Aalto University
School of Arts, Design
and Architecture

Design Approaches to Sustainable Consumption

Session 1 (9:15-12:00): Introduction to Design for Sustainability

Tatu Marttila & Philip Hector

12.1.2021

Agenda today

9:15–9:30 **Course introduction**
- *Short round of student & teacher introductions*
- *Course practicalities*

9:30–10:00 **Introduction to case work & themes**

10:00–10:45 **Introduction to Design for Sustainability (short lecture)**

11:00–11:25 **Breakout rooms (reading: chapters 2-5)**

11:25–11:45 **Present results of group activity**

11:45–12:00 **Next sessions & voting on case topics**

Course introduction

Design Approaches to Sustainable Consumption -course introduces students to the topic areas of design for sustainability and frameworks including product-service-systems, service design and material circulation.

Teachers: Tatu Marttila (@aalto.fi), Philip Hector (@aalto.fi)

Schedule: Tuesdays and Thursdays (9-12) in Zoom

Teaching period: III (12.1.-18.2.)

Course practicalities

MyCourses acts as the main platform for materials and information. See section ”Materials” for readings and slides, ”Assignments” for Learning diary and few other tasks, and ”Case work” for teamwork with your case topic

Main communication channel ”Announcements” in MyCourses and email

Lectures organized in Zoom, the same static link for sessions

Main individual assingment: Learning diary with weekly reflections

Case work: Working in 4-6 student teams with Espoo City library

Learning diary

During the course students write a learning diary, which is also one main component in grading. The learning diary consists of weekly reflection on readings, lecture contents, and also your case work progress. The outcome is a complete and finalized document with ~10 pages.

Weekly topics and more detailed instructions will be listed to MyCourses under ”Assignments”

Will be submitted via MyCourses; Deadline after the course (21.2.?)

Completing the course and grading

To pass, the students are required to attend the lectures (80%) and perform all the assigned exercises, readings and written tasks given each week.

Assessment methods and criteria:

- Individual writing task: Learning diary = 30%
- Active presence at the course (eg. discussion, chats) = 20%
- Case work, inc. presentations & final report = 40%
- Peer evaluation in groups = 10%

Course schedule

Working days	Tuesdays	Thursdays
Week 1 (12. & 14.1.)	Introduction to course; DfS introduction	**Case introduction: Espoo City library**
Week 2 (19. & 21.1.)	Design for sufficiency	System design and circular economy
Week 3 (26. & 28.1.)	Assessing and communicatiing impacts	**Present case ideas**
Week 4 (2. & 4.2.)	Taking it into action	One planet lifestyle
Week 5 (9. & 11.2.	Scaling-up sustainability transitions	Case work tutoring
Week 6 (16. & 18.2.)	**Final presentations #1**	**Final presentations #2**

Case work

Case work

Besides lectures, there is a case assignment in which the students work in 4-6 person teams

Teams work independently but in contact with client mentors, and produce design concepts that are communicated in presentations and project reports

Teams formed for Thursday, based on your preference of theme/topic, voting today!
Here: http://t.ly/iPOA

Case presentation days:
- Idea presentations on 28.1. (short pitches)
- Final presentations on 16.2. and 18.2. (5 groups each day)

IPR & contract details in separate email…

Case themes/ topics

1. **Library as a narrative, collective resource, and the future of libraries**
2. **Courses/activities or spaces to support sustainability in a library context**
3. **Visualisations of consumption / education materials for sustainability**
4. **Library as a platform for services: Product-service-system innovations in library context**
5. **Material/resources use in library context: Circular economy as a design principle**

See case topics in more detail here:
https://mycourses.aalto.fi/mod/resource/view.php?id=683366

1

Library as a narrative, collective resource, and the future of libraries:

How to perceive a library not as a service, but as a component in (societal) narratives, perceptions, and developments, and as a collective resource. How to adjust this for the future challenges and sustainability? How is the future of libraries?

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2

Courses, activities or spaces to support sustainability in libraries:

Considering the mission described in legislation, how can a library support sustainability with guidance, events, or facilitated activities and supportive spaces? What type of activities are needed to support sustainability, and how can library help in enabling them?

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3

Visualisations of consumption / education materials for sustainability:

Informative and educational materials on sustainable consumption need to be communicated interestingly to a broad group of actors. What are the ways to utilise visualisations and what are the focus activities and actors to whom these materials could be targeted, and how?

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4

Library as a platform for product-service-system innovations:

Library also acts as a place that offers various services, as access and "offerings" to various products, information, and activities. How can the conventional library service be connected and expanded to new areas, to support sustainability agenda? How to innovate new service offerings? Can the library enable new actors to utilise library services and/or develop new services to new actors?

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5

Circular economy as a design principle in libraries:

Circular economy as a principle aims to minimise waste and keep all resources in use, and utilise earlier waste streams as new raw materials. How could this thinking better guide library activities, services, and procurements? What type of design concepts could be created?

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Introduction to Design for Sustainability

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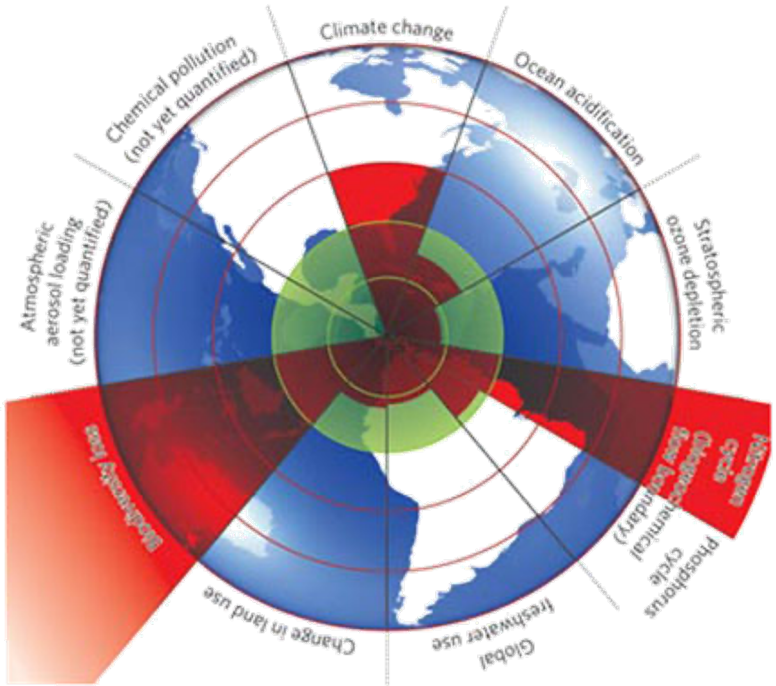
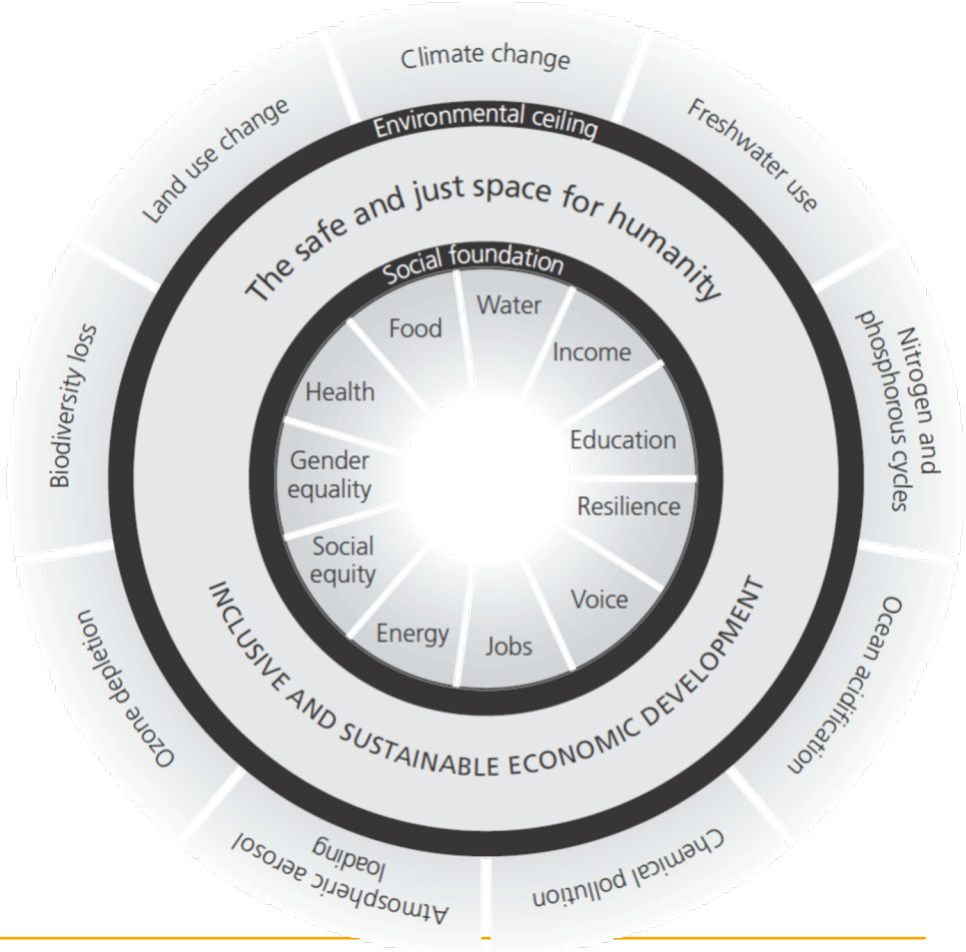
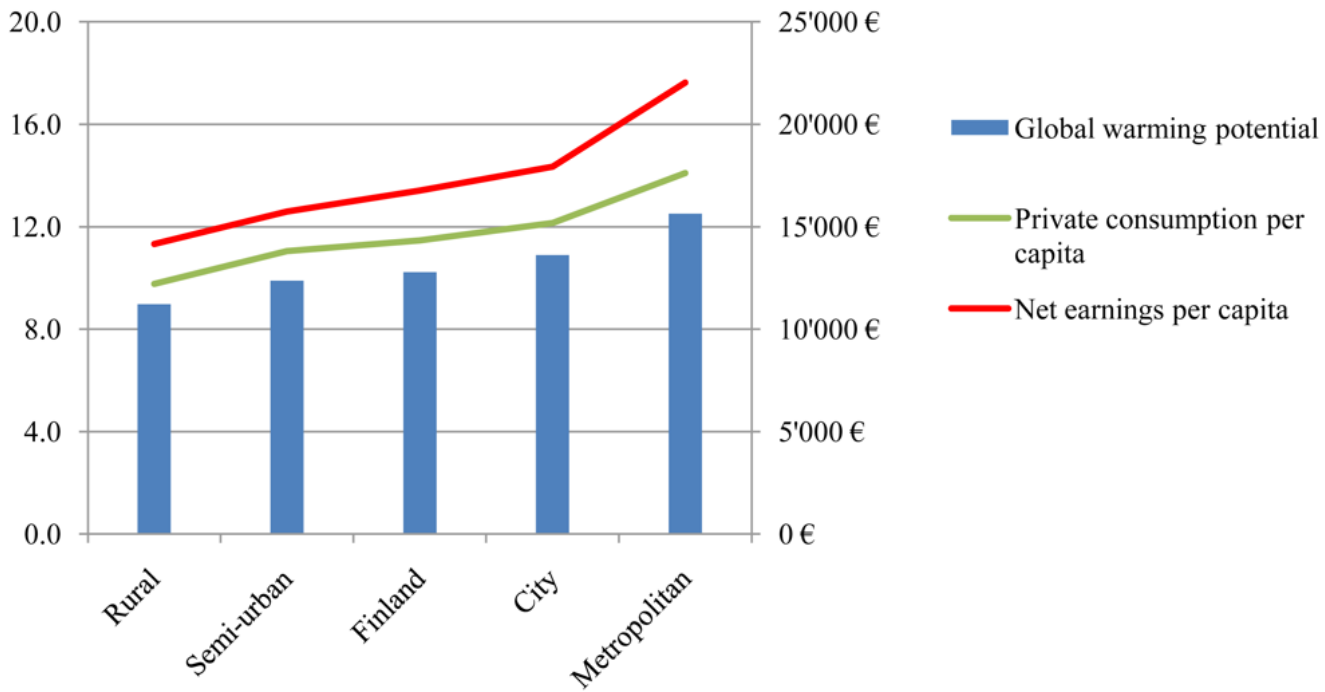
Facing limits to growth…





Wealth = More GHG emissions?



A Carbon Consumption Comparison of Rural and Urban Lifestyles
Jukka Heinonen and Seppo Junnila (2011)

THE UNHAPPY PLANET INDEX 2.0

nef
economics as if people and the planet mattered

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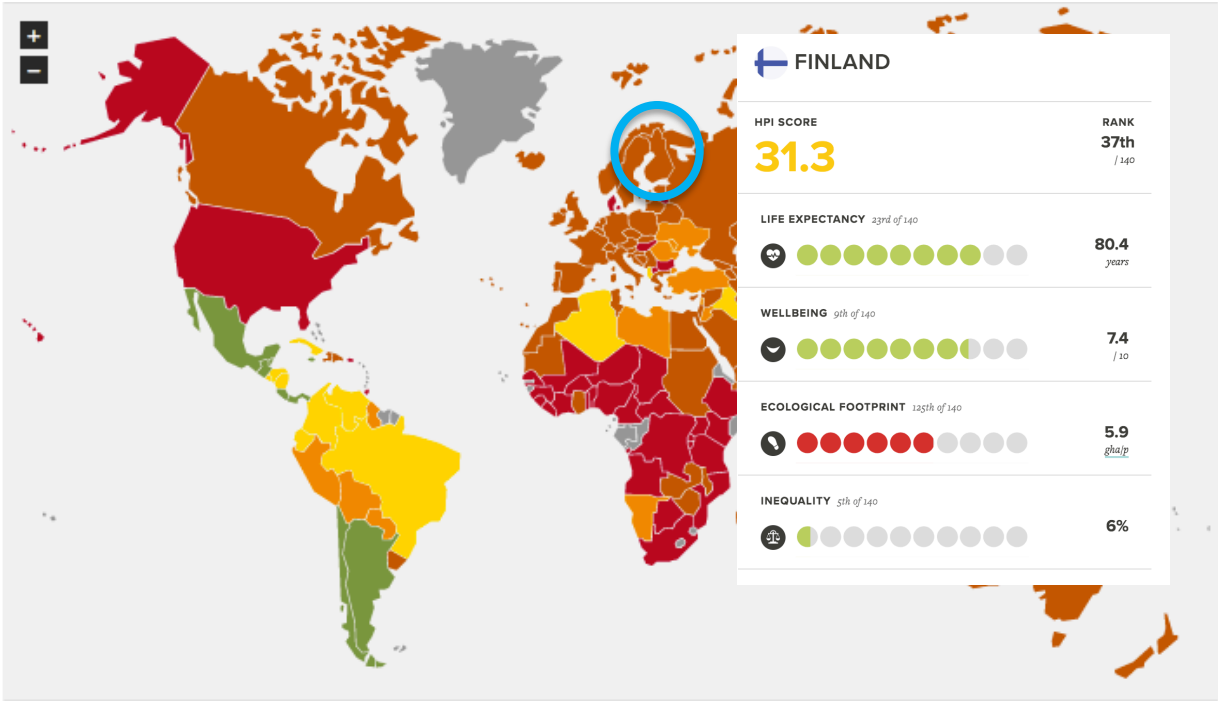
  - LIFE EXPECTANCY
  - LIFE SATISFACTION
  - ECOLOGICAL FOOTPRINT
- HPI DATA OVER TIME
- EUROPEAN HPI



Source: http://www.happyplanetindex.org/

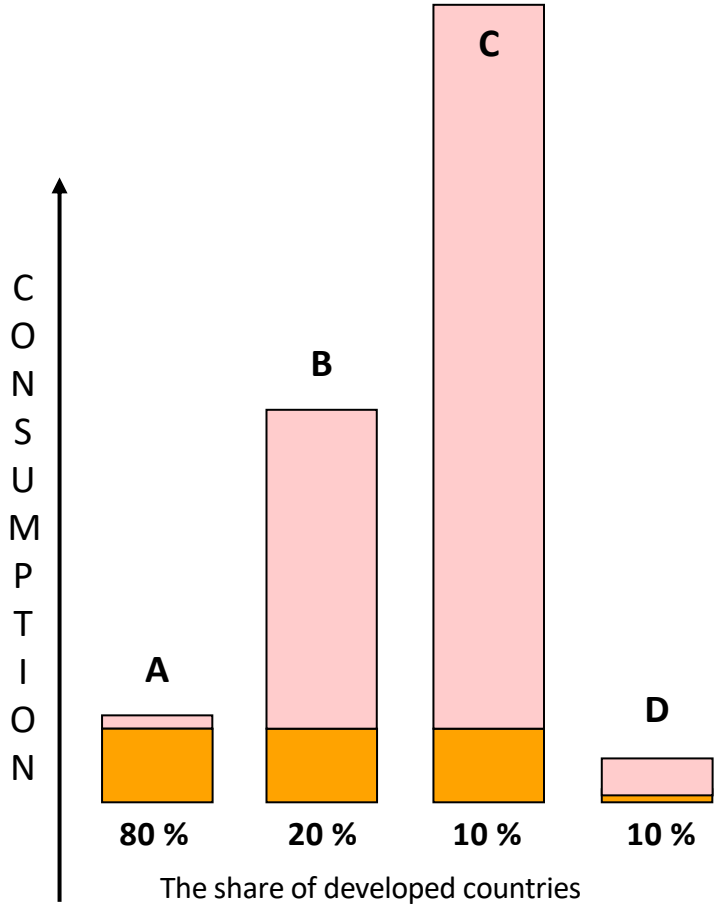
Factor thinking: Increasing efficiency by ‘factor 10’

A = current level of consumption

B = raising undeveloped countries to the level of developed countries -> 4 x present

C = in addition to B population will grow to 10 billion -> 8 x present

D = sustainable consumption ~half of the present -> consumption in developed countries must be cut into 1/10 (**factor 10**), if targetting to globally equal setting



Developed countries

Underdeveloped countries

Source: Wuppertal-institute

The traditional role of design: ‘Lock-in’ of environmental impacts

The environmental (and social) performance is largely established early in the product development cycle, when critical decisions are made on key product attributes

Design for the whole life-cycle!

From product redesign to system innovation…

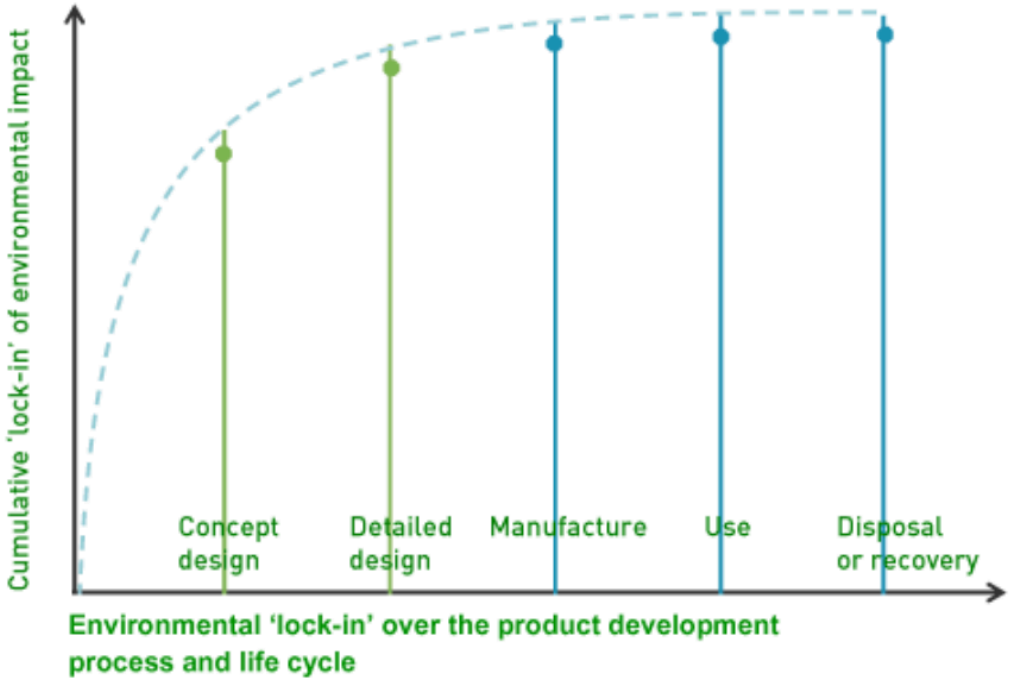
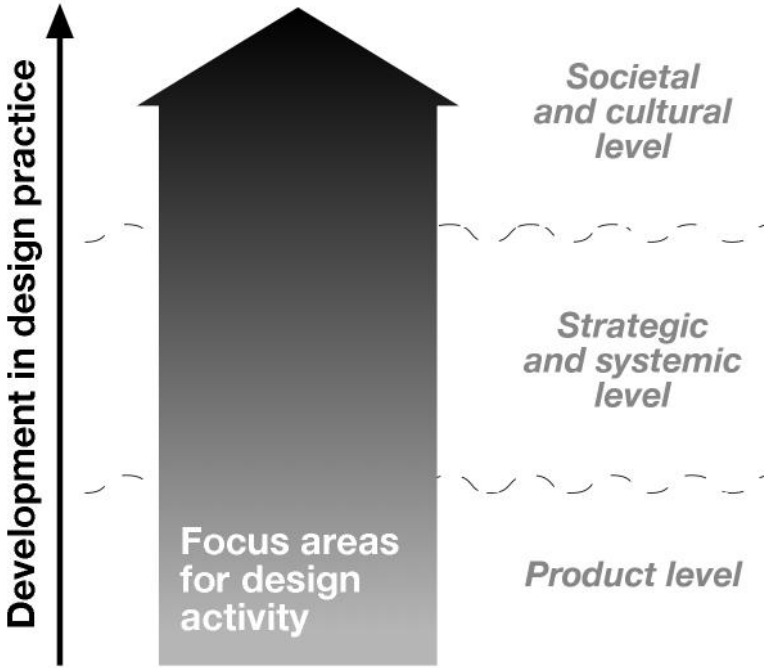


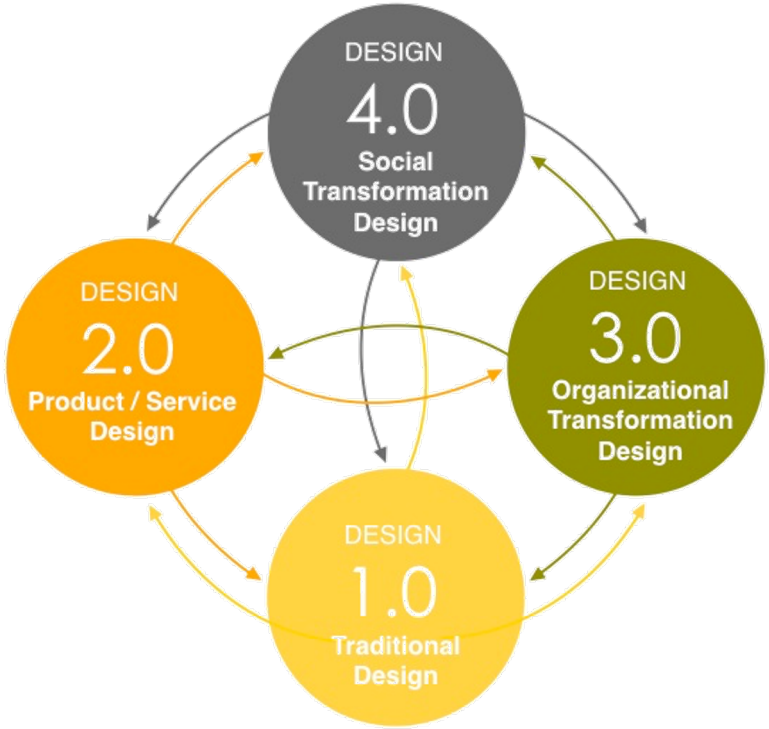
Figure 3 - Early design stages define key attributes that ultimately determine the environmental performance of a product throughout its life cycle. Adapted from "Design + Environment – a Global Guide to Designing Greener Goods", Lewis, H., Gertsakis, J., Grant, T., Morelli, N. & Sweatman, A., New York: Greenleaf Publishing 2001.

Source: sustainableminds.com/learning-center/ecodesign-and-lca/ecodesign-overview

Contemporary design action: Extending focus

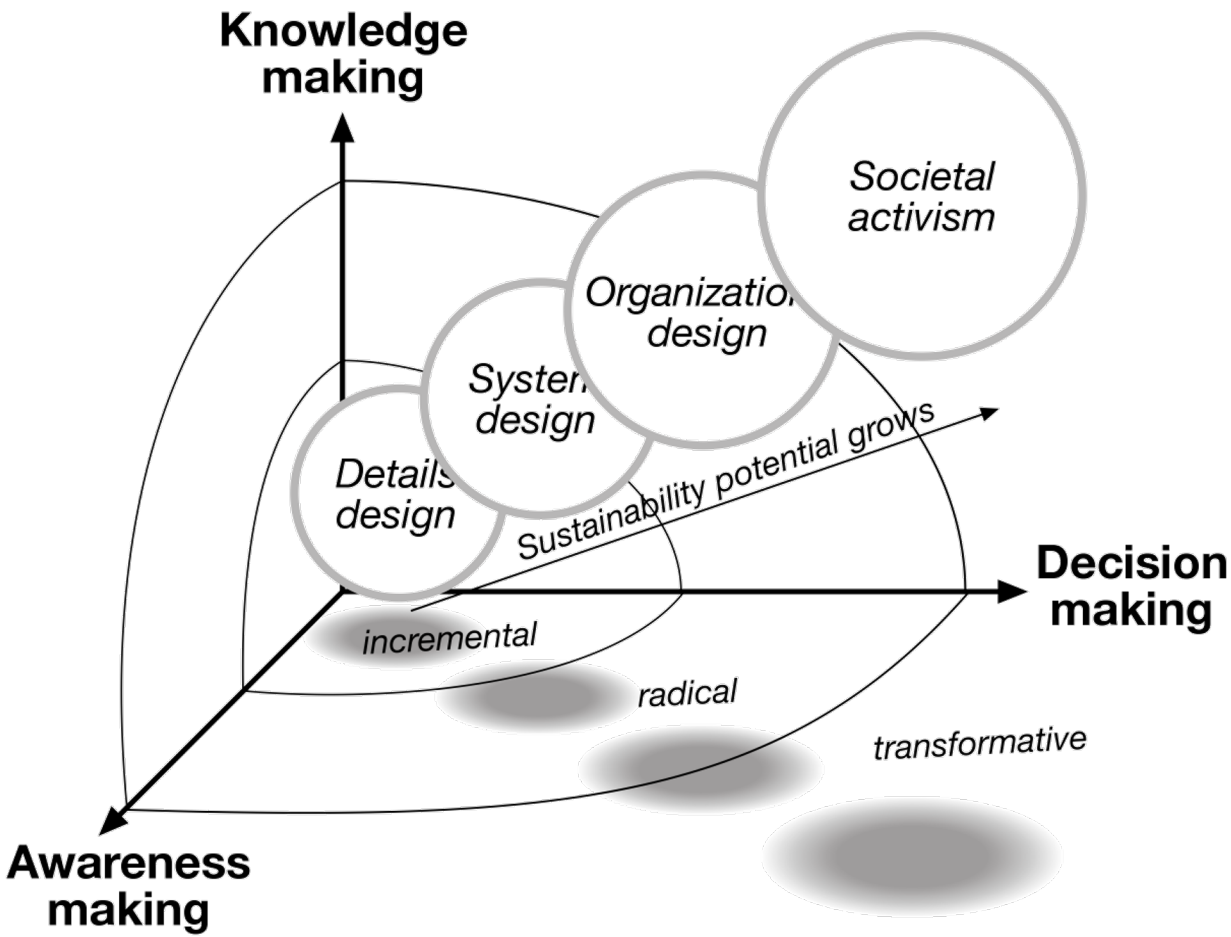


Source: Author



Source: Aminoff, et al. 2011;
GK VanPatter and Elizabeth Pastor, 2005

Expanding design action for transformative innovation:



Source: Author

Strategies for Sustainable Consumption and Production

Decoupling Strategies

Transmaterialization | **Dematerialization** | **Structural changes**

Total impact = i [impact/kg] • m [kg/utility] • u [utility/capita] • P [capita]

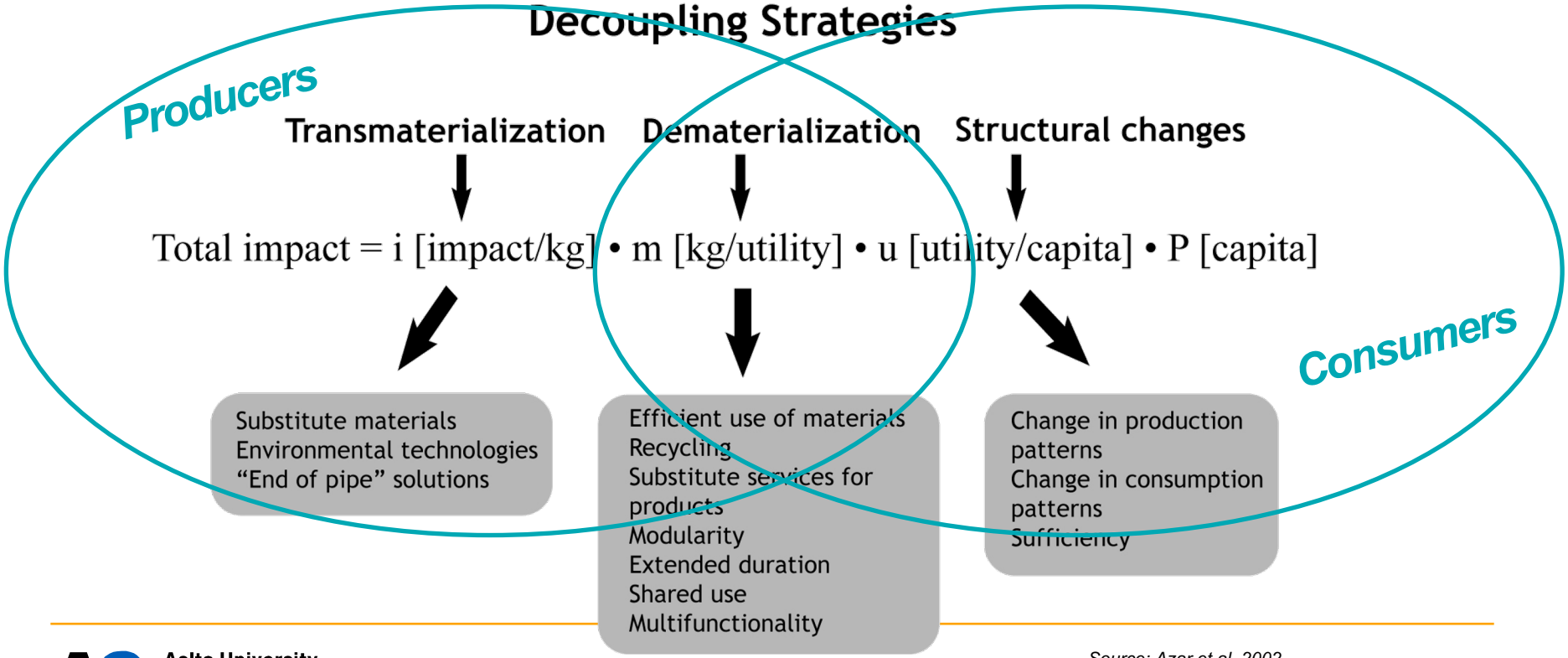
- Substitute materials
- Environmental technologies
- "End of pipe" solutions

- Efficient use of materials
- Recycling
- Substitute services for products
- Modularity
- Extended duration
- Shared use
- Multifunctionality

- Change in production patterns
- Change in consumption patterns
- Sufficiency

Source: Azar et al. 2002

Strategies for Sustainable Consumption and Production



Source: Azar et al. 2002

Sustainable production

Efficient transformation of natural resources into goods and services

Reorganization of supply chains and changing consumption patterns

Policies, regulation; Standards and best practice

'Eco-efficiency', 'Decoupling'

Sustainable consumption

Reducing consumption, the economy and the scale of environmental flows

Countering the capitalist push to consume more

Redistributing consumption opportunities globally

Consumer guidance & policies

'Degrowth', 'Scale', 'Abundance', 'Needs'

Consumer policies & strategies

Examples of consumer-side policies, strategies, and actors:

- Ecolabels and energy labels – Ecolabel Scheme is an EU supported policy
- Retail Forum, European SCP Food Round Table, etc.
- Consumer NGO's

Expanding to research and popular media:

- Research on sustainability of buildings, mobility, food etc.
- Research on consumption patterns and societal practices
- Impact through popular media
- Links to local actors, movements, social innovation?

Producer policies & strategies

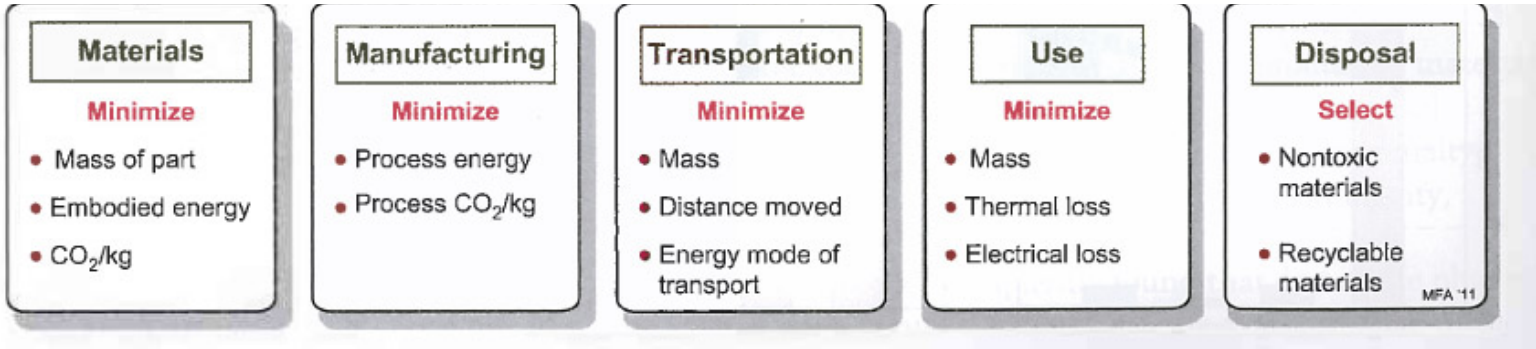
Examples of producer-side policies and strategies that promote sustainability, for example the EU policy scheme and standards:

- Eco-Management and Audit Scheme (EMAS) by EU
- ISO 14000 series
- Other EU policies, including for example Green Public Procurement (GPP), Eco-Innovation Action Plan (EcoAP), Eco-design of Energy-related Products Directive (EuP)
- Extended Producer Responsibility (EPR)
- Eco-efficiency in production
- EU Circular Economy Action Plan (2020)

Ecodesign & life-cycle assessment (LCA)

Sustainable design includes assessment of impacts of every phase of product-life, from materials production to use and to disposal

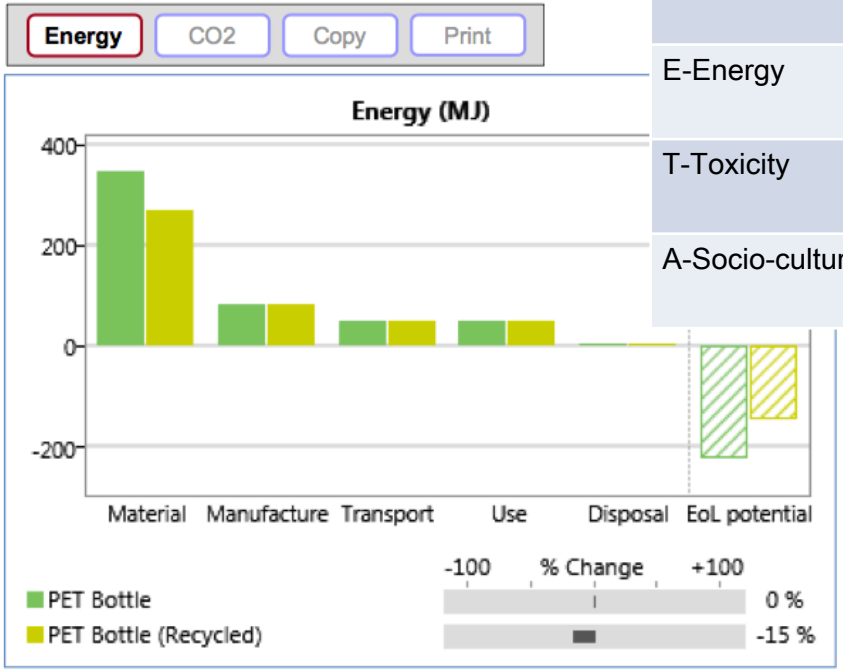
Life-cycle analysis or assessment (LCA) as an overall term of the assessment of life phase impacts of products and systems



Source: Ashby, M. (2012) Materials and the Environment: Eco-Informed Material Choice

Studying and improving life-cycle impacts:

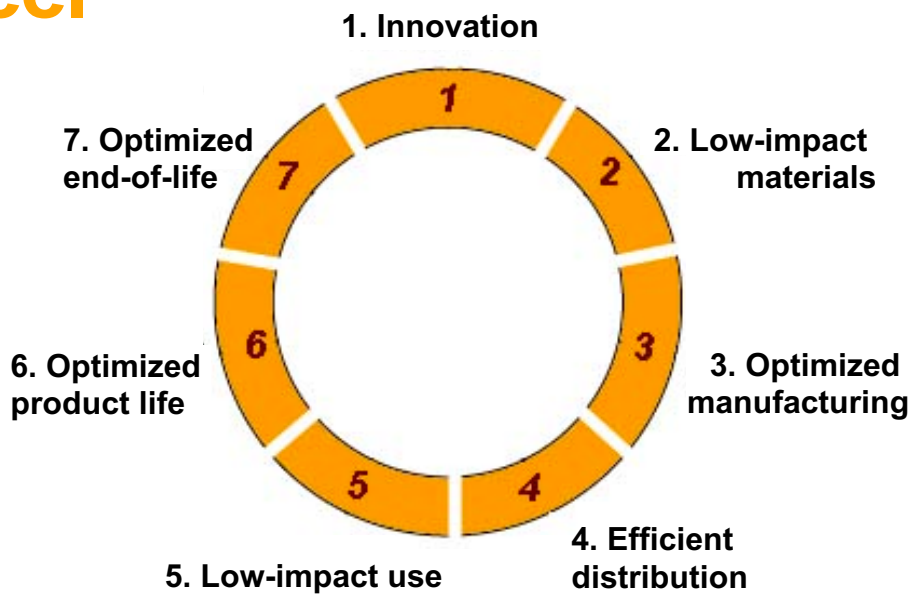
Impact category	Material production	Manufac-turing	Use-phase	End-life	Transport
M-Materials					
E-Energy					
T-Toxicity					
A-Socio-cultural					



Ecodesign strategy wheel

Specific focus on each life-cycle phase:

1. Define the product idea, product concept or existing product that will be analyzed. Evaluate existing system or your concept.
2. Systematically score the product on each dimension of the strategy wheel, linked to life phases of the product.
3. Consider the optimization options for each of the dimensions, paying special attention to those where the current design scores badly.



Ecodesign strategy wheel by TU Delft

Product-Service system (PSS) design

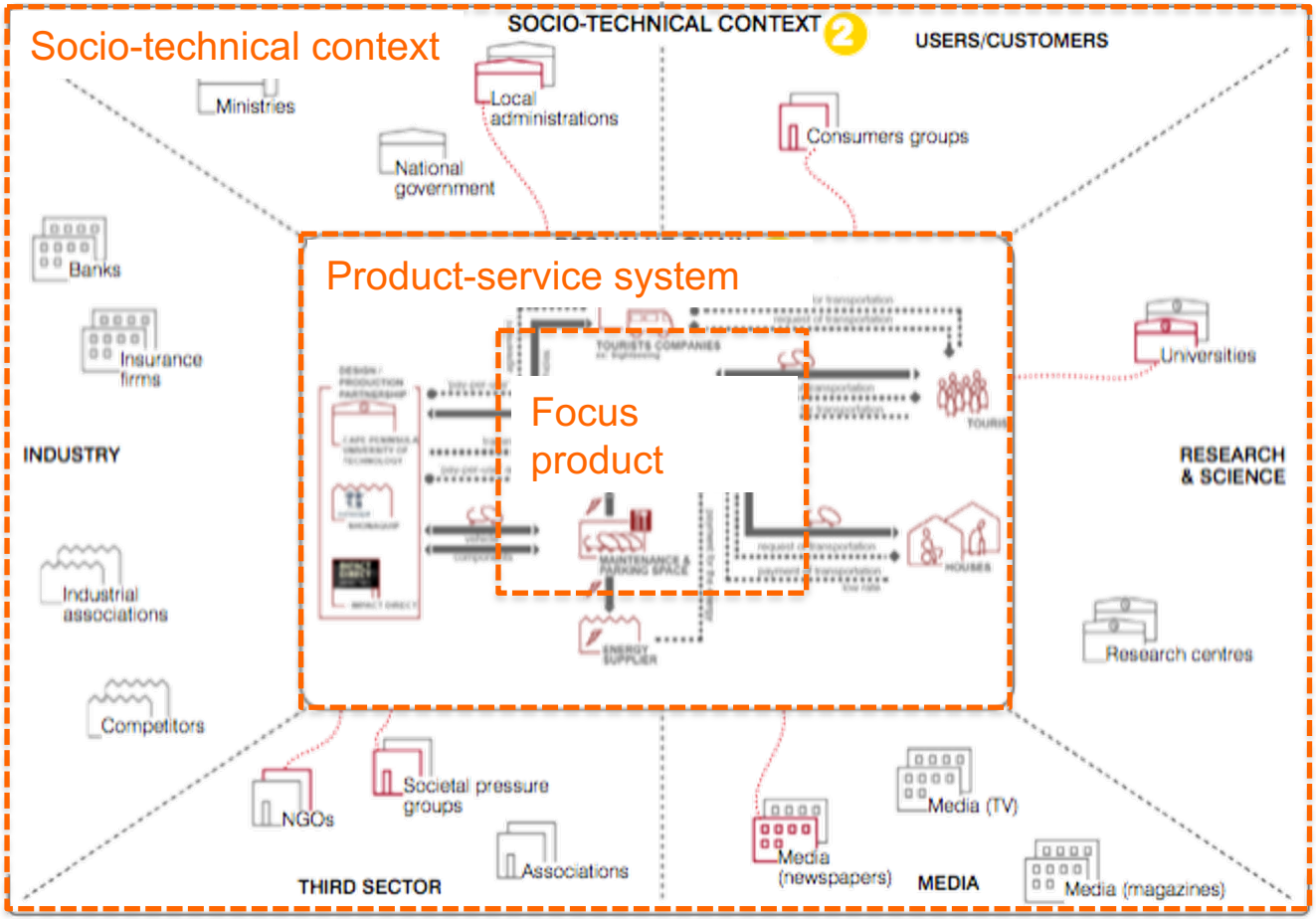
Product-Service System (PSS) design moves the focus of design action towards the whole system of service provision, and systemic efficiency and/or value addition within it.

- Assessing impacts per service-unit rather than product
- Assessing sustainability on a ‘system’ level

PSS design considers alternative business and service models that could provide improved sustainability by adjusting ownership and revenue models, and by adding more stakeholders to the process.

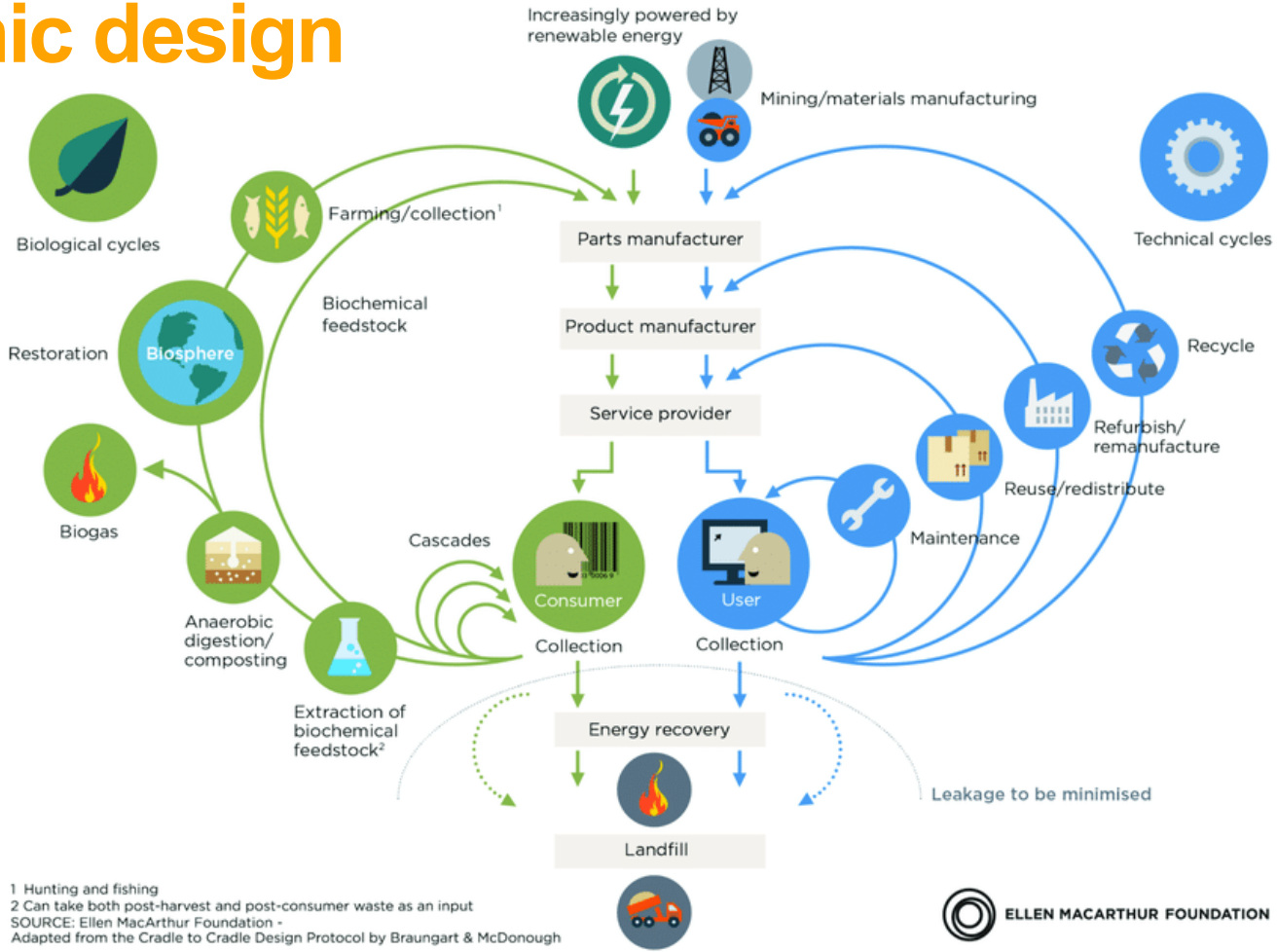
- Changing product ownership: services instead of products
- Co-governance in design and management

Mapping stakeholder interactions and offerings:



Source: Ceschin, 2013

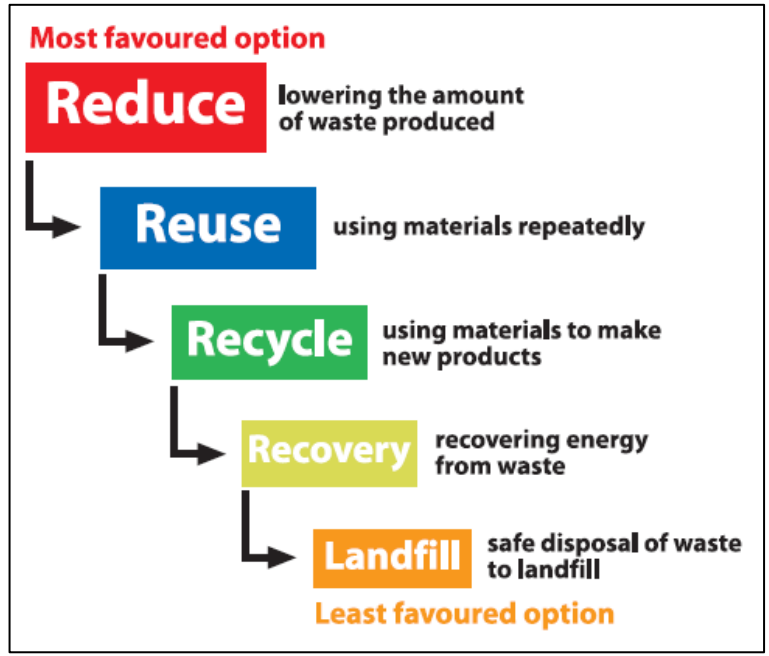
Circular economy & systemic design



Example: Redesigning plastics by Ellen McCarthy Foundation

Our current economy employs a linear, take-make-dispose, model (resources are **taken** from the ground, **made** into products and then **thrown away**). This model has contributed to both the positive but also negative effects of plastic being everywhere.

But what if we had an economic model that was more 'circular', and kept products and materials cycling within the system for longer? This vision for a 'circular economy' aims to optimise value by increasing the lifecycle of materials and designing out waste, thereby decoupling growth from the consumption of finite resources.



Source: Ellen McCarthy Foundation: Redesigning plastics

Summary:
Strategies for Design for Sustainability

Sustainability as a concept is very broad – there also exists a multitude of DfS strategies, orientations, & methods

A question of context, framing, aim and focus, and so on…

***Design for Sustainability* by Ceschin & Gaziulusoy (2020) lists the following:**

- Green design & product ecodesign
- Emotionally durable design
- Design for sustainable behaviour
- Cradle-to-cradle design
- Biomimicry design
- Product-service system design for sustainability
- Design for the base of the pyramid
- Design for social innovation
- Systemic design

Breakout room activity

Based on the readings for the session:

- While we make the rooms have a short break (10 min), then…
- Select your room based on your reading & enter
- Discuss together, ideate few examples (~20 mins)
- Present the strategy (<5 min)

Breakout rooms:

1. Green design & product ecodesign (Chapter 2)
2. Emotionally durable design (Chapter 3)
3. Design for sustainable behaviour (Chapter 4)
4. Cradle-to-cradle design (Chapter 5)

Link to Google slides working canvas: http://t.ly/T6TU

Next session & tasks

Course schedule

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Week 6 (16. & 18.2.)	**Final presentations #1**	**Final presentations #2**

For next time…

Voting on case topics & teams today! Here: http://t.ly/iPOA

Reflect session topics in your learning diary!

Begin considering the library as a context for your case work…

Thursday (14.1.) agenda:

9:15-10:00	Going through teams & themes
10:00-11:00	Sustainability and Espoo City library (lecture)
11:00-12:00	Teams connect with mentors from library