible, SMEs in all branches have to be aware of the following tasks.

- Definition of the inputs (composition of the material flows, “know what it is”) with respect to high quality recycling
- Positive Definition (e.g. knowing the exact composition of) products/materials/ingredients
- Collective understanding of recycling
- Set new standards of innovative product development for the industry by defining “positive”, beneficial and innovative products and developing an eco-effective business model for different branches.
- Creating products whose re-entrance into production is already taken into account at the product design stage.
- Improving lifecycle management into nutrient management to biological / technical metabolisms.

Teaching Unit 2: Developing potential qualification needs

Since every enterprise brings along different preconditions and capabilities, the C2C approach has to be adapted to the special needs of every single SME. A universal design or approach would only prevent the enterprises from reaching their full potential.

Special terms for enterprises in the building and construction sector for the C2C potential could be as follows:

- Change of thinking from C2C perspective: Regard of a building as a raw material base
- Deeper knowledge about properties and ingredients of construction products
- Define construction materials for biological or technical cycles
- Use of Cradle to Cradle Certified TM construction materials (LEED points possible under certain preconditions)
- Design of underground construction materials according to biological environment (e.g. no release of toxic metals)
- Roof greening for improved room climate and diversity
- Include defined C2C elements in new buildings
- Integrate renewable energy
- Water recycling measures
- Regard CO2 as a resource e.g. for vegetation instead of capturing and storing

During the seminar, the SMEs need to receive deep knowledge about the possible chances and benefits they would face by using the C2C approach.

It is important that the trainers examine the different qualification needs of the SMEs during the training in order to ensure a specific and detailed strategy of C2C.

Issues as

- financial resources
- capabilities in terms of skilled employees
- sales market conditions
- costumer services
- types of sales products

have to be considered while jointly developing a probable scenario. Especially essential is – next to the financial capabilities of the SME – how the goods produced by using the C2C design would perform on the sales market. It is possible that the market conditions in certain regions or the sales of certain companies would not respond positively to the C2C products.

In order to transform the gained awareness of circular economy, eco-efficiency and eco-efficacy into specific SME-adapted strategies, the initially stated circumstances have to be developed by the SMEs together with the consulting trainers during the seminar.

Teaching Unit 3: Developing certain strategies

Since the SMEs cannot develop strategies for implementing the C2C system by themselves, consultation is needed. C2C is an innovative, important but also demanding concept. In order to ensure that the SMEs make the most possible out of their will to work with C2C, strategies and measures have to be developed and implemented after considering their own demands and conditions. Together with the trainers who consult the SMEs in every step of the probable C2C implementation, these are created, transferred and evaluated. Thus, an application of C2C is feasible in the long term.

2. Concept of the training

2.1 Overall Objective:

The objective is for the participants…

a) …to receive a detailed understanding of the Cradle to Cradle® concept;
b) …to become interested in the practical implementation of C2C as well as initiating C2C inspired changes in own enterprise;
c) …to initiate first steps of implementation of a C2C project in their respective enterprise;
d) …to realise advantages through C2C for their own enterprise and be motivated to continue project work.

2.2 Structure and progress:

A. Part I

1,5 days of training (knowledge transfer and best practice)

- 1st Day
  - 2pm - 7pm knowledge transfer + best practice
  - 7pm - 9pm exchange of experiences over dinner
- 2nd Day
  - 9am – 1pm knowledge transfer + best practice
  - 1pm – 2pm exchange of experiences over lunch
  - 2pm – 5pm knowledge transfer + best practice

Title	**C2C knowledge transfer and best practice**	
Purpose	The first part serves the purpose of knowledge transfer, communicating best practices and the current state of C2C implementation, as well as the development a programme for independent exercise (Part II). The training in this first part should clarify and points and doubt about the application of C2C principles in the participants' area of expertise.	
Modules	**Day 1**	
	Module A: Introduction • Introduction and expectations of participants • Thematic introduction into the topic	2pm – 2.45pm
	Break	
	Module B: C2C Design • Three C2C principles • Biological and technical metabolism • Methodology: EPEA assessment (methodology of ingredients) • C2C Certified^{CM} programme as communication instrument (branding and marketing)	3pm – 4.45pm (break in between)
	Break	
	Module C: C2C Prototypes and case studies • Presentation and discussion of C2C prototypes for SMEs and implementation modalities	5pm – 7pm (break in between)
	Day 2	

	Module D: Innovation workshop (group work) • Presentation of participants (products, processes, materials) • Brainstorming, discussion (potential C2C product innovation, preference list, know-how-trustee function of EPEA, roadmap, C2C instruments) • Advantage and opportunities for enterprises implementing C2C	9am – 1pm (break in between)
	Lunch	
	Module E: Roadmap • Definition of project work of participants in own enterprises • Process/pipeline of project work and framework of contractual agreements	2pm – 5.30pm (break in between)
	Break	
	Roundup • Organisational questions (which trainer will support which SME-project, when are meeting-times, how arranged, HandOuts, Guidance Sheets) • Concluding remarks	5.45pm – 7pm; the 2. day ends at 5.00/5.30 pm
Training Methods	Lecture, visual material etc.	
Training Materials	C2C presentation (pdf/ppt), links to C2C videos etc.	

B. Part II

The second part encompasses 12 – 18 weeks of independent study and project work in respective own enterprises.

Participants receive coaching from their trainer (identified in 1st part). Coaching will take place 3 times and last 2 hours each. This includes:

+ 1 in the beginning to determine and agree on the topic of the written exercise; as a workshop or individual coaching?

+ 1 in the middle of the independent study period (discussion, draft and model); as a workshop or individual coaching?

+ 1 after handing in the written exercise to evaluate the results of the independent study. as a workshop or individual coaching?

Furthermore, participants should receive the opportunity to meet with other participants for an exchange of their respective experiences, e.g. provision of materials, addresses, contacts, or electronic exchange.

Title	**Applying C2C methods – self-study**	
Purpose	This second part is for participants to apply C2C methods independently in their own respective enterprise, and to implement a concrete C2C project in their enterprise.	
Modules	**Module F: Project workshop I** • After two weeks the participants are to hand in the theme and abstract of their first written work, which will be assessed by their teachers. • This written exercise should for instance comprise proposed changes in the enterprise (goals, action plans, milestones reached etc.) and should include a planning, what the process/roadmap of the enterprise should be after the third part.	Week 6
	Module G: Project workshop II • A second written exercise will be completed and discussed in the company: developing a value-driven model for the company.	Week 14
Training Methods	One-to-one mentoring, written work etc.	
Training Materials	C2C Handbook etc.	

C. Part III

1,5 days of analysing project work, distillation of advantages and opportunities for enterprises, further knowledge sharing and proceedings.

- 1st Day
  - 2pm - 7pm knowledge transfer + best practice
  - 7pm - 9pm Exchange of experience with dinner
- 2nd Day

- 9am – 1pm knowledge transfer + best practice
- 1pm – 2pm Exchange of experience with lunch
- 2pm – 5pm together with other representatives of the enterprises reflect and exchange experiences on the programme and potential continuation for enterprises

Title	**Exchange of experiences and next steps**	
Purpose	The purpose of the third part is primarily to reflect and exchange experiences. In this context, the participants should have the opportunity to dive into greater depth should they desire. For this reason, there can only be limited prescription of content for the individual modules of this part of the programme. Potential modules and respective focus points are:	
Modules	**Day 1**	
	Modul H: Exchange and reflections • Reports/ experiences by participants • Reflection of participants‘ project-workshops • Planning next steps	2pm – 3.45pm (break in between)
	Break	
	Module I: Models and instruments • Assessment and certification • Roadmap • Communication and branding • SME Prototypes	4pm – 4.45pm
	Break	
	Module J: • Further in-depth study of individual modules depending on the needs of the participants	5pm – 7pm (break in between)
	Day 2	
	Module K: **Outlining the steps to implementation** • **Step 1** Have a look at the situation in your company • **Step 2** Find out what’s already there to build upon	9am – 1pm (break in between)

	• **Step 3** Identify what is needed to be even more helpful to employees and customers • **Step 4** Find indicators of achievement • **Step 5** Make a plan on how to implement activities • **Step 6** Check how the outcomes are and adapt activities accordingly	
	Lunch	
	Modul L: Steps ahead • Roadmap after project • Long-term strategy, in terms of product/service development in C2C, network etc. • Exchange experiences with others and potential continuation of project	2pm – 5pm
Training Methods		
Training Materials		

3. Final assessment

- The complete training consists of three parts and comprises between 200 to 275 contact hours
- In Germany, the training ends with an official examination with a recognised continuing education qualification.
- In the other countries, an internal examination is to take place, which can be carried out on the basis of the German examination regulations.
- Each participant should receive:
  a) A certificate with the examination results
  b) In any event, a qualified participant certificate in accordance with the model below.

Co-funded by the Erasmus+ Programme of the European Union

Management and Technologies of Water, Waste Water, Waste and Circular Economy WWW&CE

Logo Project Partner

Confirmation of attendance

Name of the participant

Name of the company

took part in the advanced training with the topic

Cradle to Cradle in SMEs

That was carried out within the EU co-financed project "Management and Technologies of Water, Wastewater, Waste and Circular Economy" (Project No. 600835-EPP-1-DE-EPPKA2-ssa).

The advanced training was carried out from *(date)* – *(date)* in *(city, country)*. It consisted of 3 training parts, in which the following contents were imparted, knowledge deepened and applied in practice:

Part I: 12 Hours

- Modul A: Introduction of the SME-Training, curriculum and goals
- Modul B: Cradle to Cradle® design concept
- Modul C: Cradle to Cradle® prototypes, case studies and Cradle to Cradle® use in SMEs
- Modul D: Cradle to Cradle® Toolbox and Roadmap
- Modul E: Roadmap development
- Modul F: Development of the outline of the own Cradle to Cradle® project

Part II: 150-180 Hours

- Practice: Processing an own Cradle to Cradle® project and implementation in the company, accompanied by individual coaching

Part III: 12 Hours

- Modul G: Exchange of experiences and reflections
- Modul H: Presentation and consultation of results of all individual projects
- Modul I: Models and instruments
- Modul J: Further in-depth study of individual modules
- Modul K: Outlining the steps to implementation
- Modul L: Cradle to Cradle® workshop with other persons of the company: practice meets science; new developments; planning in the company

……Place, Date……

Signature
Name, Position
Implementing institution

Annex I German examination regulation

Legislation for the further training examination for designers of sustainable products and services for small and medium enterprises (HWK) in accordance with § 42a HwO.

The Schwerin Chamber of Crafts will implement the following statutory provisions for further training examinations for the recognized degree of "Designer of sustainable products and services for small and medium enterprises (HWK)" in compliance with the ruling of the vocational training committee of 17th. March 2016 and the General Assembly on 10th. May 2016 in accordance with § 44 para. 4 and § 106 paragraph 1 No. 10 Handicrafts Regulation (HWO) in the version published on 24th. September 1998 (BGBl.I 3074;.. 2006, I S.2095), last amended by Article 283 of the Act of 31.08.2015 (Federal law Gazette I p 1474), as the competent authority in accordance with § 71 paragraph 1 of the vocational training Act of 23 March 2005, the last by Art. 436 of the Act of 08.31.2015 (I, p. 1474), in connection with § 42a and § 91 paragraph 1 No. 4a HWO

§ 1 Purpose of the examination and designation of the degree

1) The examination for designers of sustainable products and services for small and medium enterprises (HWK) is intended to determine whether the candidate possesses the necessary knowledge, skills and experience required for the development of Cradle to Cradle (C2C) design in small and medium-sized enterprises in craft-oriented functional areas.
2) A successful pass in this examination leads to a recognized degree in design of sustainable products and services for small and medium enterprises (HWK).

§ 2 Requirements

The examination is to admit those who have:
1) successfully passed a Master Craftsman's examination in a skilled trade or have passed a commercial training test.
2) Further to Paragraph 1, admission to the examination may also be granted on presentation of certificates or otherwise, as proof that the requisite knowledge, skills and experience have been acquired in previous activities and can justify admission to the examination.

§ 3 Structure, content and duration of the test

1) Theoretical fundamentals
In the first part of the examination, basic knowledge will be tested in the following fields of activity:
a) analysis of operating conditions with respect to their current and future potential for the implementation of sustainable products and services
b) submission of economically viable proposals to support Cradle to Cradle measures

c) activities for the implementation of Cradle to Cradle measures in the operation
d) assessment of the operational suitability of Cradle to Cradle measures
e) development of optimization suggestions for improvement of Cradle to Cradle measures.

§ 4 Consideration of previous examinations

1) The examinee can apply for exemption from the Chamber examination in individual areas of action, if he/she has passed a previous examination before a competent authority, a public or state accredited educational institution or before a state examination board whose content requirements correspond to the respective fields of activity.
2) A complete exemption is not allowed.

§ 5 Passing the written and oral examinations

1) The examination results in the parts stipulated in § 3 must be assessed separately.
2) The number of points obtained in the three papers for the oral and written examinations should be summarized into a total score. The final grade is therefore:
   15% from the first part of the examination,
   25% from the written examination in the second part of the test,
   40% of the project work in the third part of the test and
   20% of the technical discussion in the third examination.
3) The written test in the second part of the examination is to be supplemented by an oral examination if this can tip the scales in passing the test. The oral examination should not last longer than 15 minutes per test.
4) The test is successfully passed if the performance achieved is at least adequate in each part of the examination.
5) A certificate is issued to confirm the passing of the test; this must show the final grade.

§ 6 Retests

(1) An examination which was not passed can be repeated twice.
(2) If the candidate has passed individual sections of the examination but has not performed at least adequately in sections in accordance with §3, the parts successfully passed must not be repeated on further application, provided that the candidate has filed for reassessment within two years from the date of the declared result of the failed examination. The assessment of the examination will be made with regard to this factor.

§ 7 Application of other provisions

Insofar as these provisions do not depart from the regulations, the training examination regulations of the Schwerin Chamber of Crafts are applied for non-craft occupations in the current version.

§ 8 Commencement of effect

These regulations and their publication on the website www.hwk-schwerin.de under the heading "legal bases" take effect following their publication in the Official Gazette of the Schwerin Chamber of Crafts (Northern craft).

Annex II Guidelines and check list

Guidelines and check list for conducting of the C2C seminar for small and medium-sized enterprise

Suggestions and recommendations	Check
A) Objectives of the seminar a) Communication of a substantiated overview and deep understanding for environmental protection, health and circular economy and meaning thereof for SMEs b) Learning about principles, biological and technical circulation and also Cradle to Cradle procedures c) Transfer of knowledge and skills for the evaluation of SMEs from the point of view of the Cradle to Cradle and identification of approaches for the implementation of C2C d) Start of Cradle to Cradle realization and implementation of C2C projects in SMEs	
B) Target groups of participants 1. The first priority belongs to owners, management personnel and employees of small and medium-sized enterprises – basically from all branches 2. Business founders and potential business founders – basically from all branches 3. Scientists and consultants dealing with economic questions and furtherance of SMEs during research and consulting 4. Students who are interested in preparing seminar and bachelor works related to C2C in SMEs or would like to work in SMEs after completing their studies 5. Persons who are temporarily unemployed and would like to improve their chance for employment through visiting the seminar	....
C) Announcements and information for participants Avoid using the term “Cradle to Cradle” because it is hardly known. Instead of this circular economy, recycling and health should be mentioned. It should be emphasized that it’s about environmental protection and about production and sale of **healthy** products. For the target groups specifically the importance and also advantages and benefits of participation should be emphasized, for example a) Health is a rapidly growing market: market success and intensive sales promotion through healthy production and healthy products b) Consumers and other customers are always more conscious in relation to the environment: stronger image building in environmental protection c) Raw materials are becoming scarcer and more expensive: saving energy and raw materials costs d) Public sector customers and major industrial enterprises will more often award contracts to those enterprises which implement circular economy; for example, already today in Holland	....

e) Pioneer advantages are implemented through moving to the circular economy at an early stage f) To a large degree product innovation are achieved with the extension and improvement of existing products and services and also of new products and services; therefore, the future-oriented guarantee of sales and growth is obtained g) Strong increase of attractiveness and improved image for specialists and customers	
.....	.....
Information should be distributed repeatedly in writing through various media and especially intensively personally, for example, during personal conversations, at meetings, during other further trainings, through consultants etc.	
.....	.....
Special emphasis that the participation and important qualification are **free of charge**. In case of future implementations participant fees are levied!	
D) Winning participants Preliminary and repeated announcement of the seminar in specialized magazines, at websites, in newsletters, circular letters etc.	
.....	.....
Production of posters or banners with invitations to the seminar and placement thereof in educational institutions, chambers, high schools etc.	
.....	.....
Sending personal letters of invitation with the indication of date and reply sheet through post and/or mail; at least 50 times more potential participants should be served than the desired number of participants	
.....	.....
Repeated telephone follow-up campaigns for registered potential participants	
.....	.....
Holding press meetings and sending press releases in order to achieve publications in the daily press with invitations to the seminar	
.....	.....
Engagement of disseminators (e.g. consultants, teaching staff etc.) who speak to potential participants personally and hand over letters of invitation	
.....	.....
At every opportunity personal contact, informing and consulting of potential participants	
.....	.....
Winning at least 15 (optimally 25) participants who will register obligatorily and participate in all 3 parts of the seminar	
.....	.....
As a basic principle persons from all branches and fields of activity participate in the seminar. If possible participants for chosen related branch groups should be addressed and obligatorily won over in order to facilitate the holding of the seminar. In case the number of applications is too low a variety of different branches can also be represented.	
E) Structuring of the seminar and employment of lecturers E 1) The first part: workshop The first workshop should be held during two consecutive days; all weekdays are possible; with regard to the lack of time of SMEs Friday and Saturday, for example, are the best variant. The workshop should be approximately 12 – 15 clock hours (=16 – 20 class hours, 45 minutes each).	

The corresponding implementing partner is responsible for the whole preparation, implementation, moderation and support of participants of the seminar. Lecturers the teaching staff of the implementing partner and/or lecturers on a fee basis are employed – preferably persons who have participated in the Train the Trainer seminar. The employment of the teaching staff, range of tasks and division of responsibilities should be obligatorily agreed upon in a timely manner.	…… ……
Structuring of the seminar and employment of lecturers E 2) The second part: self-study and project work The second part should be approximately 12 weeks; at least 9 and maximum 15 weeks. The corresponding implementing partner is responsible for the implementation of the second part. The employment and tasks of the teaching staff should be obligatory agreed upon in a timely manner. During the whole second part the support, the backing and the consulting of participants must be obligatorily provided by the own teaching staff and/or by lecturers on a fee basis.	…… ……
Structuring of the seminar and employment of lecturers E 3) The third part: final workshop The final workshop should be held during two consecutive days; all weekdays are possible; with regard to the lack of time of SMEs Friday and Saturday, for example, are the best variant. The workshop should be approximately 12 – 15 clock hours (=16 – 20 class hours, 45 minutes each). The corresponding implementing partner is responsible for the whole preparation, implementation, moderation and support of participants of the workshop. As lecturers the teaching staff of the implementing partner and/or lecturers on a fee basis are employed – preferably persons who have participated in the Train the Trainer seminar. The employment of the teaching staff, range of tasks and division of responsibilities should be obligatorily agreed upon in a timely manner.	…… ……
F) Conducting of the seminar F 1) Period for conducting All 3 parts of the seminar must be conducted within the period from May 2020 till the end of April 2021 at the latest and must be completed in full.	
Conducting of the seminar F 2) Materials for the conducting a) Curriculum b) Analyses of labour and education markets in Baltic Sea Region c) Qualification needs of the SMEs e) Power Point presentation g) Available check list h) Publications in the Internet under “Cradle to Cradle” Suitable seminar documentation should be prepared for the participants and distributed during the first workshop.	……
Conducting of the seminar F 3) Structuring of the first workshop	

a) Welcoming, introduction of participants and also goals and procedure of the whole seminar and of the first workshop The seminar must be consequently oriented at the needs of SMEs and their capabilities and also it must be based on the background experience of participants. b) Introduction and overview of the Cradle to Cradle, basic principles, biological and technical circuits, use of regenerative energies etc. c) More detailed studies of the Cradle to Cradle on the basis of SME prototypes and use thereof in SMEs d) Work in small groups (3 – 4 persons each) with reflection of the communicated material on the basis of the own enterprise and of the personal background experience e) Presentation of group results and discussion f) Examples for the first steps and for C2C use in SMEs with deeper studies of the C2C concept, for example: + A producer of conventional workwear in Hamburg expands the range of his products through the additional purchase of C2C workwear, he makes first experiences, wins over additional customers and creates the image. + A bakery does not use plastic bags any more, it sells C2C carrying bags to its customers much more and informs its customers about the ingredients of its products. + A retailer with a shop and internet sales uses social media and gets information from the customers which C2C products they have learnt and wish in the future which are then included in the range of products. + Beside traditional products a painting company offers to its customers the use of C2C products (e.g. paints) at additional costs, makes advertisement with arguments of environmental and health protection and begins using C2C in a processual manner. + A tailor makes advertisement that she produces clothes and suits which are so healthy that they can be eaten and implements this reliably with the use of C2C materials in case of corresponding wishes of the customers. + A bakery uses only raw materials and ingredients from the region and converts its production to healthy whole meal bakery. g) Work in small groups (3 – 4 persons in each) with identification of the first C2C applications at the own enterprise or in the own field of activity. h) Presentation and discussion of group results. i) Further communication related to C2C and more detailed information on the basis of results of working groups. j) During single work of each participant outline of the first C2C project which should be processed and implemented during the second part of the seminar. Subsequently presentation, consulting and assessment of the individual project in small groups (3 – 4 persons in each). k) In plenary presentation and discussion of each individual C2C project with the goal that for each participant a C2C project is agreed upon obligatorily for the processing and implementation during the second part of the seminar. l) Appointment of the further procedure, especially for the second part of the seminar and determination of the date for the final workshop.	
Conducting of the seminar F 4) Indications related to the second part of the seminar For self-study, project work and exchange of experiences each participant receives a list with:	

a) All contact data of the teaching staff and lecturers of the corresponding implementing partner who can be addressed by the participant if necessary, any time with questions. b) All contact data of all the participants for the independent organization of exchange of experience. c) Literature references and web addresses for self-study	.....
After one to maximum three weeks the project work has to be finally agreed upon and discussed with each partner. It can be done at the site of the participant. Alternatively, for the reasons of simplification and time saving the implementing partner can offer and arrange for one-hour individual consultation appointments.	.....
Every participant must be contacted by the teaching staff and lecturers of the implementing partner at least every 2 – 3 weeks personally or per telephone. For this purpose, evening events with all participants can be held at regular intervals.	.....
During contact with the participants teaching staff and lecturers of the implementing partners gather topics and questions of participants with the lack of knowledge and distinct need for improvement. For this purpose, a uniform survey form related to the written documentation is recommended.	
Conducting of the seminar F 5) Structuring of the final workshop a) Transfer of knowledge and detailed information related to questions and topics which were collected by the teaching staff and lecturers during the second part of the seminar. b) Plenary discussion and clarification of further questions. c) Presentation, consultation and discussion of results of all individual project works. d) Following project works further studies and also further transfer of knowledge related to C2C. e) During independent work of each participant outline of his further plans and procedures for future further developments and implementations of C2C. After that presentation, consultation and assessment of individual plans in small groups (3 – 4 persons in each). f) In plenary presentation and consultation concerning each individual plan for future C2C works with the goal to make available a realistic plan for each participant. g) If necessary, transfer of deeper knowledge related to plans and final discussion of the contents. h) Scheduling further procedure	
Conducting of the seminar F 6) Examination and certificate The C2C seminar for SMEs can be completed with an examination (assessment of the project work and oral examination). For this purpose, each implementing partner receives examination regulations timely as a basis and orientation.	.....
In case of examination each participant receives an examination certificate and also a separate document (participant certificate). For this purpose, each implementing partner receives timely a draft certificate.	.....

In case there is no examination each participant receives only one document (participant certificate). For this purpose, each implementing partner receives timely a draft certificate.	
G) Evaluations At the end of the first workshop each participant and each participating lecturer should evaluate the workshop in writing. For this purpose, each implementing partner receives timely a questionnaire for each participant and also for lecturers. The completed questionnaires are sent by the implementing partner within one week to the evaluating partner Satakunta University. During the second part of the project the teaching staff and the lecturers personally ask every participant. For this purpose, each implementing partner receives timely a short-standardized form. The completed forms are sent by the implementing partner within one week after the end of the second part of the seminar to the evaluating partner Satakunta University. At the end of the final workshop each participant and every participating lecturer should evaluate the workshop and the whole seminar in writing. For this purpose, each implementing partner receives timely a questionnaire for each participant and also for lecturers. The completed questionnaires are sent by the implementing partner within one week to the evaluating partner Satakunta University. The evaluation of all questionnaires and surveys is performed by the partner Satakunta University which prepares an evaluation report till 31.05.2021.	…… …… ……
H) Implementation report Within 4 weeks after the end of the seminar each implementation partner prepares a clear implementation report till May 31, 2021 at the latest with a) number of participants in all 3 parts of the seminar b) represented branches and fields of activity d) possible drop out of participants and reasons for this e) possible new participants f) short outline of implemented projects g) possible results of examinations h) own experiences and evaluation of the procedure i) recommendations and instructions for future implementations of the C2C seminar for SMEs j) own plans for future implementation of the seminar by implementation partners after the end of the project	

Annex III Qualification needs SMEs

Qualification needs SMEs[1]

Cradle to Cradle (C2C) is a promising and innovative methodology of circular economy with 100% recycling rate, which corresponds to the objectives of policy and businesses particularly. C2C has been successfully used by individual major enterprises; more than 2.000 C2C products have already proven on the market. In SMEs, there does not currently exist knowledge of the C2C approach. The engagement of SMEs with these issues often lacks due to insufficient knowledge about strategies and measures of implementation or simply financial resources.

During this special further for SMEs, this knowledge gap is to be closed by measures adjusted to the SMEs conditions and needs. Various results resp. levels can be achieved by applying this very innovative approach, e.g. a Quality Statement, an Environmental Health Statement or "Inspired by C2C" or "Certified according to the Cradle to Cradle CertifiedTM product Standard".

- **Need for new effective solutions to maximum economic benefit**

Energy efficiency, climate and environmental protection belong to the EU top priorities and likewise of considerable and growing importance of the economy of the member states. With C2C approach SMEs can make crucial contributions to the achievement of objectives and at the same time strengthen their competitiveness, develop new market segments and create jobs on a large scale.

- **Training of SMEs and equipping with new knowledge, skills and experiences**

SMEs are often struggling with fulfilling the demands on the market in order to continue with their existence and work. Hence, there is seldom time and capacity for overthinking their strategies and economic management. According to the SME needs for effective innovative solutions with a maximum benefit (time is money!), the C2C training is time-saving with a maximum knowledge transfer and intense support by coaches.

- **"Time is money"**

This aspect affects SMEs in particular due to the very limited time, financial and personnel capacities. Seminars/trainings taking several days are not appropriate for SMEs with less than 10 employees at all, which are the most SMEs in Baltic Sea Region. This is why the C2C training is planned with very short theoretical lessons at the beginning and end of the training. The main part makes a self-study phase in the own enterprise, when applying the theoretical knowledge in practice and developing very concrete individual solutions for own enterprise.

- **Need for imparting comprehensive information package on C2C**

In order to become, be and stay innovative and competitive SMEs need to look for new working, production and service opportunities continuously. The C2C design concept allows responding the environmental challenges and at the same time opens new economic

[1] The needs analyses bases on experiences of project partners and analyses of different reliable sources.

opportunities. SMEs should be aware of the C2C design concept and numerous possibilities C2C offers. During the planned further training at least basic knowledge about the Cradle to Cradle (C2C) design and the feasibility of its implementation in individual/own enterprises are to be gained. So that, completing the training the participating SMEs should know the main aspects of the Cradle to Cradle approach and be able to find innovative solutions in their own enterprise by working closely along the C2C approach. For this an individual project work will be done with the support of coaches.

- **Consideration of individual needs by applying C2C**

Since every enterprise brings along different preconditions and capabilities, the C2C approach has to be adapted to the special needs of every single SME. A universal design or approach would only prevent the enterprises from reaching their full potential.
It is important that the trainers examine the different qualification needs of the SMEs during the training in order to ensure a specific and detailed strategy of C2C. Issues like

- financial resources
- capabilities in terms of skilled employees
- sales market conditions
- costumer services
- types of sales products

have to be considered while jointly developing a probable scenario.
In order to transform the gained awareness of circular economy, eco-efficiency and eco-efficacy into specific SME-adapted strategies, the initially stated circumstances have to be developed by the SMEs together with the consulting trainers during the seminar.

- **Need for high-quality services**

Given the limited time, personnel and financial resources in SMEs, there is a great need for high-quality services, which are tailored exactly to the needs for SMEs: duration of the training, date (in the week or rather at the weekend), relevance of the contents, structure, teaching methods, qualified trainers, etc. The C2C training contents are adapted to the needs of SMEs, the training will be organised concerning SME needs and training program for trainers developed and tested to ensure high-quality services for SMEs.

- **Intense support for SMEs**

C2C is an innovative, important but also demanding concept; a practical implementation accompanied by intensive coaching by trainers is needed. That ensures that the SMEs make the most possible out of their potential. Together with the trainers who consult and coach the SMEs in every step of the probable C2C implementation, favorable conditions for implementation are created. Thus, an application of C2C is feasible in the long term.

- **Practical implementation**

The experiences making and carrying out trainings for SMEs show that the step from theoretical knowledge gained in a seminar or training and its application in practice for the most of the SMEs is difficult. They fail often because of little things e.g. not knowing the proper way of implementation, methods or next steps for own enterprise. For this, the most optimum is if the training contains a practice part; support by coaches during such a practice part and even

afterwards is required for successful implementation with sustainable effects. So that SMEs are able to find innovative solutions in their own enterprise.

- **Best practices**

Best practices serves best for SMEs to visualise difficult or even abstract contents in trainings. The experiences show that these also often ease the imagination how to use certain measures, approaches, methods in practice. In general, practical examples have proven as relevant and useful methods of teaching and better understanding of contents.

Findings of further needs for SMEs

- Enterprises and their customers must be treated respectfully and regarded as esteemed partners.
- The information exchange can be performed in writing and electronically; however communication in person is especially important.
- The cooperation with SMEs must be arranged in a process-oriented and permanent manner and stand out due to its highest reliability. It is necessary to build and to earn trust.
- Lecturers, trainers and consultants must be familiar with the needs of SMEs. It is ideal to have a constant contact person for an enterprise who also possesses specific knowledge related to corresponding branches and if necessary involves further experts.
- In the most of the cases SMEs have small capacities for information processing and problem solution. It is difficult for SMEs to filter the relevant information from the constantly growing information flow, adjust it to the specific requirements of their enterprise and implement them.
  Professional journals are appreciated; also open newsletters with very short articles and references where further information can be obtained if necessary. Especially intensively the information is taken from daily and district newspapers. A very short announcement in a daily newspaper brings more feedback than a long article in a professional journal or a letter.
  Letters with long text passages are often not read. At the same time seminars must be announced through mailing actions which arouse interest when they are compiled in short form, communicate information specifically and possibly contain a flyer which makes clear what benefits the seminar brings for the enterprise.
- Follow-up by phone after the training is essential. What matters is the individual contact. It should take place at off-peak hours and all the possibilities must be used, for example, meetings, discussion evenings etc.
- The transfer of information, for example, an announcement of a seminar, is one of the important tasks of the organizer to be successful with the training.
- Coaching of SMEs is the key to successful implementation of new economic practices, integration of new working structures, etc.
- All services and promotion for SMEs must be tailor-made for SMEs. A further training seminar must exactly correspond to the requirements and the problems of the participants to the maximum possible extent. A good preparation work to provide SMEs with specific knowledge or preliminary determination of demands of participants are decisive factors of success.

- Due to limited time SMEs further training and consultations must take place at a time which suits the enterprises best, for example, in the evening, on Friday afternoon and Saturday morning or during less intense working periods (e.g. in winter).
- SMEs require all the services and funding just in time. It is less important to get information or help at some point in time but the fact that they can directly obtain it when they have the need for it.
- For the most SMEs bureaucracy is annoying; they need all the services and funding from a single source. It is the task of the service and further training provider to guarantee it constantly. SMEs may not be loaded with coordination works among various institutions or persons.
- In SMEs the enterprise management is constantly overcharged with plenty of management tasks which must be usually performed by one person. Unlike major enterprises SMEs cannot have internal staff departments. Promoters and further training providers must externally perform the required staff functions and thereby offer non-monetary advantages to SMEs.
- The lecturers should be experts or possess profound knowledge in the certain field. They should also have good skills by the transfer of competences through the implementation of various didactic methods.
- It is favorable to shape the training interactive and flexible. It is worthwhile to perceive the expertise of the participants and self-produced findings. These are more present than many other forms of communication. Work in small groups according to the dynamics of the group requires for moderation, however, a high level of competence to use flexible methods.

Cradle to Cradle® Prototypes

1. Rise to the formation of prototypes

Cradle to Cradle® (C2C) means a design concept related to circular economy, where all materials, equipment, tools, products, etc. are healthy as well as re-used to the maximum extent. The main focus lays not on the reduction of use of environmental goods but on the recycling and re-use of these goods. Here, Cradle to Cradle® approach pursues an optimization process with gradual solutions over time. Various results resp. levels can be achieved by applying this very innovative approach, e.g. a Quality Statement, an Environmental Health Statement or "Inspired by C2C" or "Certified according to the Cradle to Cradle Certified™ product Standard".
With C2C quality, health and safety of products are assured and at the same time the highest level of environmental and health protection.

The aim of identifying the prototypes of SMEs is the fact that depending on the nature of their business, SMEs can be affected by C2C to very different extent and also benefit from it differently (e.g. SME with main field of activity in an office work compared to a SME in production). Therefore, SMEs across all economic sectors are concerned in very different extent of C2C and accordingly have to apply C2C in various ways. The prototypes are prepared to classify SMEs with roughly comparable C2C application possibilities according to the potential of use and influence of C2C in a SME.

2. Intersectoral: All Branches

Possible Issues

From a *Cradle to Cradle®* perspective, products are generally not well defined within the supply chain, which means the generic materials are mostly known but little or nothing about the minor ingredients. Furthermore, products enter the market, which are not designed for recycling. The main challenge lies in designing products, which are appropriate for continuous material flows, either making the materials suitable for returning safely and completely to the biosphere or being recovered at a consistently high quality. Therefore, the implementation of a comprehensive quality concept by positively defining products/materials/ingredients and the subsequent input into (recycling) systems is fundamental.

Remark: "Positive definition" of products means in the C2C sense knowing the exact composition of a product down to the level of chemical names described by the international CAS-numbers.

C2C Potential and chances

The major tasks for all branches are as follows:

- Definition of the inputs (composition of the material flows, “know what it is”) with respect to high quality recycling
- Positive Definition of products/materials/ingredients
- Collective understanding of recycling
- Set new standards of innovative product development for the industry by defining “positive”, beneficial and innovative products and developing an eco-effective business model for different branches.
- Creating products whose re-entrance into production is already taken into account at the product design stage.
- Improving lifecycle management into nutrient management to biological / technical metabolisms.

EPEA invites companies to adopt Cradle to Cradle® Design as a tool to achieve Eco-effectiveness through the application of established EPEA methods. Opportunities of Cradle to Cradle® are shown in the following sections on a general basis as well as specified on particular branches.

3. Intersectoral: Office and Administration

Branches:
All prototypes with offices Administration
Ministries
Consulting companies
Government
Chambers of commerce
Administration
Associations

Possible Issues
Health effects on employees due to low indoor air quality (e.g. off-gassing of textiles or toner dust)
Problematic waste management due to missing material flow management

Take back systems to be established
- Electronics (see e.g. WEEE Guideline, RohS Guideline)
- Packaging
- Batteries
- Restriction of problematic and toxic substances (further than REACH)

Development of Service Concepts for technical products
Running out of materials will probably being earlier than running out of energy

C2C Potential
Conducting office material (e.g. paper) in cycles
Use of certified office equipment
Introduce material flow management
Use of healthy and cyclable office equipment
Office buildings with C2C elements (see under “Building and Construction)
Purchase renewable energy
Water Management according to C2C
Communication to customers about C2C achievements
Improving social quality of the workplace

C2C regions for implementation of the general idea of a comprehensive quality (including reutilization properties)
Creating partnerships under the new C2C aspect
Enhance use of renewable energy

Possible chances and benefits
Creating positive agenda for office improvement
Reduce waste management costs

Getting money for sorted fractions like paper
Improve health of employees
Becoming more attractive for new employees
Creating technical cycles
Meeting EU requirements e.g. on recycling
Less CO2 emissions due to recycling
Development of new technology for recycling
Import of technology from other countries with enhancement of technological level
Organization as a catalyst in use of renewable energy

Added value
Potential cost savings from a macroeconomic view due to material cycles, refer to "circular economy"
Less dependent on import of raw materials like metals

Frame conditions to be taken into account
C2C frameworks and partnerships not yet existing
People and industry not yet familiar with C2C and possible effects
Little consciousness in offices about C2C
Possibly low standard of municipal-waste management
Possibly also low standard in separate collection of used products

4. Prototype: Building and Construction

Concrete, cement
Glass
Wall covering (indoor and outdoor)
Wood for construction purposes
Flooring (plastics; textiles see under textiles)
Indoor equipment (see there)
Coatings, paints for construction materials
Lighting

Possible Issues
Construction materials not designed or selected in view of later de-construction
Construction materials not safe from health standpoint for use in buildings
Indoor air quality negatively affected by non-optimized materials
Big amount of waste during demolition
Value of materials and esp. metals which can be obtained during demolition not realized

Dissipation of problematic materials and chemicals in the environment due to less effective waste management
First step required: Sorting of non-optimized materials during demolition
"Recycling" with undefined materials which are not designed for recycling

C2C Potential

Change of thinking from C2C perspective: Regard of a building as a raw material base
Deeper knowledge about properties and ingredients of construction products
Define construction materials for biological or technical cycles
Use of Cradle to Cradle Certified™ construction materials (LEED points possible under certain preconditions)
Design of underground construction materials according to biological environment (e.g. no release of toxic metals)
Roof greening for improved room climate and diversity
Include defined C2C elements in new buildings
Integrate renewable energy
Water recycling measures
Regard CO2 as a resource e.g. for vegetation instead of capturing and storing

Possible chances and benefits

Less contamination of the environment coming from potentially toxic ingredients of construction materials in combination with inappropriate waste management or recycling
Valuable materials recovered
Positive health effects for people in optimized buildings
Positive environmental effects due to optimized construction products

Added value

Optimization of recycling and reuse of materials may lead to positive cost effects
Sorted metals can be sold
Achievement of LEED points possible subsequent to certification
Cost reduction by including renewable energy

Frame conditions to be taken into account

Existing waste management and recycling structures in construction and demolition
Motivation of construction companies not yet focused on C2C

5. Prototype: Production

C2C applicable for several branches

Biggest potential for C2C
Many examples of C2C projects and certifications

For all branches (points partly repeated in following production-prototypes):

Possible Issues
No detailed knowledge about ingredients of their products
Possibly unknown problematic ingredients
Products entering the biosphere (e.g. waste water) not designed for this scenario, still e.g. aqua toxic or not biodegradable
Product safety affected
Not yet prepared on request of customers for “sustainable” or “healthy” products
Conditions of production may become a public issue (like in Germany)

C2C Potential
Deeper knowledge about their products
Opportunity to achieve higher product quality
Higher product safety
Encouragement of supply chain for more transparency
Opportunity for Certification C2C Certified™ and therefore market differentiation
Awareness in company for possible simplification of recipes
Products for Technical Cycle: Opportunity to get back materials “for free”
More focus on renewable energy

Possible chances and benefits
Less vulnerable against attacks from test institutes or NGOs
Higher sales due to higher product quality
Differentiation in the market by better products
Creation of communication measures within the supply chain and/or for the public

Added value
Specific for branches

Frame conditions to be taken into account
Still little awareness in public about concept of comprehensive quality
Supply chain not yet used to disclose confidential information to a know-how-trustee (EPEA)
Chemical industry or importers focusing on requirements of European regulations of REACH and therefore not yet open to C2C
Financial effects not predictable

a. <u>Textiles and Shoes</u>

Fashion apparel

Synthetic-, natural textiles (incl. leather products)

Work wear

Hospitals, construction sector, etc.

Home textiles

Upholstery, hangings, towels, etc. (incl. leather products)

Accessories

Buttons, Zippers, Labels, etc.

Shoes

Fashion and Casual

Carpets and Flooring

Possible Issues

Most of the chemicals are problematic with respect to specific scenarios (e.g. skin contact, inhalation, environmental fate, recycling and reuse, etc.)

Sensitizing ingredients widely used in textile and shoe production are not designed for skin contact.

Lots of problematic process chemicals are released uncontrolled into the waste water during production

Most of the dyes and other textile additives used for production are not known by the textile producer

Double standards: Textile production is in most of the cases abroad (e.g. Asia, South America, Africa) and mostly under very low social and environmental conditions.

Standards of dye production in Asia

Standards of leather production in Asia

C2C Potential

Enhance product quality according to a comprehensive quality term

Identifying and looking for C2C alternatives with respect to the sensitizing properties

Basically design for biological and/or technical cycles possible

For work wear:

Existing renting system usable as logistics for take back

Source for textile fibers to be used in other industries

Creating transparency along with textile production, - processing, assembly, usage and after usage for new cycles of new quality products.

Possible chances and benefits

Improved presence in the market due to introduction of new quality criteria

Frontrunner because occupying the field of expected demand of customers who will ask for origin, usage and next cycle of clothing and shoes

Frame conditions to be taken into account

The new quality approach based on C2C to be explained, discussed, improved and published
Textile production shall take place under comparable and safe environmental and socio-economic conditions worldwide.
Advantage for the consumer: Textile and shoe production in consideration of joy, health and high quality

b. <u>Furniture</u>

Office furniture
Other furniture

Indoor

- Wood
- Metals
- Plastics
- Multiple constituents, complex products

Outdoor

- Wood
- Metals
- Plastics
- Multiple constituents, complex products

Possible Issues

No detailed knowledge about ingredients of their products
- Coatings
- Glues

Wood origin and production
Metal production conditions
Metal alloys specification (toxic heavy metals?)
Plastics additives esp. in indoor use (e.g. skin contact)
Off gassing of volatile chemicals
- from coatings
- from additives
- impurities from supply chain

Indoor air quality affected
Formaldehyde release
Not designed for recycling
Recycling system existing?

C2C Potential

Knowledge about potential toxic ingredients of products

Improving indoor air quality
Encouragement of supply chain for more transparency

Possible chances and benefits, added value
Positive health effects due to improved indoor air quality
Enhancement of awareness of high-quality furniture in the public
Marketing of better health quality potential for higher sales
Supply chain not yet used to disclose confidential information to a know-how-trustee (EPEA)

Frame conditions to be taken into account
Supply chain not yet used to disclose confidential information to a know-how-trustee (EPEA)
Awareness of the C2C issues not yet developed in public

c. Health Care
Cosmetics
Baby care

Possible Issues
Generally, not made for entering the biosphere
No detailed knowledge about ingredients of their products
High exposure due to skin contact
Possibly sensitization potential
Health effects of problematic ingredients

C2C Potential
Deeper knowledge about their products
Higher product safety

Possible chances and benefits
Less vulnerability against awakening public awareness for “healthy” products
Possible simplification of recipes

Added value
Positive effects on production costs due to optimized and simplified recipes
Advantage and market differentiation by offering optimized “healthy” products

Frame conditions to be taken into account
Supply chain not yet used to disclose confidential information to a know-how-trustee (EPEA)
Potential for higher awareness in the public regarding typical home products

d. Home Care
Cleaning agents and detergents
Laundry products

Washroom supplies

Possible Issues
Generally, not made for entering the biosphere
No detailed knowledge about ingredients of their products
Skin contact probable

C2C Potential
Deeper knowledge about products
Opportunity to achieve higher product quality
Encouragement of supply chain for more transparency
Encouragement of supply chain for more transparency
Improvement of wastewater

Possible chances and benefits
Higher quality of a high-exposure-product used at home
Less health effects on skin of users due to optimized, less problematic products
Simplification of recipes

Added value
Positive effects on production costs due to optimized and simplified recipes
Higher sales due to less health effects of optimized, less problematic products

Frame conditions to be taken into account
Supply chain not yet used to disclose confidential information to a know-how-trustee (EPEA)
Potential higher awareness in the public regarding typical home products

e. <u>Materials Basic for Designers</u>
Plastics
Polymers
Textiles (see there)
Wood
Paper
Composite materials
Packaging

Possible Issues
Designers focusing more in the shape and design of products than in ingredients
Modification of thinking required regarding reutilization potential of designed products
Composites included in design considerations, not designed for recycling

C2C Potential

Creation of attractive products with C2C properties included
Every day products connected to C2C principles
Enhancement of awareness of designers regarding material properties (toxicological, reutilization)
New way of thinking implemented also in producers of complex products like household appliances

Possible chances and benefits
Higher sales due to higher product quality
Chance for dissemination of C2C into the public

Added value
New quality aspects included in products
Support of cycles of valuable materials

Frame conditions to be taken into account
In design field C2C not yet established

f. <u>Packaging</u>

Packaging with metals (Steel cans, Aluminum cans) Metal (cans, bottles)
Flexible paper packs, modules-pulp packs, Carton board packs, Corrugated fiberboard
Packaging with plastics
Packaging with glass
Printing, labeling
Bioplastics

Possible Issues
Migration of substances (e.g. of volatile substances, antimony, BPA, etc.)
Migration takes place even from labels into the packed food
Problematic substances in the packaging (e.g. PVC or problematic additives)
Problematic substances arising from a recycling process (e.g. detection of residues of mineral oil in recycled paper)

C2C Potential
Improvement of environmental, health and recycling aspects by applying C2C-principles
Deeper knowledge about packaging
Opportunity to achieve higher product quality
Higher product safety
Encouragement of supply chain for more transparency
Development of strategic collaboration between packaging stakeholders for know-how exchange
Defined input in recycling systems

Possible chances and benefits

Less vulnerable against attacks from test institutes or NGOs
Higher sales due to higher product quality
Differentiation in the market by excluding problematic ingredients of packaging used in every household
Energy savings and improvement of CO2 balance possible by implementation of a nationwide packaging recycling system

Added value

Reduction of waste management costs
Higher value of sorted positively defined fractions of plastics and metals
Enhanced branding and marketing value
Avoidance of regulatory costs (water discharge, energy use etc.);

g. <u>Paper</u>

Office paper
Printed paper
Tissue paper

Possible Issues

Problematic substances arising from the recycling process
(e.g. detection of residues of mineral oil in recycled paper)
Paper sludge not made for returning back safely into biological systems (soil, air, water)
Process chemicals in paper production not suitable for biological cycle
Health protection in paper production, exposure of problematic chemicals
High water use

C2C Potential

Optimization of inks, coatings, glues, etc.
Optimization of process chemicals in paper production
Optimization of material flows in view of C2C (e.g. differentiation of input- and output streams)
Long term goal: printing chemicals to be used I printing companies defined
so that the recycling paper company receives a defined input

Possible chances and benefits

Establish recycled paper as a suitable resource also for higher quality applications of paper
No transfer of problematic substances from paper production or recycling into every day products

Added value

Getting more money for sorted, positively defined, fractions
Higher branding and marketing value
Avoidance of regulatory costs (water discharge, energy use etc.);

h. <u>Machine construction</u> (complex products)

Engines,
Machines
Appliances
Gadgets

Possible Issues

Valuable materials incl. electronics hidden in machines
No take back system existing
Machines become waste after use

C2C Potential

Machines designed for disassembly in view of later take-back
Introduce service concepts (machine leasing for defined use periods)
Potential for complete definition limited due to high complexity, but implementation of C2C relevant elements possible in order to enhance quality
Establish recycling potential also for rare high-value metals

Possible chances and benefits

Getting defined, possibly high-quality materials back
Use of higher quality materials for production because these are coming back after use
In certain branches logistics is already existing (e.g. by active sales representatives) but products not yet designed for take back

Added value

Better market position due to better service and take back of machines after use
Getting defined materials back “for free”
Reduction of waste management costs

Frame conditions to be taken into account

Metal prices expected to increase in a long run
Logistics to be developed
Still little awareness in public about the concept of comprehensive quality
Customers and suppliers not yet familiar with service concepts according to C2C

i. <u>Metals</u>

Copper and copper products
Zinc and zinc products

Aluminum and Al products
Steel and steel products

Possible Issues
Mining (environmental and social issues)
Ore processing (emissions in air, water, soil; social issues)
Contamination of metals during recycling by contaminated, undefined or little defined recycling input
Toxic metals in alloys
Toxic or rare metals in coatings

C2C Potential
Introduce service concepts (for certain metals and defined use-scenarios)
Better separation of metals during recycling of metal containing products
If several metal qualities are used for the same purpose in one product:
Review resp. redesign of products
Creating new models of cooperation by service concepts according to C2C
Development of pigments and dyes suitable for biological or technical cycles
No dissipation of toxic and rare metals into the environment

Possible chances and benefits
Improved material cycles of metals
Maintain high quality of metals by definition of recycled input

Added value
Maintain high value of metals if not contaminated

Frame conditions to be taken into account
Metal industry highly optimized according to efficiency criteria
Different environmental standards for metal producers in certain countries
Chemical industry or importers focusing on requirements of European regulations of REACH and therefore not yet open to C2C

6. Prototype: Trading

Branches:
Wholesale
Retailer
Online retailer
Textiles
Tools (metals, for handcraft and industry)

Possible Issues

Quality of product ingredients not known due to lack of transparency in the supply chain

C2C Potential

Opportunity for influence by trading and retailing companies on their supply chain
Preference Lists as guideline for suppliers
Documenting high product quality and pathway of improvement
Improvement packaging
Influencing the supply chain esp. by bigger customers to deliver C2C quality
Encourage qualified and regulated packaging recycling

Possible chances and benefits

Integration supply chain in product optimization
Cost savings by improved packaging
Less vulnerable against attacks from test institutes or NGOs
Higher sales due to higher product quality
Differentiation in the market

Added value

Reduction of waste management costs
Image of a frontrunner in quality may result in higher sales

Frame conditions to be taken into account

Possibly new approach, potential partners not yet acquainted with

7. Organizations

Government
Chambers of commerce
Administration
Ministries
Associations

Possible Issues

Take back systems to be established
- Electronics (see e.g. WEEE Guideline, RohS Guideline)
- Packaging
- Batteries
- Restriction of problematic and toxic substances (further than REACH)

Development of Service Concepts for technical products
Running out of materials will probably being earlier than running out of energy

C2C Potential

C2C regions for implementation of the general idea of a comprehensive quality (Including reutilization properties)
Creating partnerships under the new C2C aspect
Enhance use of renewable energy

Possible chances and benefits

Creating technical cycles
Meeting EU requirements e.g. on recycling
Less CO2 emissions due to recycling
Development of new technology for recycling
Import of technology from other countries with enhancement of technological level
Organisation as a catalyst in use of renewable energy

Added value

Potential cost savings from a macroeconomic view due to material cycles, refer to “circular economy”
Less dependent on import of raw materials like metals

Frame conditions to be taken into account

C2C frameworks and partnerships not yet existing
People and industry not yet familiar with C2C and possible effects

Power Point Presentation

Cradle to Cradle for Small and Medium-sized enterprises

Cradle to Cradle for Small and Medium-sized enterprises

Jenny Pfau & Robert Meyer
EPEA GmbH / Hamburg, Germany

Introduction: EPEA

EPEA Internationale Umweltforschung GmbH

- Headquarters in Hamburg, Germany
- In the Building of the Patriotic Society
- founded in 1987
- by Prof. Dr. Michael Braungart

EPEA
The Cradle of Cradle to Cradle

cradle to cradle

EPEA

Cradle to Cradle

• Developed btw. 1987-1992 as "Intelligent Product System" (IPS)

• In 1995, establishment of McDonough Braungart Design Chemistry (MBDC) in Charlottesville, Virginia (USA), together with architect William McDonough

• In 2002, publication of the book "Cradle to Cradle – Remaking the Way We make Things" by Michael Braungart und William McDonough

Round of introductions

1. Who am I?

2. Where do I come from? (Background, job)

3. Experience with and knowledge

   about Cradle to Cradle

4. Expectations regarding this workshop

Cradle to Cradle Philosophy & Principles

EPEA Internationale Umweltforschung GmbH

Robert Meyer

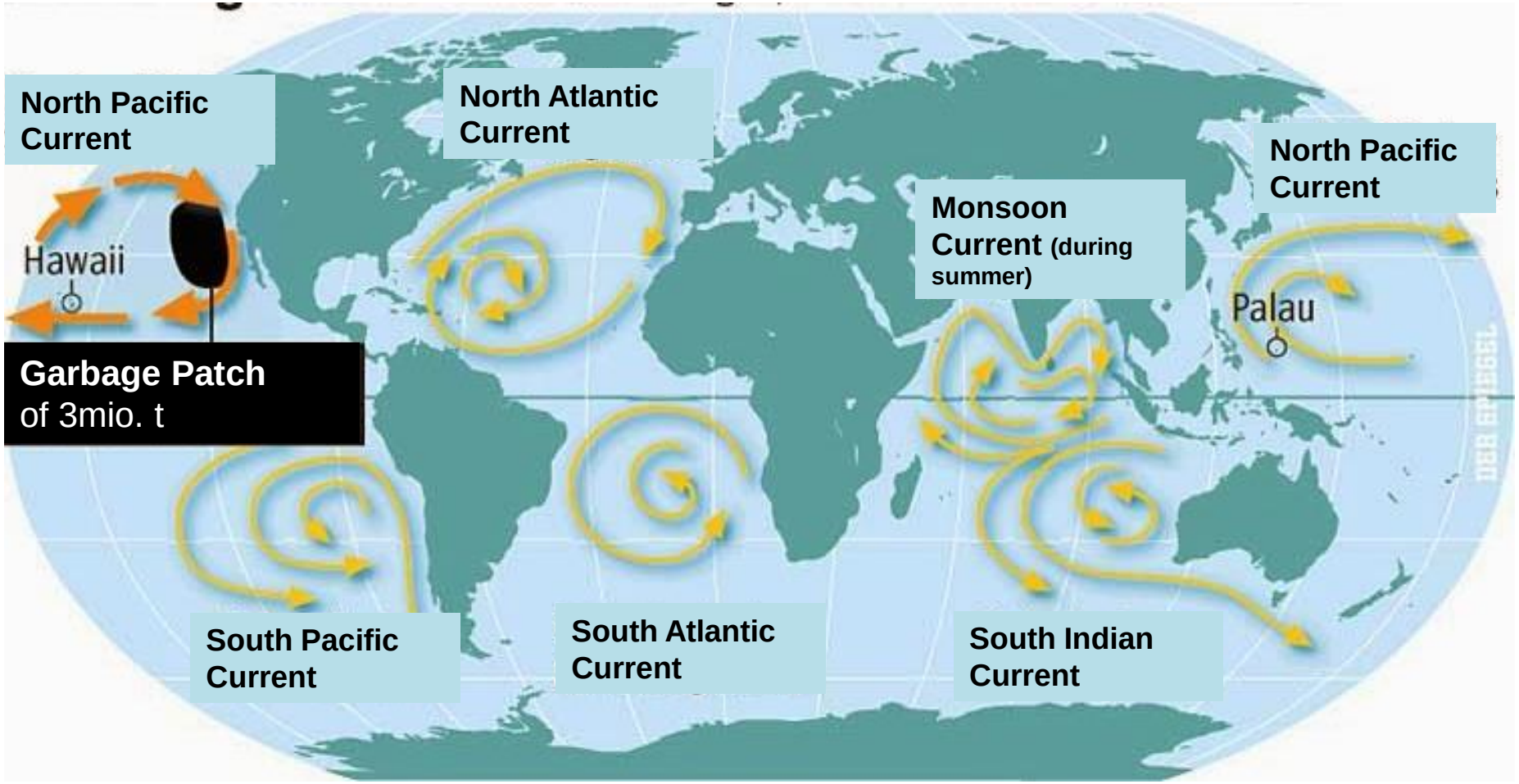
Cradle To Grave Design Paradigm

cradle to cradle

EPEA

CRADLE TO GRAVE DESIGN PARADIGM

Great Pacific Garbage Patch covers an area as big as Central Europe



http://stefanseite.blogspot.de/2013/12/sechs-mal-mehr-plastik-als-plankton-im.html

Death in Plastic Soup

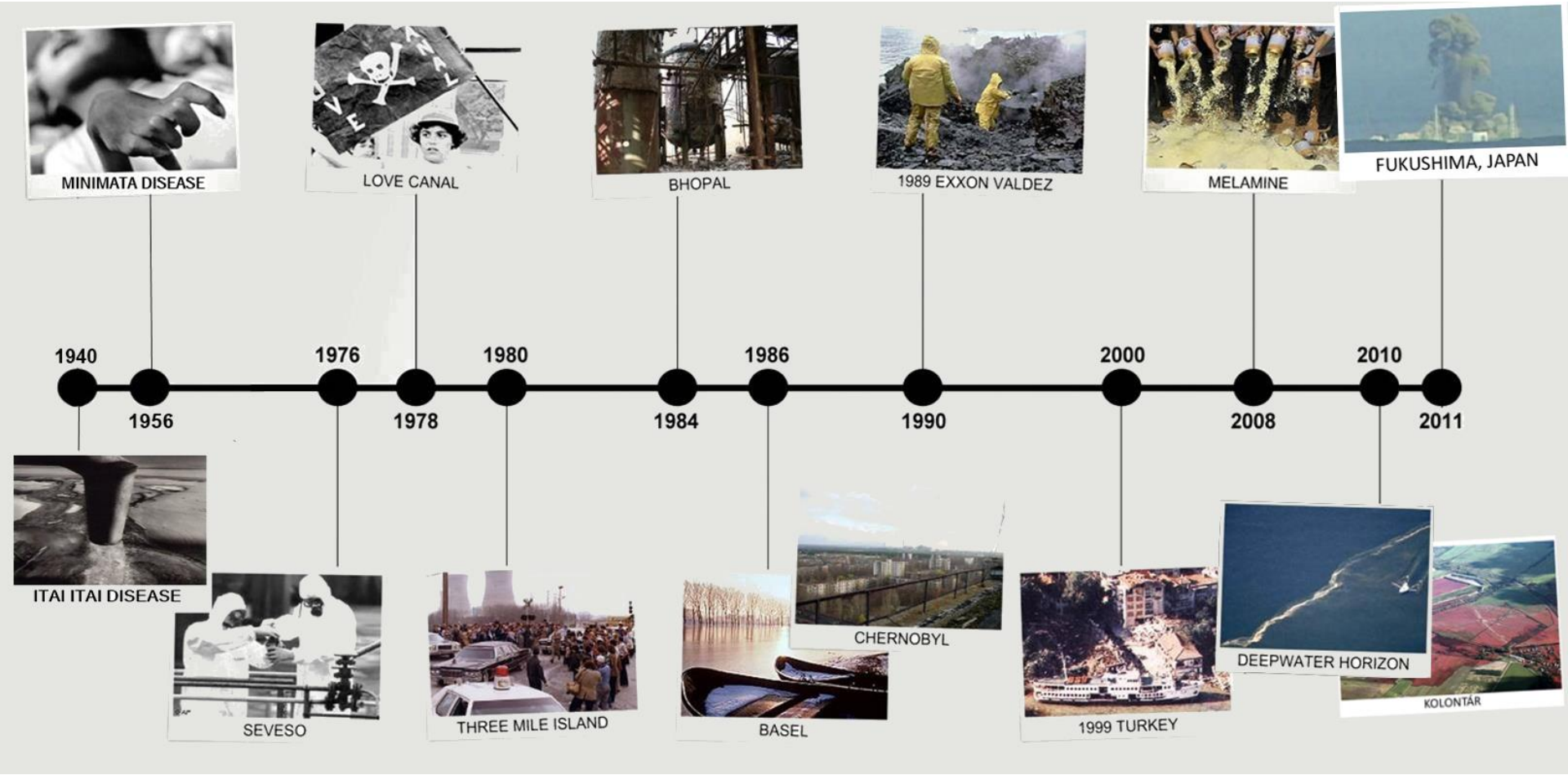
The proof is found in the stomach of seabirds: plastic pollution of the oceans has now reached the Northwest coast of Canada, which until just recently was considered one of the last unpolluted coasts. A Team of scientists "[…]" discovered plastic laces, Styrofoam, or plastic wrap in **92.5%** of the 67 fulmars found dead on the beach.

On average, 36.8 pieces of plastic were found per bird, and one even had 454 pieces in its stomach.

Source: Süddeutsche Zeitung No. 153 from Thursday, July 5th 2012, page 18

http://katha-kocht.de/austern-ganz-klassisch/

Environmental Disasters

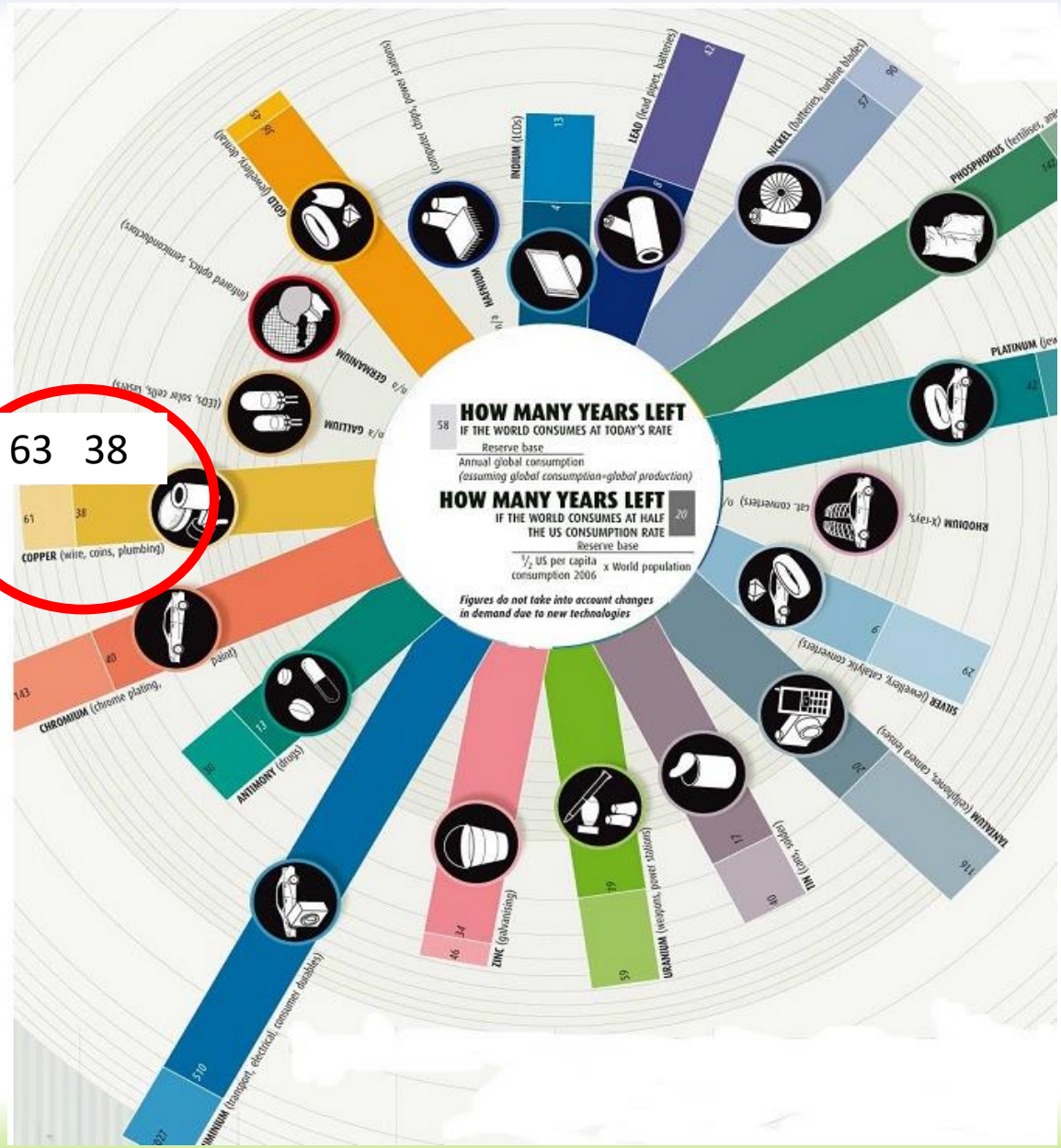



reduce, reuse, recycle
minimize your ecological footprint
zero emissions
reduce consumption
sustainable
green
carbon - neutral
energy - efficient
simply useless

We do not have an energy-problem.

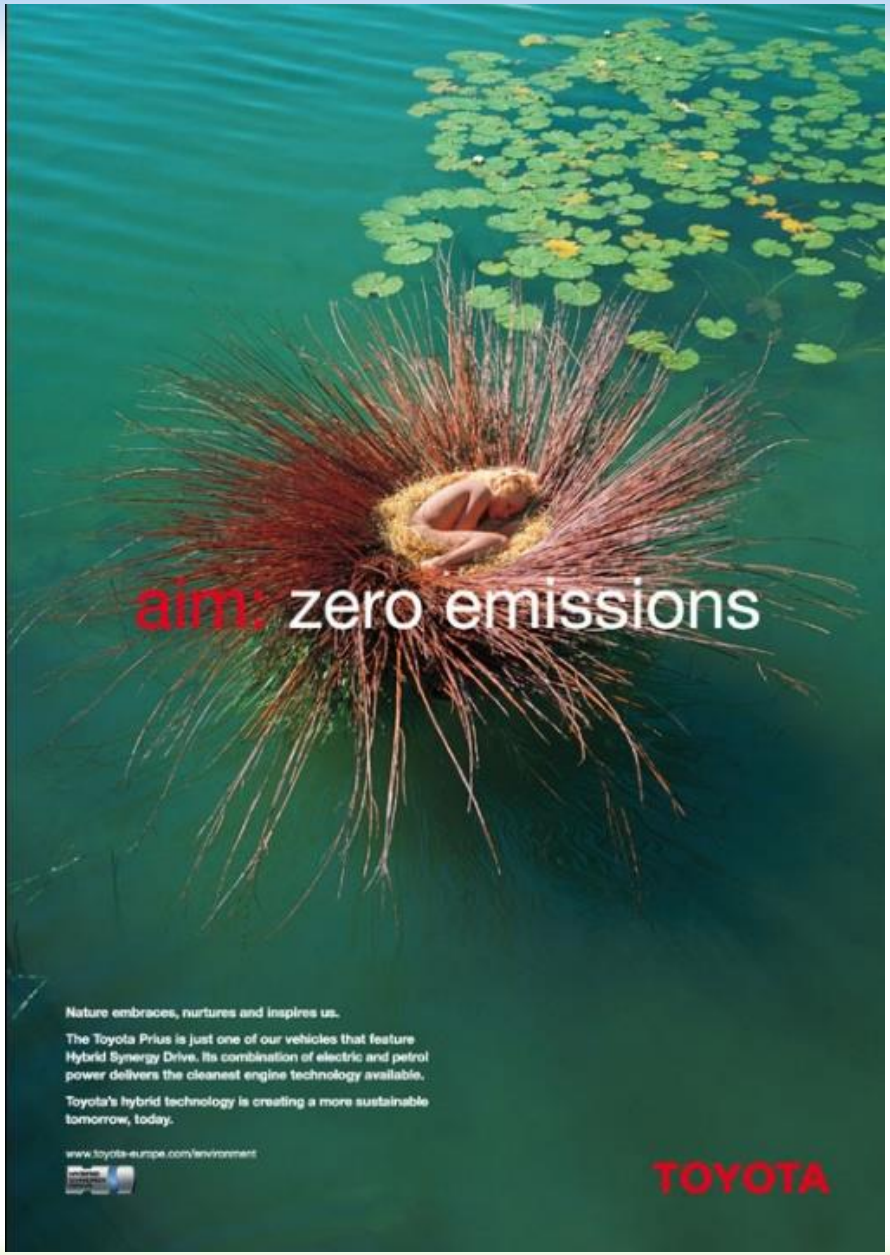
But limited natural resources!

Scarcity of Resources



cradle to cradle

EPEA



http://www.welovead.com/en/works/details/e65xkloB

aim: zero emissions

cradle to cradle

EPEA

Ecoefficiency Has Limits

You Want Your Customers As Friends Not Enemies


www.businessweek.com
BusinessWeek
JUNE 5, 2000
A PUBLICATION OF THE McGRAW-HILL COMPANIES
IS YOUR OFFICE KILLING YOU?
The dangers of sick buildings
By Michelle Conlin
PAGE 114

Off-Gassing Cromatogram: Wallpaper

cradle to cradle

EPEA

Off-Gassing: Toy, Batman

```
File       : C:\DATEN\EPEA\12204057\003A.D
Operator   : Ostrop
Acquired   :  4 Oct 2012  14:00      using AcqMethod SCREEN40
Instrument :   ALGE GCD
Sample Name: 12204057-002
Misc Info  : 34 L, 30 min, 60 Grd.
Vial Number: 6
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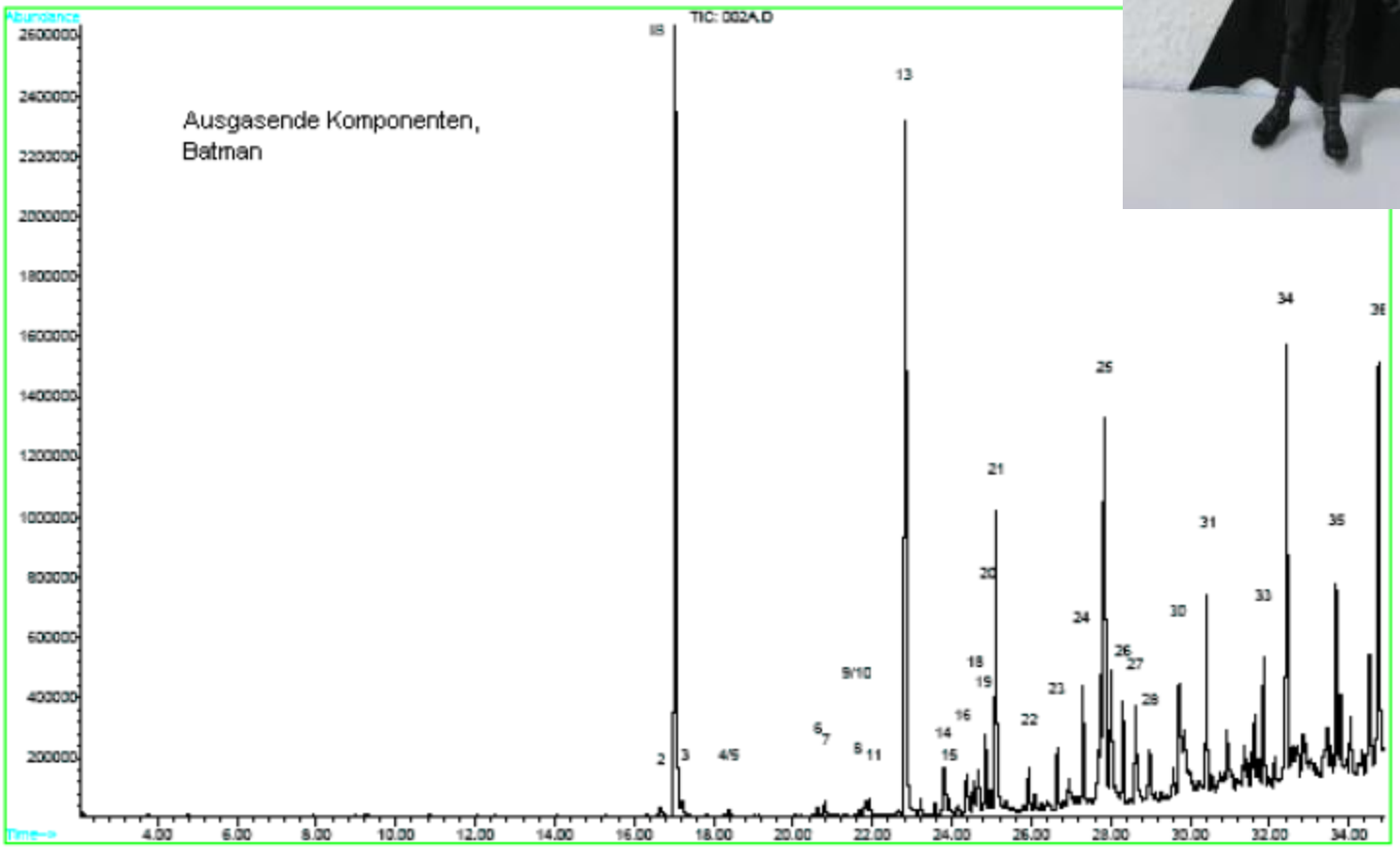


DETOX: IS IT A SOLUTION?

„Free of …“ leads to

Revision of recipes for getting rid of first excluded chemicals today

Repeating the operation one year later for 20 additional chemicals ?

Again and again ?

What is the quality at the end?

Example: yoghurt pots

How many different ingredients?

Coatings, Pigments and PVC

Lid:

Aluminum
Printing inks
Top Coat
Primar
Sealing wax
Binder
Pigments
Photoinitiators
Additives

http://www.bild.de/ratgeber/verbrauchertipps/recycling/fg-35094438.bild.html, picture alliance

Cup:

Plastics
Additives
Pigments
Filler
Label
Printing inks

More than 600 different chemicals used for one yoghurt pot!

Not welcome on the planet?



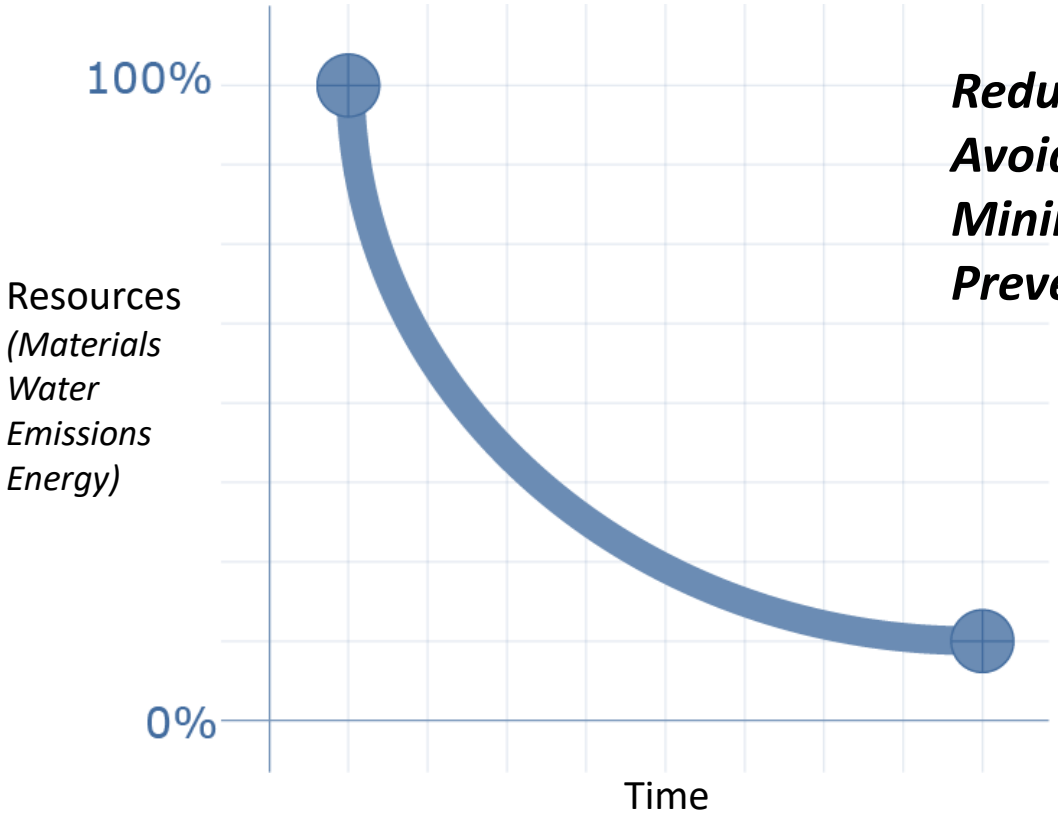
Are we too many?

…are <u>they</u> too many?

cradle to cradle®

EPEA

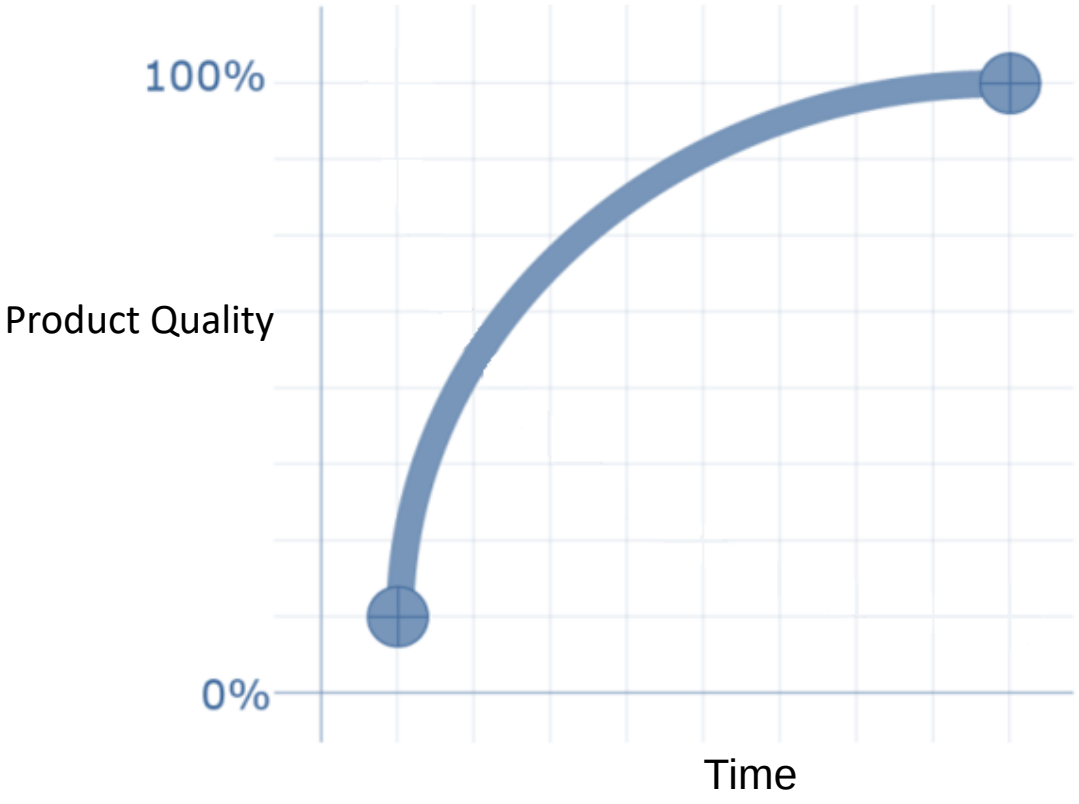
Cradle to Grave: target is zero harmfulness



Reduction
Avoidance
Minimization
Prevention

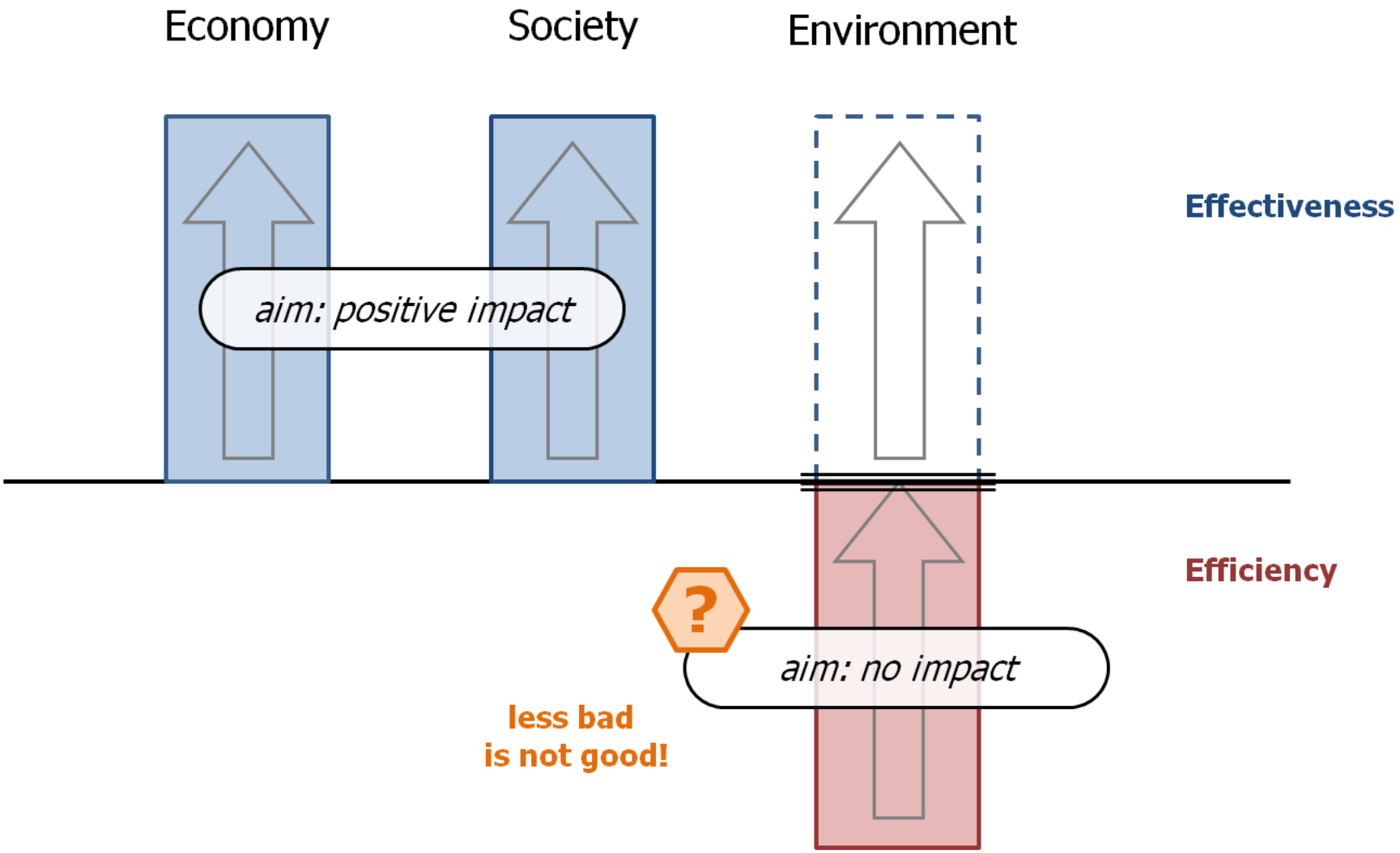
ECO-EFFICIENCY

Cradle to Cradle®: target is all-encompassing quality and usefulness

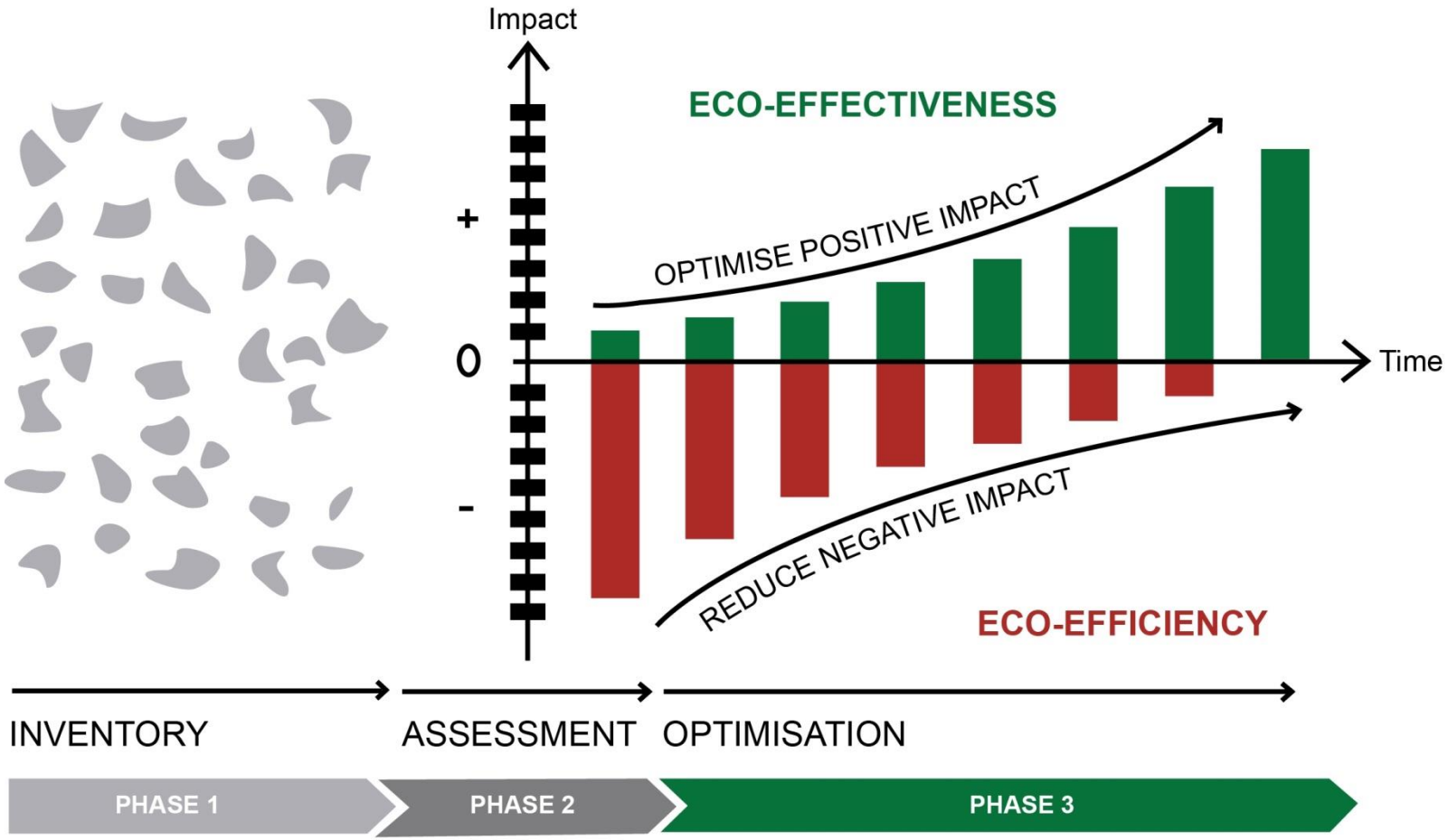


ECO-EFFECTIVENESS

Why Aim For Zero?



Cradle to Cradle® DESIGN PROCESS



The Journey To Positive Impacts

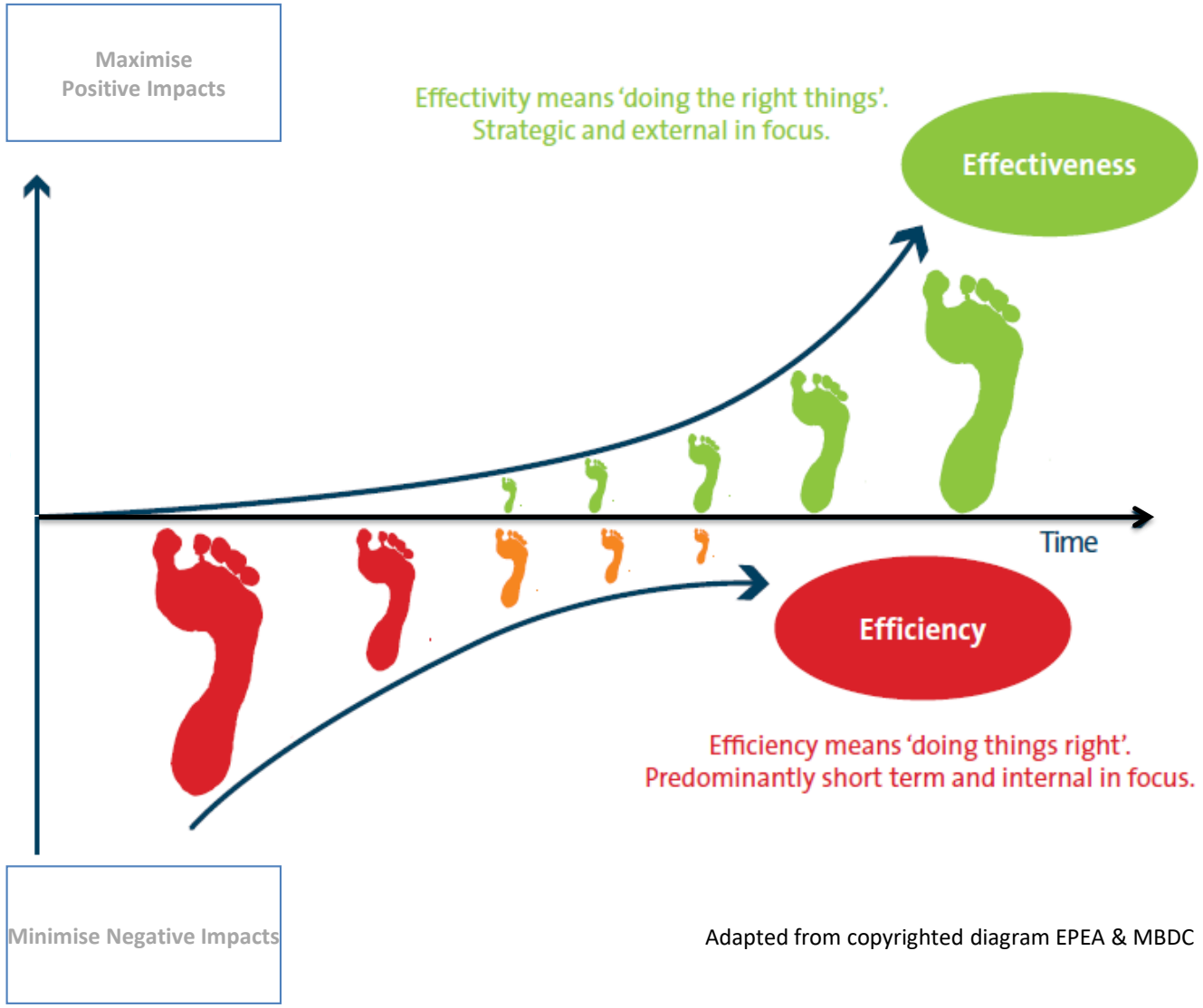
RETHINK
Innovation New Uses

REUSE
with high quality

UPCYCLE
Quality Improvement

RECYCLE
Downcycling

REDUCE
Incremental Reduction

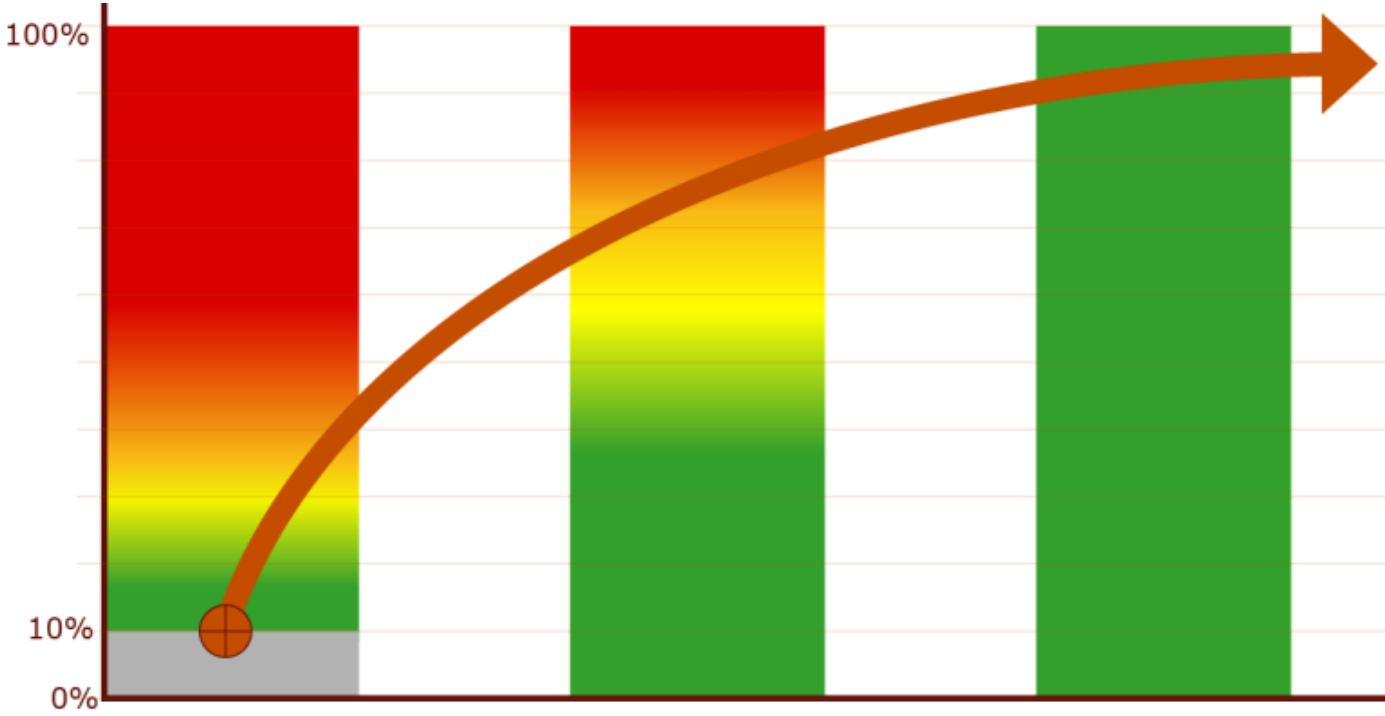


Adapted from copyrighted diagram EPEA & MBDC

cradle to cradle

EPEA

Progress of quality from Cradle to Cradle® with time



Clients & suppliers regard themselves as partners, aiming for the highest qualities

Cradle to Cradle®: doing the right things!

Doing things right

Doing the right things!

Eco-Efficiency

Rearranging the deck chairs on the Titanic

POSITIVE IMPACTS!

- ✓ Absorbs CO_2
- ✓ Produces Oxygen
- ✓ Produces biomass
- ✓ Supports biodiversity
- ✓ Provides habitat
- ✓ Filters the air
- ✓ Makes soil

Cradle to Cradle Principles



Nutrients = Nutrients



Use Current Solar Income

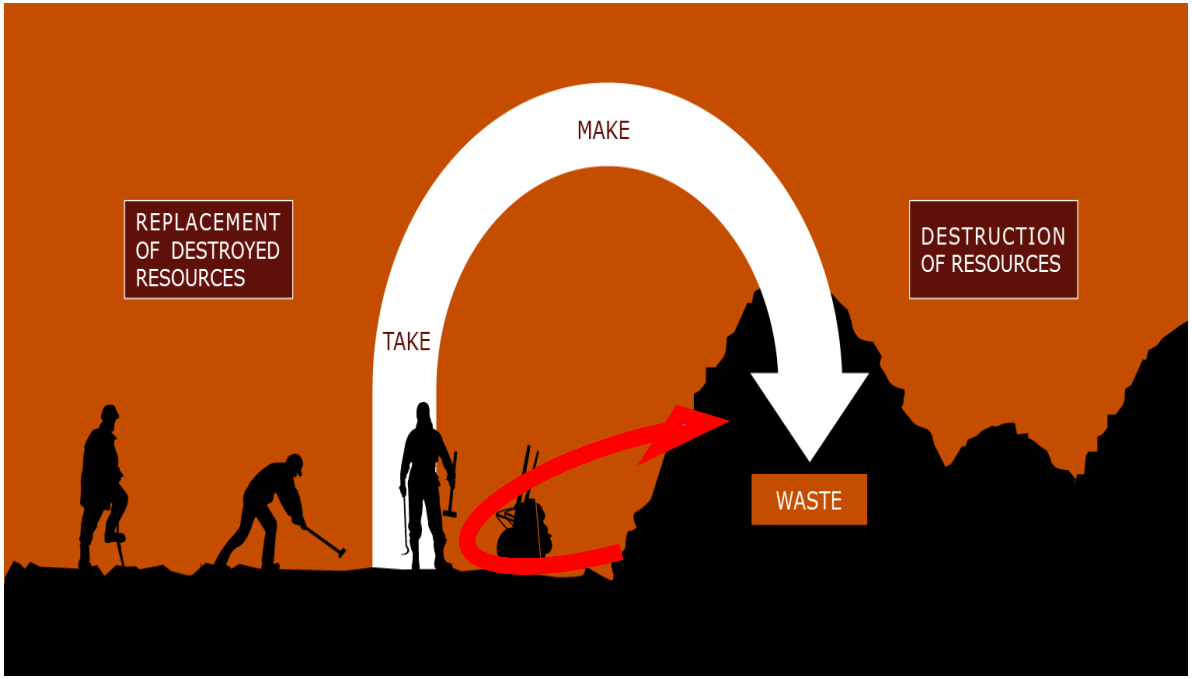


Celebrate Diversity

cradle to cradle

EPEA

Most Recycling Is Still Cradle To Grave



Recycling = Downcycling

Downcycling = Poor quality

Poor Quality = Poor products

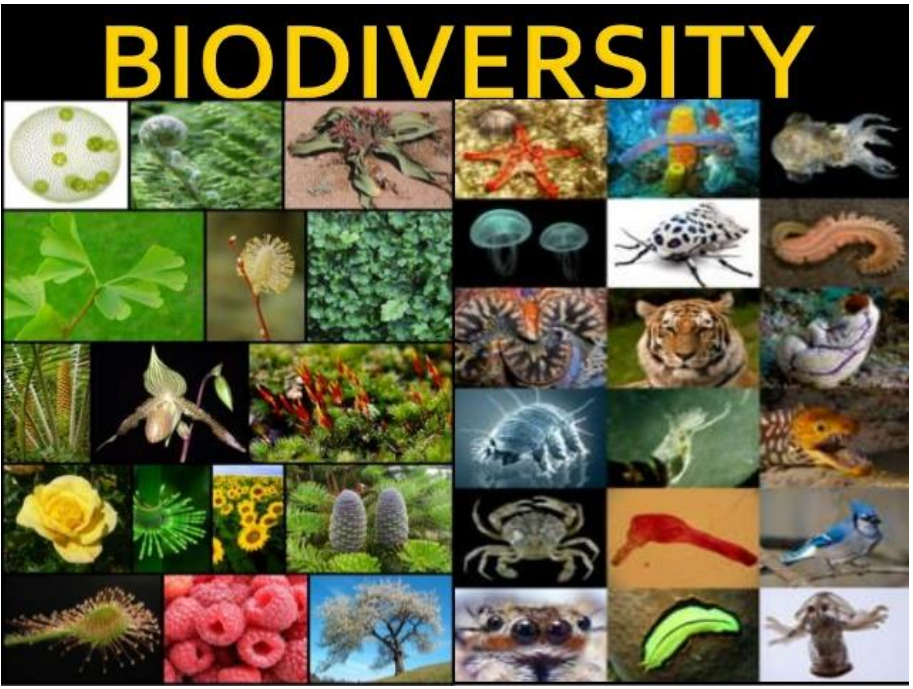
Renewable Energy vs. C2C Energy

More than just wind power - what materials are used and can they be a resource for something else? Is energy storage combined with generation?

More than just solar power - SunPower solar panels.

C2C certified for resource re-use;
potential for multiple land-use, potential for energy storage

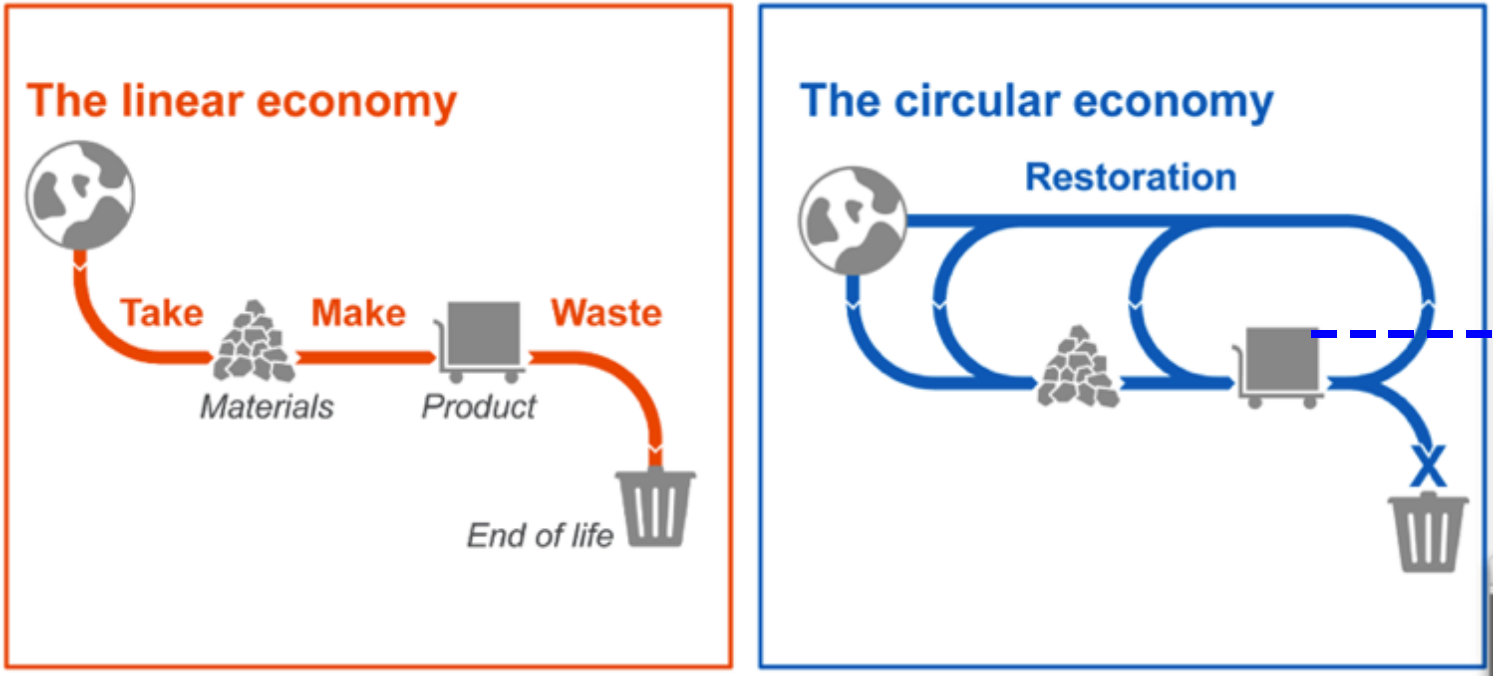
Diversity



Cultural Diversity

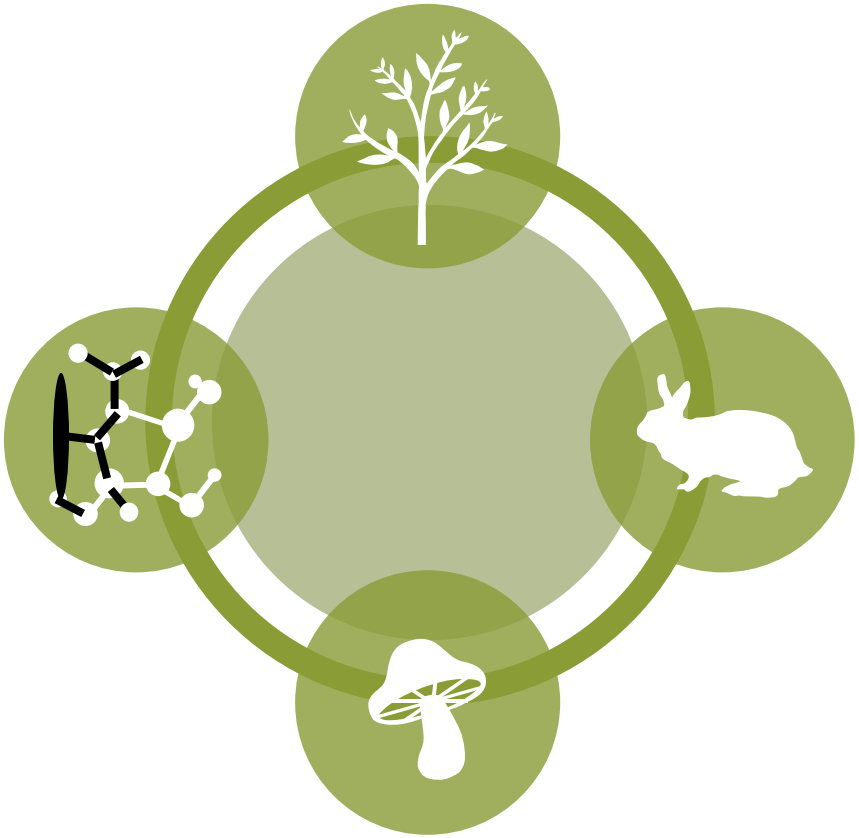
Conceptual Diversity

C2C Is The Most Effective Way To Get From Here To There

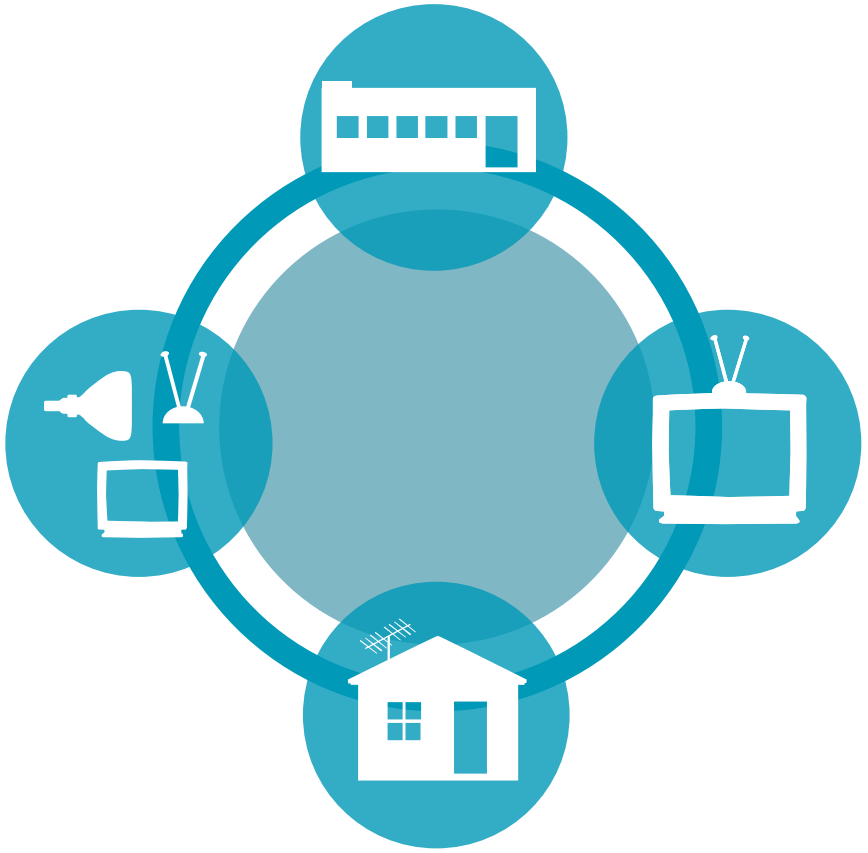


Source: Desso

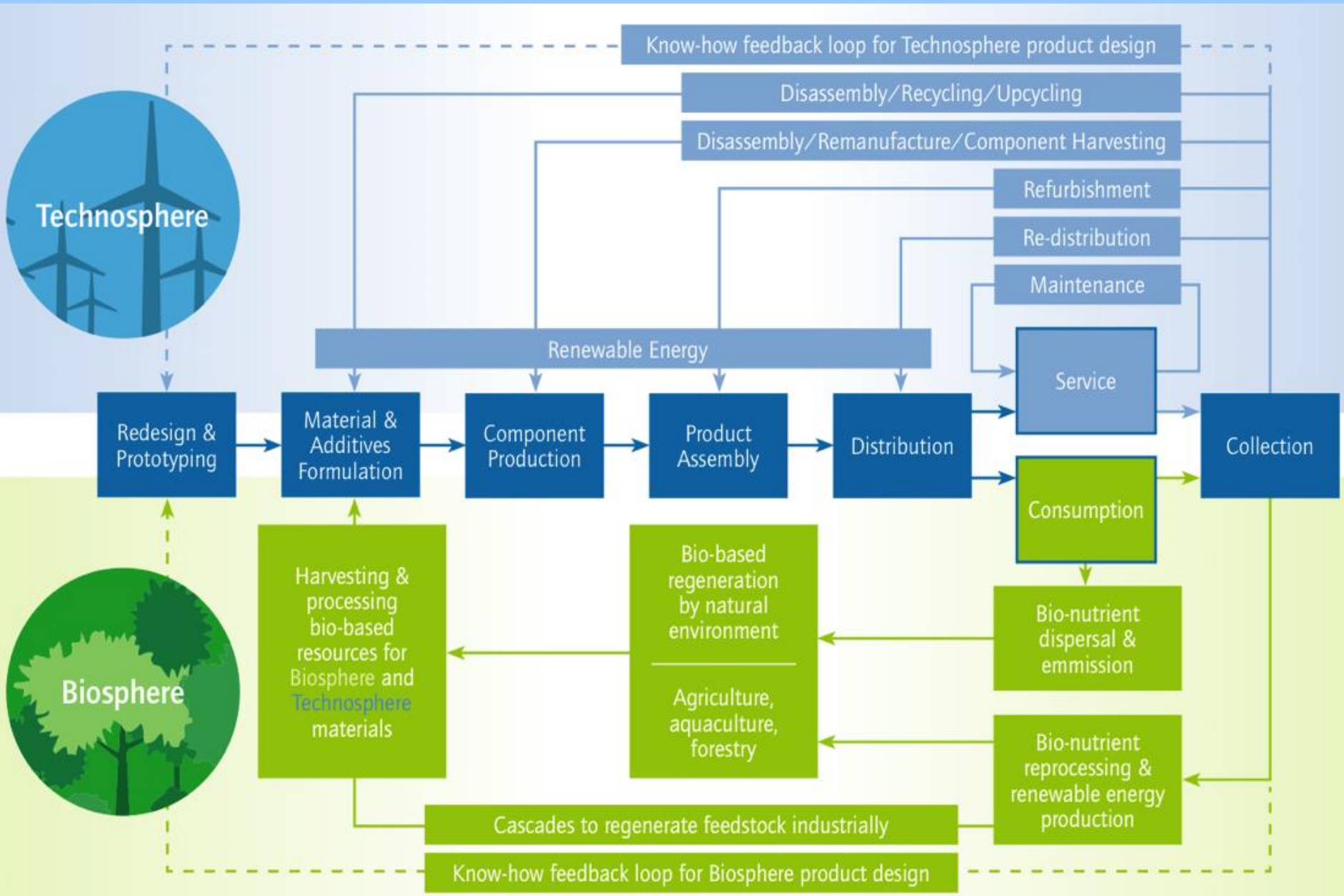
KH



Biological
Metabolism



Technical
Metabolism



cradle to cradle

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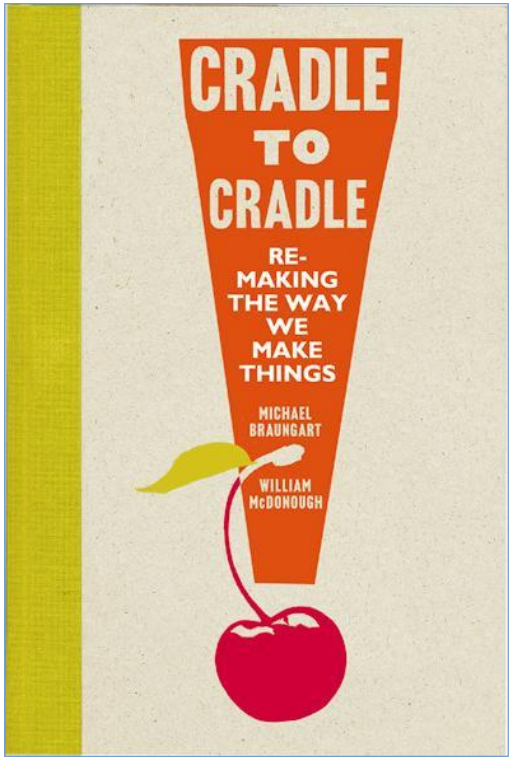
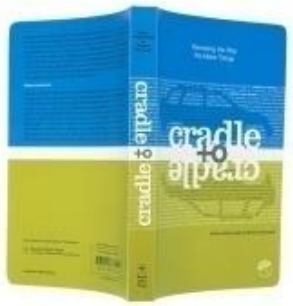
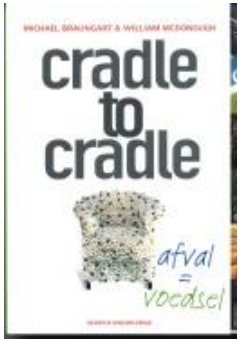
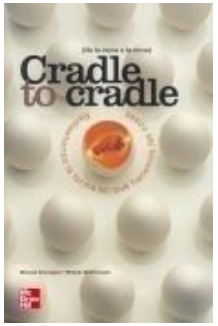
Cradle to Cradle®: Remaking the way we make things









cradle to cradle®

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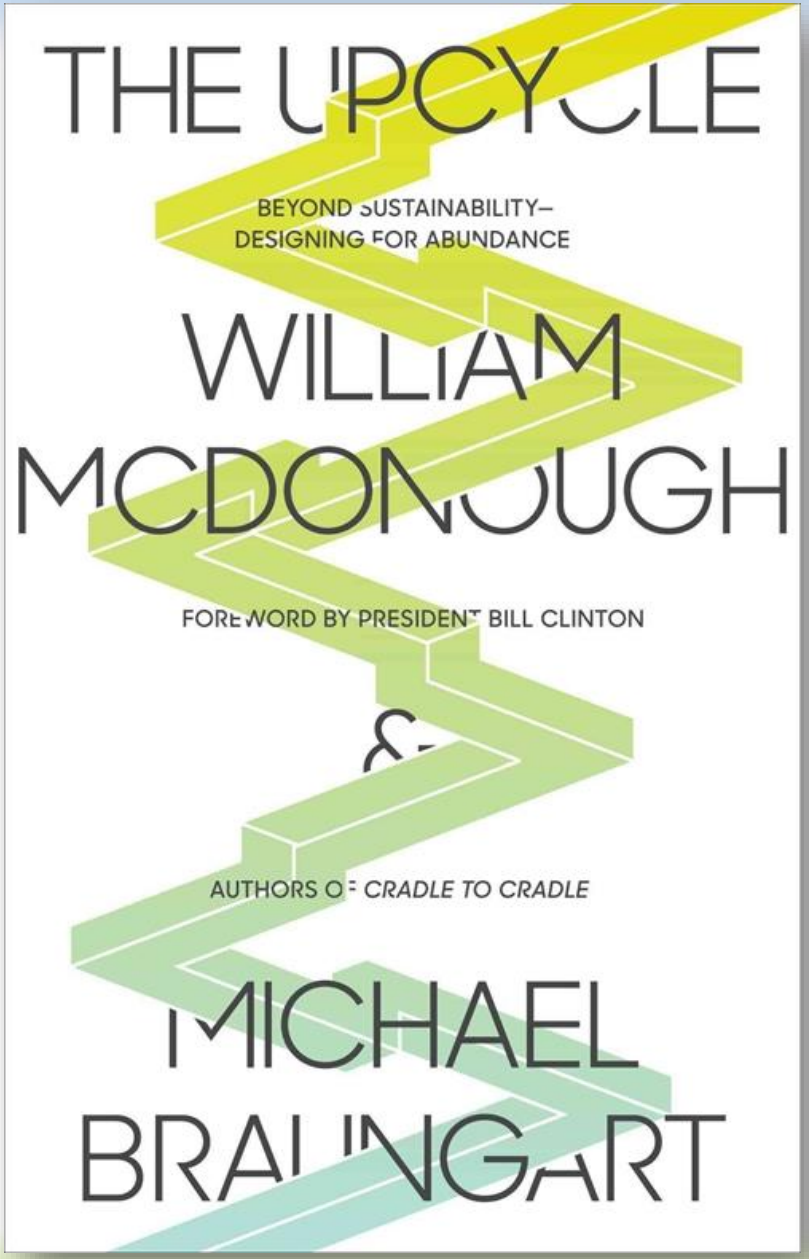

THE UPCYCLE
BEYOND SUSTAINABILITY–
DESIGNING FOR ABUNDANCE
WILLIAM
MCDONOUGH
FOREWORD BY PRESIDENT BILL CLINTON
&
AUTHORS OF CRADLE TO CRADLE
MICHAEL
BRAUNGART

Brainstorming:

How could C2C work in SMEs?

(in 2 groups)

Cradle to Cradle Methodology & Criteria

EPEA Internationale Umweltforschung GmbH

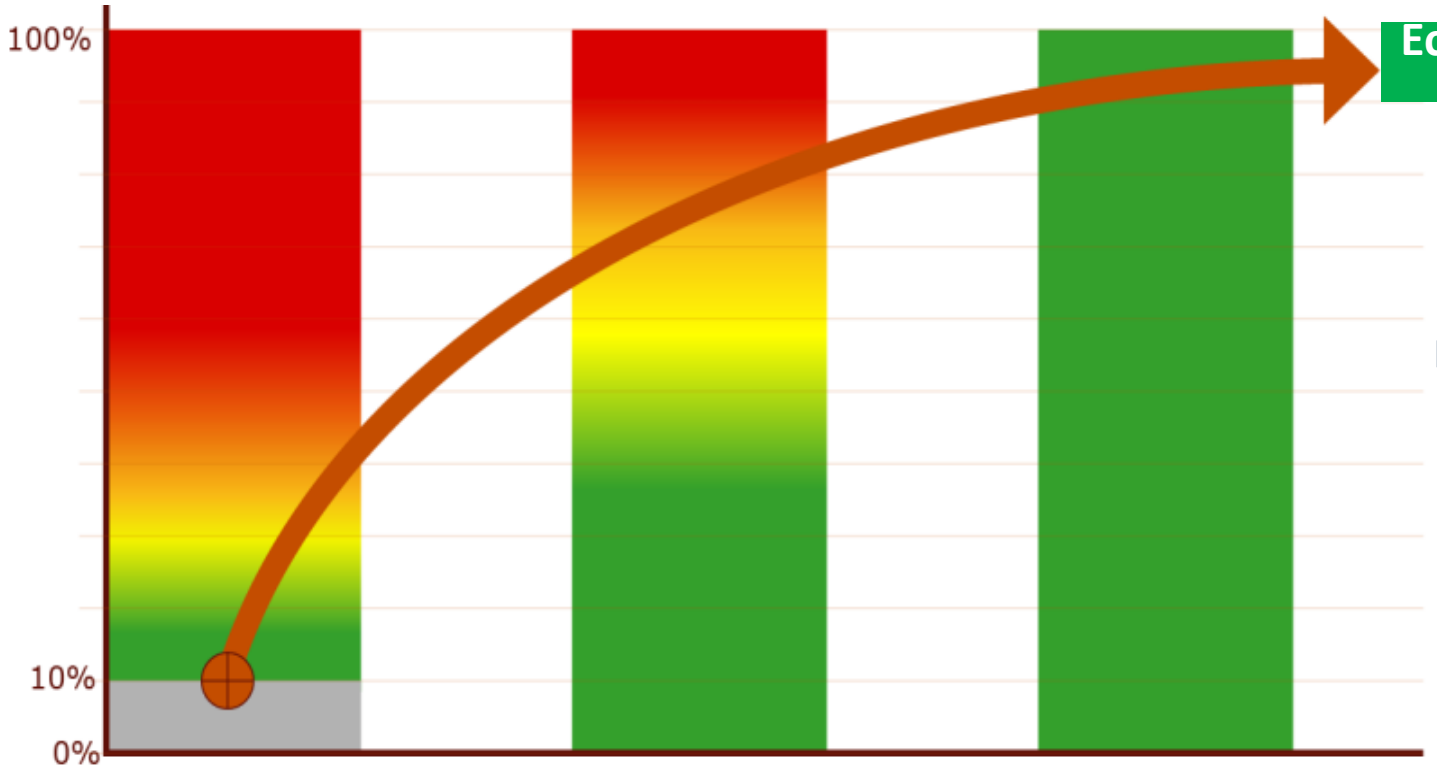
Jenny Pfau

Geoecologist & Building Biologist IBN

& PermacultureDesigner

Cradle to Cradle ® - Inspired by Nature

Progress of Quality



Clients & suppliers regard themselves as partners, aiming for the highest qualities

Which criteria should be fulfilled?

Is it safe for Use?

- Safe for Skin Contact?
- Chewing?
- Inhaling?

Colored synthetic fibres

The new cupboard is smelling like glue and colorants?

Is it safe for Use?

- Safe to keep Foodstuff?

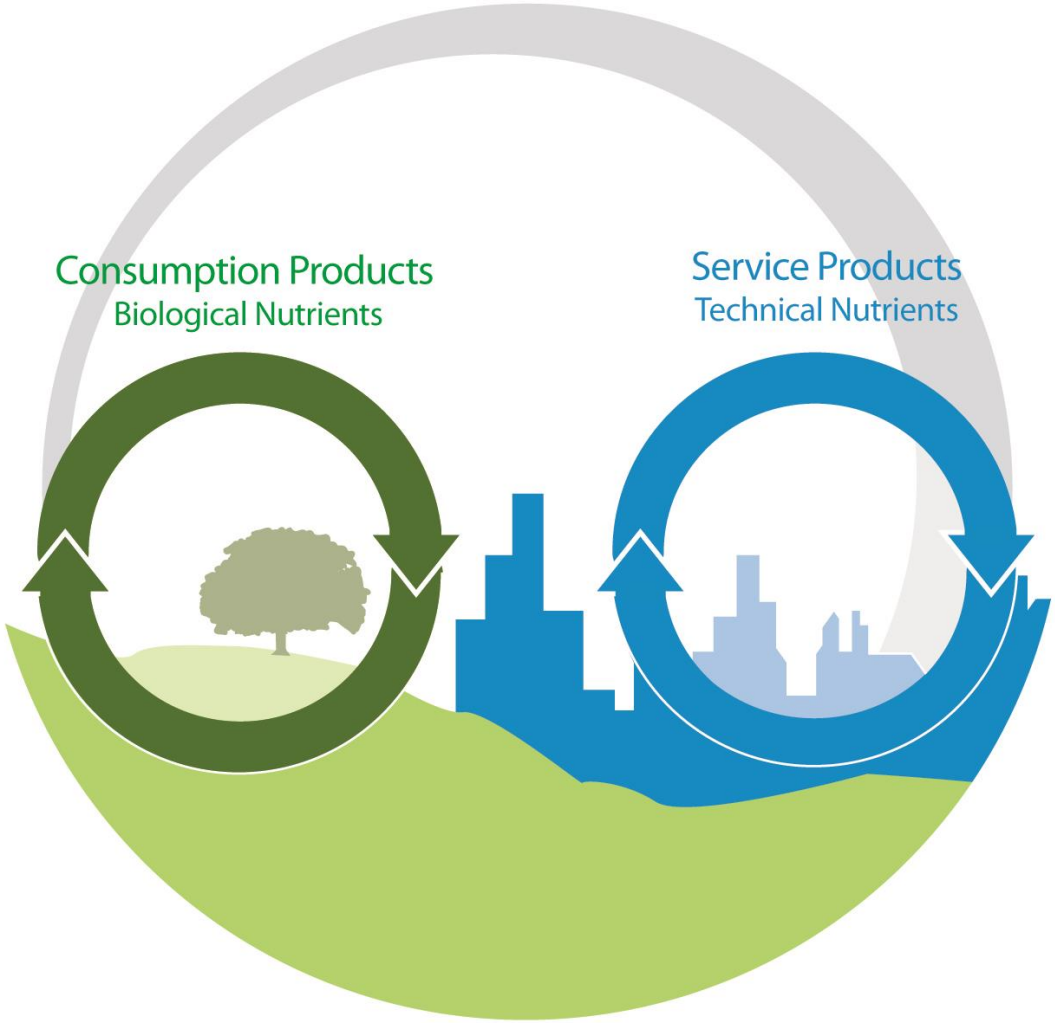
- Beverages?
- Toxic Materials: endocrine disruptors, cancerogenic, mutagenic, teratogenic…

Antimon?

BisPhenol A?

Is it safe for our Environment?

Chemicals are directly released into our environment


Consumption Products
Biological Nutrients
Service Products
Technical Nutrients

Definition of a CRADLE TO CRADLE® Metabolism Scenario

Consumption Product
(Materials enter the environment through diffuse processes during use)

Biological Cycle

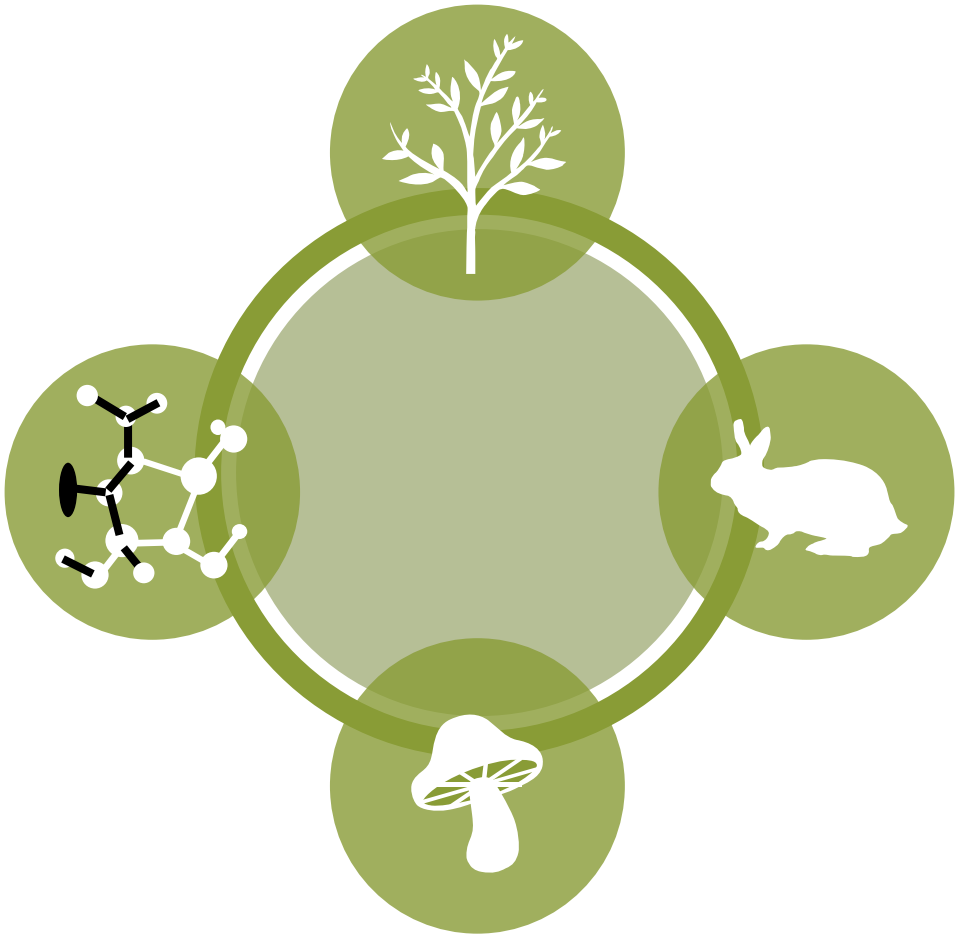
- Is made from renewable resources
- Materials are nutrients in the environment enabling production of new resources
- Is non-toxic or beneficial to humans or ecosystems along the biological cycle

Service Product
(No relevant material flows during use of the product)

Technical Cycle

- Necessary for non-renewable resources
- Materials flow in industrial systems and are nutrients for the production of new products of same or higher quality
- Is non-toxic or beneficial to humans or ecosystems along the technical cycle (e.g. due to deficits)

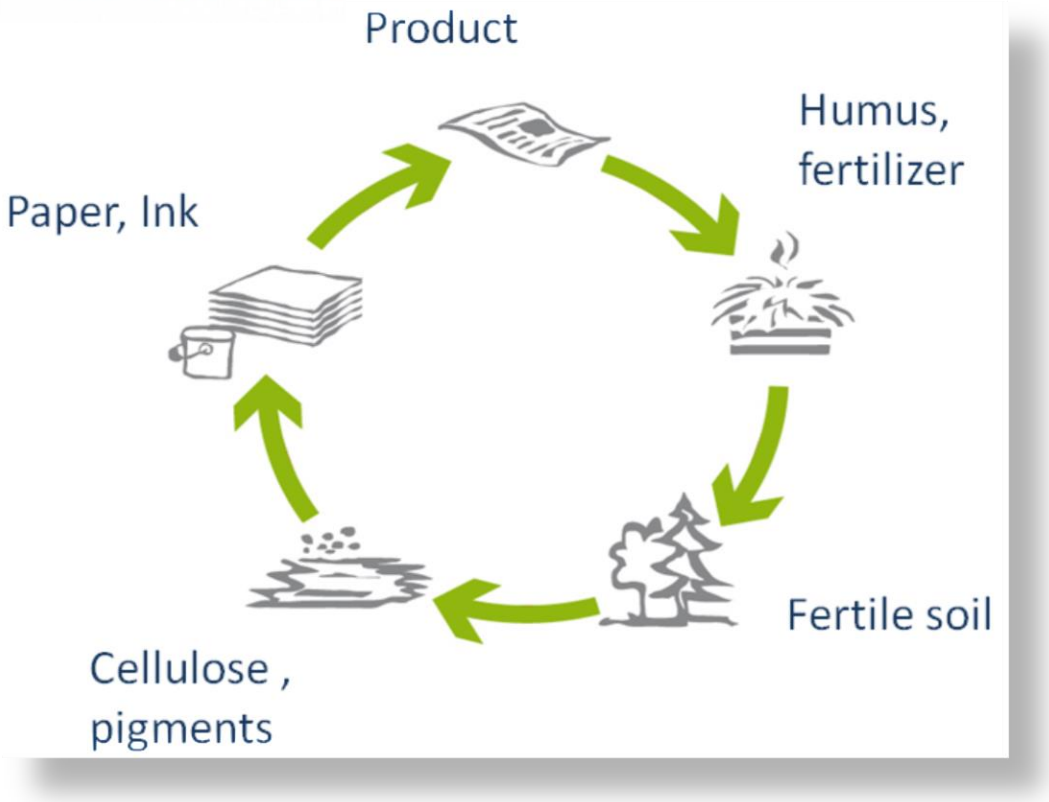
Product examples



Biosphere

Paper

gugler* cross media



van Gansewinkel

océ

STEINBEIS
Papier mit besten Werten

Printing inks: Marabu

In Kooperation mit:
Marabu GmbH & Co. KG
71730 Tamm

Marabu

Compostable or combustible printing inks

cradle to cradle

EPEA

Paper

VanHoutum

CERTIFIED
cradle to cradle
SILVER

Satino
BLACK
IT'S SO EASY TO GO GREEN

cradle to cradle

EPEA

Textile

backhausen
interior textiles

Trigema
SILVER

CERTIFIED
cradle to cradle
SILVER

WORLDS FIRST CRADLE TO CRADLE®
CERTIFIED COTTON WORKWEAR

wet-green®
Natural Leather Solutions

cradle to cradle

EPEA

Textile

climatex®
GESSNER AG

CERTIFIED
cradletocradle
SILVER

Gabriel®
Gaja C2C

Quelle: http://c2ccertified.org/index.php/products/scorecard/climatex_lifeguard

Quelle: http://c2ccertified.org/images/made/images/product_images/lifecycle_270_180_c1_0_0.jpg

cradle to cradle

EPEA

Health & Beauty

AVEDA

THE ART AND SCIENCE OF PURE FLOWER AND PLANT ESSENCES

VanHoutum

O'right

method

vendor

WASHROOM HYGIENE

cradle to cradle

EPEA

Home & Office Supply

method

Cradle to Cradle Certified GOLD

GREEN CARE PROFESSIONAL CLEANING & CARE RANGE

tana-Chemie GmbH and Werner & Mertz Group

Certification Standard Version 3.0

tana PROFESSIONAL schafft den Unterschied

ECOVER

Frosch MARKE

Cradle to Cradle Certified SILVER

ADD CIP 15 - ECO-POINT INTERNATIONAL B.V.

Eco-Point International B.V.

Certification Standard Version 2.1.1

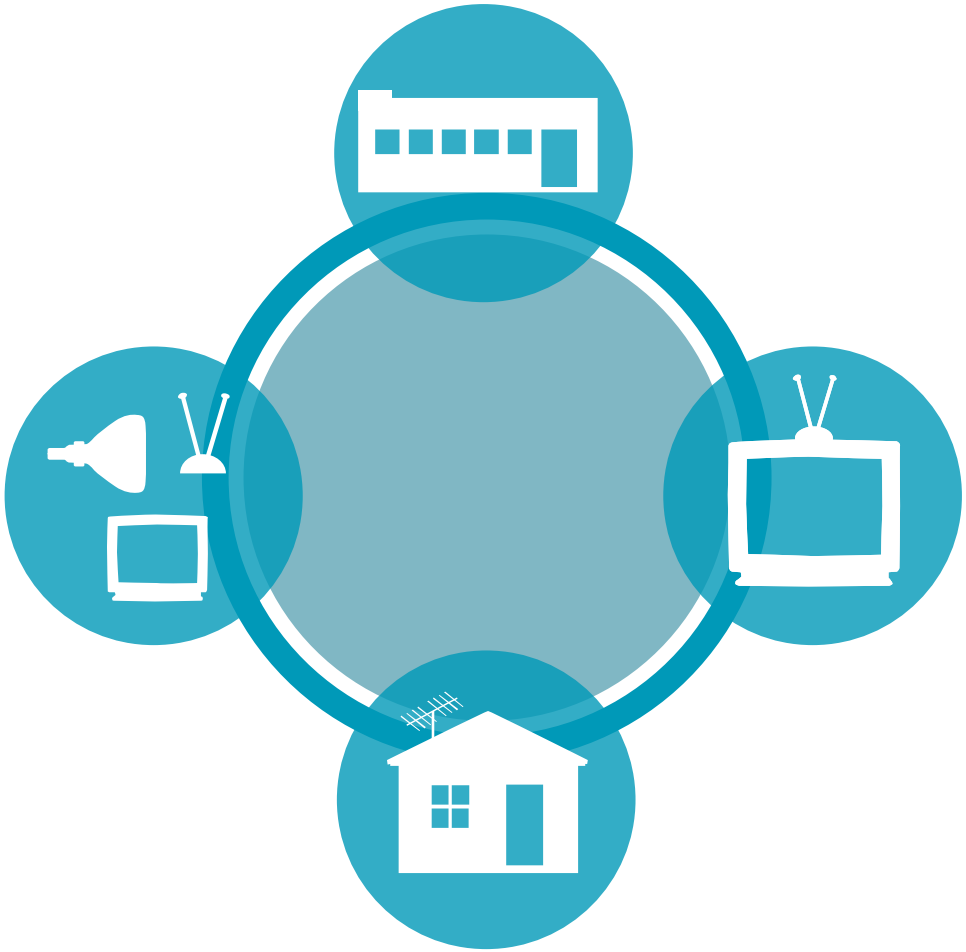
PRODUCT WEBSITE

replenish

cradle to cradle

EPEA

Product examples



Technosphere

Toys

Gustav the first Cradle to Cradle® Cuddly toy

✓Material optimisation
✓Cradle to Cradle certified (Basic level)

Floors

DESSO

The Floor is Yours

Tarkett

Furniture

ahrend

giroflex
designed to work

Herman Miller, Inc.

Packaging

ArdaghGroup

year of the can 2010

Ball

cradle to cradle

EPEA

Packaging

Cradle to Cradle Certified SILVER

INCA PRESSWOOD PALLETS - LITCO INTERNATIONAL, INC.
Litco International, Inc.

Certification Standard Version 2.1.1

FOODSERVICE PACKAGING
Be Green Packaging, LLC

Certification Standard Version 2.1.1

PRODUCT WEBSITE

Cradle to Cradle Certified SILVER

MICRO-PAK® PE SHEET
Micro-Pak Ltd.

Certification Standard Version 2.1.1

PRODUCT WEBSITE

Cradle to Cradle Certified SILVER

220 L / 55 US GAL. PLASTIC TIGHT HEAD DRUM - MAUSER WERKE GMBH
Mauser Werke GmbH

cradle to cradle

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Building Materials

STRUCTURAL BUILDING MATERIALS — Gold V2.1.1

ACCSYS TECHNOLOGIES PLC

Accoya® Wood (Radiata Pine & Alder)

Accoya® is a world leading high technology wood with properties that surpass the best tropical...

MORE INFO »

BUILDING EXTERIORS — Gold V2.1.1

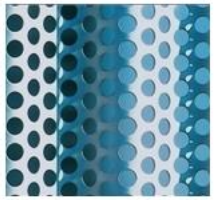
HIGHLAND CRAFTSMEN

Bark House® Poplar Bark Shingle Siding and Wall...

Bark House® shingle siding was the first product HC® developed in 1990. We are the original...

MORE INFO »

BUILDING EXTERIORS — Gold V2.1.1



CENTRIA

EcoScreen

CENTRIA offers exterior perforated screenwall panels using Econolap 3/4", Style-Rib, and BR5-36 in 20...

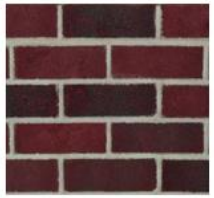
MORE INFO »

GARDEN & LANDSCAPE — Silver V2.1.1

VAN HELVOIRT GROENPROJECTEN BV

Bomenzand+ (Tree-Terra)

CONCRETE, CEMENT, AND MASONRY — Silver V2.1.1



BORAL BRICKS, INC.

Boral Bricks

Boral® manufacturing plants are located across the southeast and southwest, and this geographic...

MORE INFO »

BUILDING EXTERIORS — Silver V2.1.1

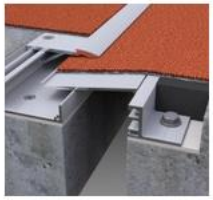
BORAL COMPOSITES

Boral TruExterior® Trim - Boral Composites

Boral TruExterior® Trim is a revolutionary new exterior trim product that combines superior...

MORE INFO »

SPECIALTIES AND MISCELLANEOUS APPLICATIONS — Gold V2.1.1



CONSTRUCTION SPECIALTIES, INC.

Expansion Joint Covers (Selected Models)

C/S offers a wide variety of expansion joint covers for seismic, thermal and wind sway applications...

MORE INFO »

INSULATION — Gold V2.1.1

BAUFRITZ-GMBH & CO. KG

HOIZ Insulation

The first sustainable natural insulation in the world, made from wood chips "HOIZ" by Baufritz,...

MORE INFO »

CONCRETE, CEMENT, AND MASONRY — Gold V2.1.1

HYCRETE TECHNOLOGIES

Hycrete Admixtures - Hycrete Technologies

Hycrete admixtures for concrete shut down capillary transport of water and chlorides through concrete...

MORE INFO »

ELECTRICAL — Silver V2.1.1

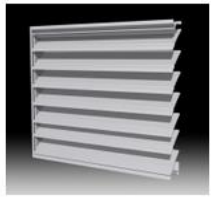
BYRNE ELECTRICAL SPECIALISTS

Byrne Power/Data Centers

Introducing an edgy solution to solve desktop power and data demands that takes your business where...

MORE INFO »

HEATING, COOLING, & VENTILATION — Silver V2.1.1



CONSTRUCTION SPECIALTIES, INC.

C/S Louvers

Conventional, Storm Resistant and Hurricane
(Anodized finish only)

DAYLIGHTING & SHADES — Silver V2.1.1

CONSTRUCTION SPECIALTIES, INC.

C/S Sunshades

Our Cradle to Cradle Silver certified C/S Cantilevered Sunshades not only look great on buildings,...

MORE INFO »

cradle to cradle®

EPEA

Architecture

Daas Baksteen: ClickBrick®

Cradle to Cradle Certified™ Silver

Wood Cube – Wilhelmsburg

Thoma
IMMER SCHON GEBORGENHEIT

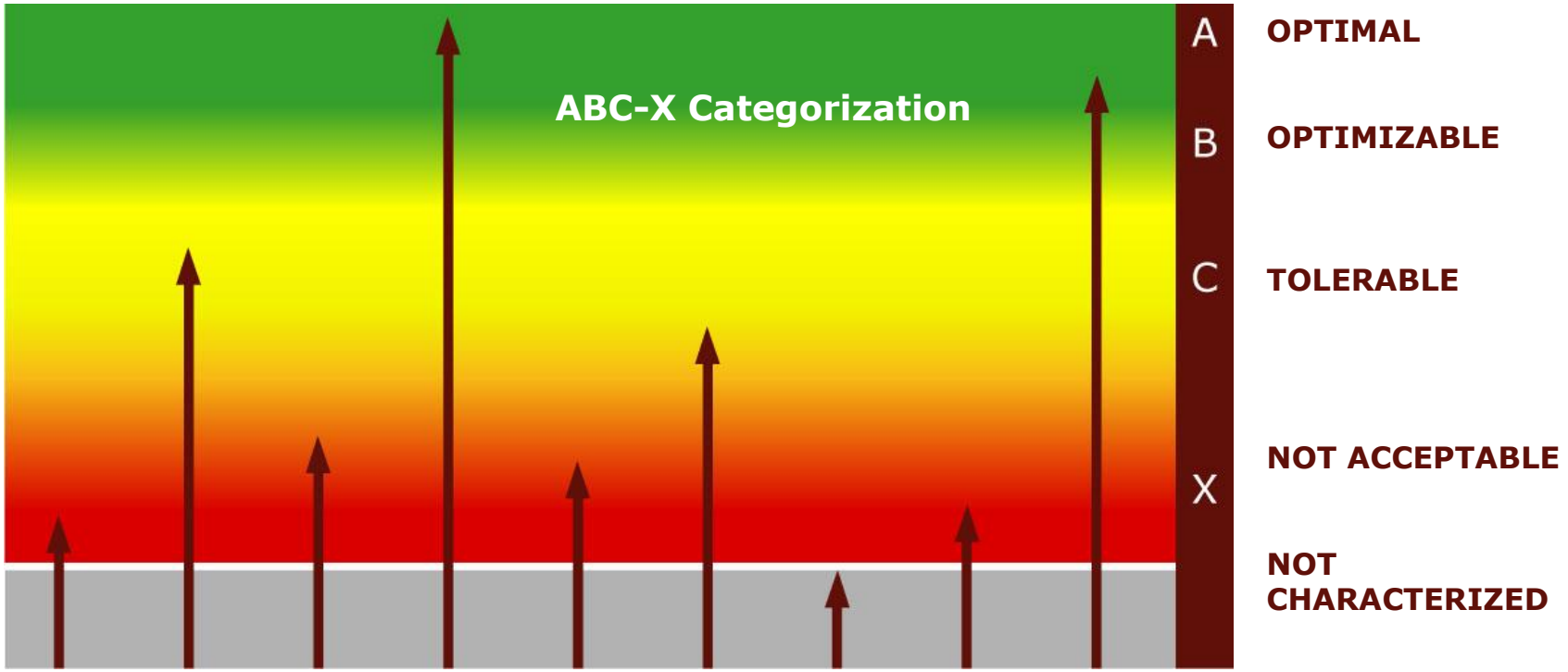
Cradle to Cradle Certified™ Gold

cradle to cradle

EPEA

CRADLE TO CRADLE DESIGN

Material Assessment Methodology


ABC-X Categorization
A
B
C
X
OPTIMAL
OPTIMIZABLE
TOLERABLE
NOT ACCEPTABLE
NOT CHARACTERIZED

NEEDED DATA FOR AN ASSESSMENT

- Composition of a product (BoM)
- Data/ Information of the Ingredients:

  Chemical Name

  CAS-Number

  Pigments: Color Index Number

→ **High Requirements!**

Definition of a CRADLE TO CRADLE® Metabolism Scenario

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(Materials enter the environment through diffuse processes during use)

Biological Cycle

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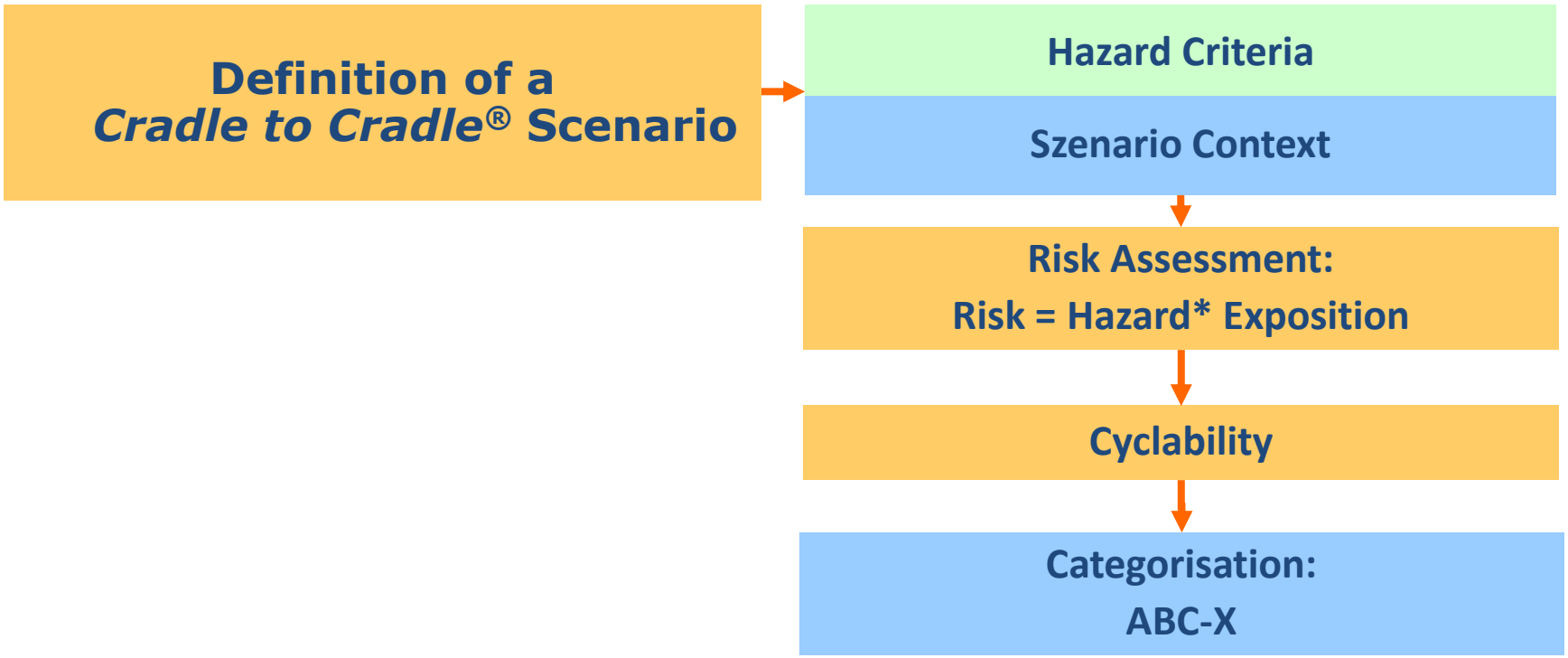
ABC-X Assessment Methodology (SIMPLIFIED)



ABC-X Assessment Methodology (SIMPLIFIED)

- **Material**
  Component
  Polymer + Additives
  Masterbatch
- **„Ingredient“**
  Monome
  Chemicals
- **„Component“**
  Polymer
  Chemicals
  - Colorant
  - Pigment

„Human Health“ Criteria

- Acute Toxicity (oral, dermal, inhalativ)
- Chronic Toxicity
- Skin Irritation
- Sensitation Potential
- Mutagenicity
- Cancerogenicity
- Reprotoxicity

„CMR“

- Endocrine Disrupter

ABC-X Assessment Methodology (SIMPLIFIED)

- Material
- „Ingredient“
- „Component“

Environmental Toxicity - Criteria

- Toxicity against
  - Fish
  - Daphnia
  - Bacteria
  - Algae
- Bioaccumulation/Persistence
- Biodegradation
- Potential of Ozone Layer Depletion

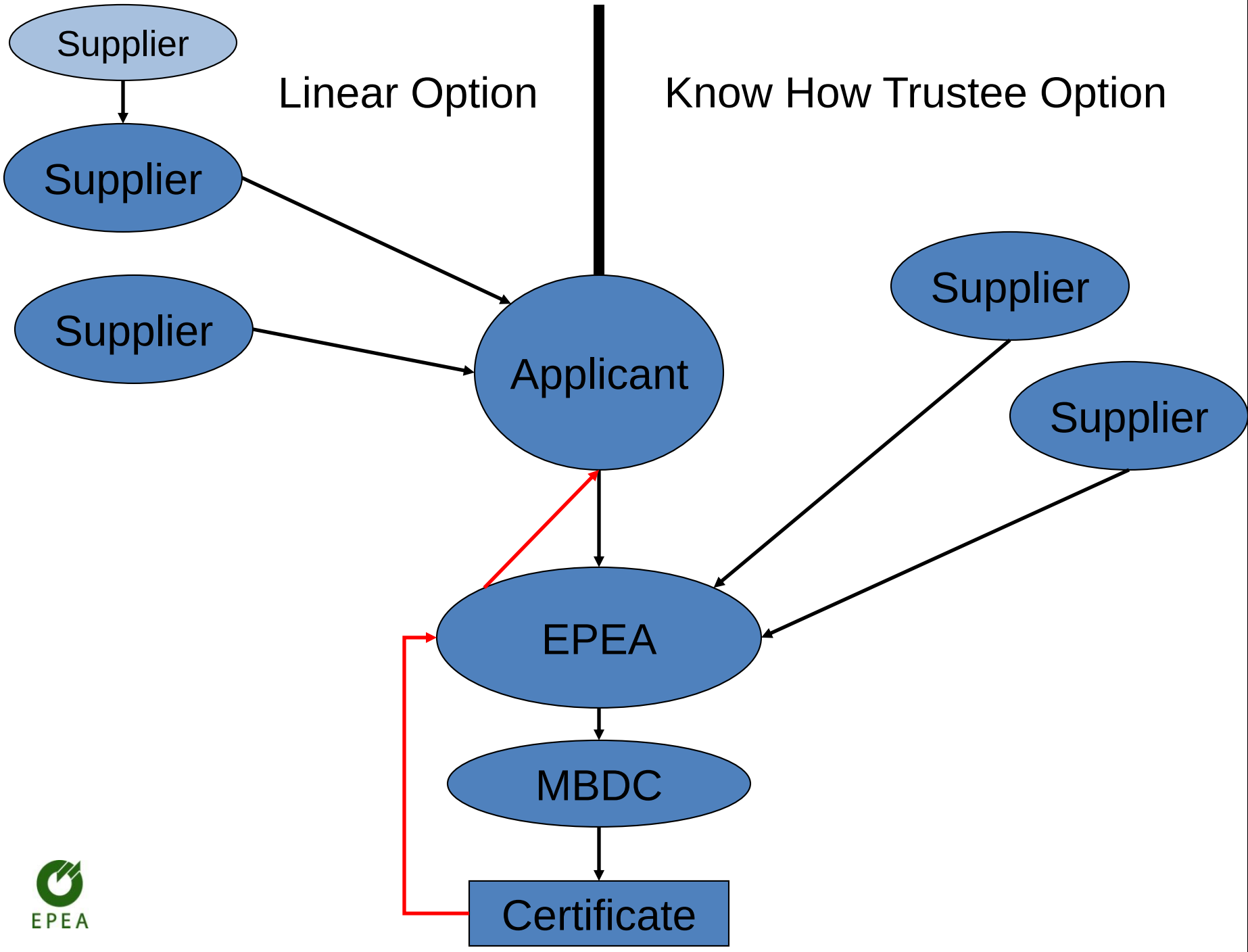
RESEARCH SOURCES

Basis of Data

- Evaluation of Supplier-Data and –information (like MSDS, SDS)
- Databases referring toxicological Information
- Chemical Analysis (like ICP-AES, GC-MS)

Examples of Hazard Rating Criteria

Criterion	Green	Yellow	Red
Carcinogenicity	Not known or suspected of being carcinogenic or TLV A5, IARC 4	Not classifiable as a human carcinogen or MAK III 3A, 4, 5	Known or suspected carcinogen or MAK III 1, 2, 3B; IARC Group 1, 2A, 2B; TLV A1, A2, A3; GHS Category 1A, 1B, 2; H350, H351
Mutagenicity/ Genotoxicity	Substance induces neither punctual mutations nor aberrations of chromosomes/ chromosome segregation at concentrations up to 100 mg/l in in vitro systems	Substance doesn't induce punctual mutations at concentrations up to 100 mg/l	Substance has been tested and induces either punctual mutations or aberrations of chromosomes or of their segregation at concentrations lower than to 100 mg/l in in vitro systems or classified as GHS 1A, 1B, 2; listed MAK 1, 2, 3A, 3B; H340, H341
Reproductive Toxicity	Exhibits no adverse effects to sexual function or to the development of an embryo or fetus and based on human or animal studies	Equivocal evidence of toxic effects to sexual function, fertility, or to the development of an embryo or fetus	Known or suspected of causing adverse effects to sexual function, fertility, or to the development of an embryo or fetus based on human or animal studies or listed as MAK Group A or B, classified as GHS 1, 1A, 1B, or 2; H360, H361, H362
Oral Toxicity	**Acute:** Oral LD50 > 2000 mg/kg BW **Single exposure organ:** LOAEL > 2000 mg/kg BW **Chronic/Sub-chronic:** LOAEL > 100 mg/kg BW/day	**Acute:** 2000 ≥ Oral LD50 > 300 mg/kg BW **Single exposure organ:** 2000 ≥ LOAEL > 300 mg/kg BW **Chronic/Sub-chronic:** 100 ≥ LOAEL > 10 mg/kg BW or listed H373	**Acute:** Oral LD50 ≤ 300 mg/kg BW **Single exposure organ:** LOAEL ≤ 300 mg/kg BW **Chronic/Sub-chronic:** LOAEL ≤ 10 mg/kg BW or listed H372


Supplier
Linear Option
Know How Trustee Option
Supplier
Supplier
Supplier
Applicant
Supplier
Supplier
EPEA
MBDC
Certificate
EPEA

C2C BANNED LIST

- What is it?

  - List of highly toxic and or problematic chemicals in terms of products and how they are used and/or recycled.

- What is its Purpose?

  - Provide a very basic exclusion criteria for C2C Certification.

- Can it be compared to the REACH SVHC list?

  - No, but with X-substances

- How does EPEA assess chemicals?

  - EPEA's seeks to identify chemicals that best fit into a biological or technical system

The C2C Certification Criteria

The C2C Certification Criteria

Step by Step

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