Aalto University
School of Arts, Design
and Architecture

Design Approaches to Sustainable Consumption

Session 1 (13:15–17:00): Introduction to Design for Sustainability

Tatu Marttila, 10.1.2023

Agenda today

13:15–14:00 Course introduction

- *Short round of introductions*
- *Course practicalities*
- *Sessions and schedule*
- *Case work themes*

14:00–15:00 Introduction to Design for Sustainability (lecture part)

15:15–15:45 Activity in (random) groups (session readings)

15:45–16:30 Present results of group discussions

16:30–16:45 Next session & case work themes

– *Case work theme selection*

(after session voting on theme preferences for case work…)

Teacher:

Tatu Marttila

- Post-doctoral researcher and lecturer
- Aalto University School of Arts, Design and Architecture
- Alumni of UIAH, M.A. in industrial design in 2007
- Doctoral studies 2010–2018
- https://people.aalto.fi/index.html#tatu_marttila
- tatu.marttila@aalto.fi

My research interests…

My general area of interest has been in **strategic codesign for sustainability transitions:**

How design can be of help in transforming our socio-technical systems to achieve sustainability.

Round of introductions

- *Your name & educational, geographic background*
- *Specific sustainability interests?*

Course introduction

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, Mikko Jalas, Sanna Tiilikainen (@aalto.fi)

Schedule: Tuesdays (13:15–17) and Thursdays (9:15–12)

Teaching period: III (10.1.–16.2.)

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 F101/Q201/other rooms, see MyCourses for details;
80% attendance requirement

Main individual assingment: Learning diary with weekly reflections

Case work in groups: Working in 5-6 student teams on food system sustainability theme

Case work output: Presentations, concept poster, project report

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 at the end of course (19.2.?)

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 (also discussion) = 20%
- Case work, inc. Presentations, poster & final report = 40%
- Peer evaluation of group work performance = 10%

Course and case work schedule

Working days	Tuesdays (13-17)	Thursdays (9:15-12)
Week 1 (10. & 12.1.)	Introduction to course; DfS introduction (F101)	**Case introduction:** **Food system sustainability** (Q201)
Week 2 (17. & 19.1.)	Systemic (PSS) design and circular economy (Q201)	Design for sufficiency (Q201)
Week 3 (24. & 26.1.)	**Presenting case work ideas** (F101)	Assessing and communicating sustainability impacts (Q201)
Week 4 (31.1. & 2.2.)	Scaling-up: socio-technical experimentation(Q201)	Changing consumption and production patterns (Q201)
Week 5 (7. & 9.2.)	One planet game session (L1–241, Puunjalostustekniikka 1)	**Case work tutoring** (Q101) ***Concept poster by Friday!***
Week 6 (14. & 16.2.)	**Final presentations** (F101)	Summary discussion (Q101)

Case work

Case work

Besides lectures, the course includes a case assignment in which the students work in 5-6 person teams

Teams work independently but in contact with tutors, and produce design concept ideas that are communicated in presentations, a concept poster, and a more detailed project report

Case presentation days:

- Idea presentations on 24.1. (10 minute presentations)
- Final presentations on 14.2. (<15 minute presentations)

Teams formed for Thursday based on your preferences of focus themes/topics!

Case work ‘client’ – ORSI project

Climate change challenges welfare states, such as Finland, to change their practices. How to steer that transition? The **ORSI project** investigates fair and robust methods to make Finland environmentally sustainable.*

The project invites key decision **makers, citizens and businesses around the same table to develop solutions.**

What we want to find for the ORSI project:

- Practical, applicable, fair, and just design solutions **for reducing the CO2 emissions of food**
- The ideas must work in the everyday life of the Finns and be sustainable also from the food production and retail point of view

Aalto University
School of Arts, Design and Architecture

***Towards Eco-Welfare State: Orchestrating for Systemic Impact (ORSI)** is a joint project of Tampere University, the Finnish Environment Institute SYKE, Aalto University and VTT Technical Research Centre of Finland, funded by the Strategic Research Council at the Academy of Finland.

Case themes /topics

Food system sustainability – How to develop design solutions to improve sustainability in food production, consumption and retail?

1. **Rules** – Rules (laws, regulations, recommendations, commitments) can govern citizens', producers', and retailers' activities
2. **Money** – Monetary incentives (both carrots and sticks) can be used for governing choices
3. **Information** – Information can help citizens in making sustainable choices
4. **Selection** – Innovations in the production, availability, and retail can lower co2 emissions
5. **Nudging** – Nudging is about fostering a voluntary change: making the preferred choices easier and the non-preferred more difficult with design solutions

Groups are structured around the interest themes and topics!

Rules

Rules (laws, regulations, recommendations, self-made commitments) can govern citizens', producers', and retailers' activities

Money

Monetary incentives (both carrots and sticks) can be used for governing choices

Information

Information can help citizens in making sustainable choices

Selection

Innovations in the production, availability, and retail can lower co2 emissions

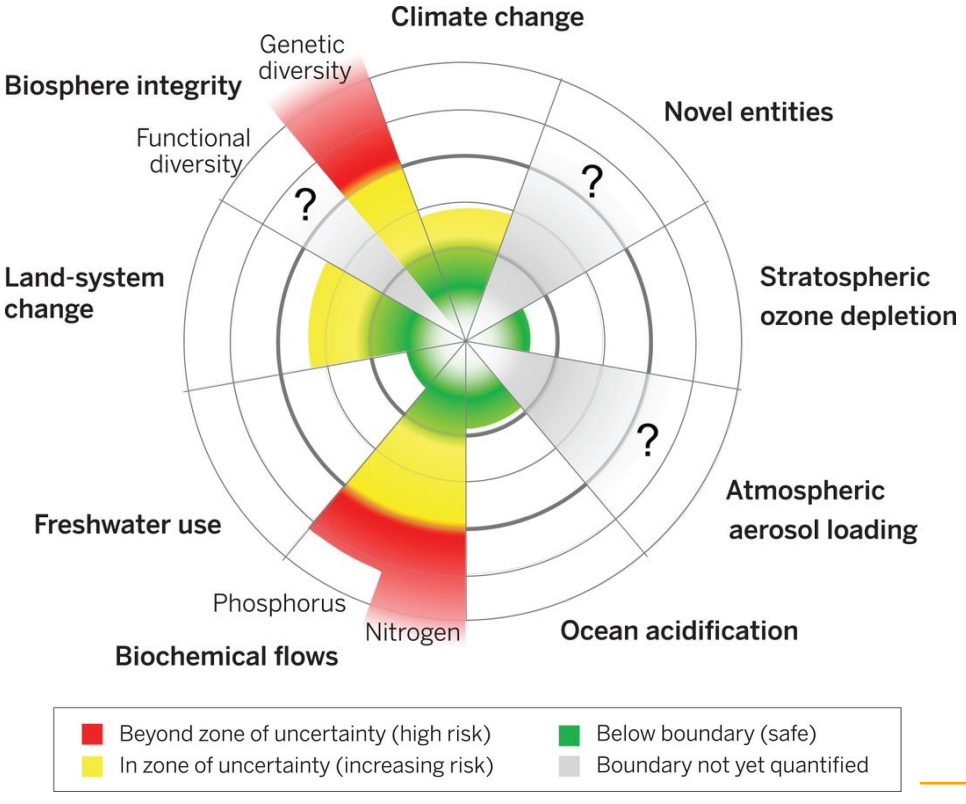
Nudging

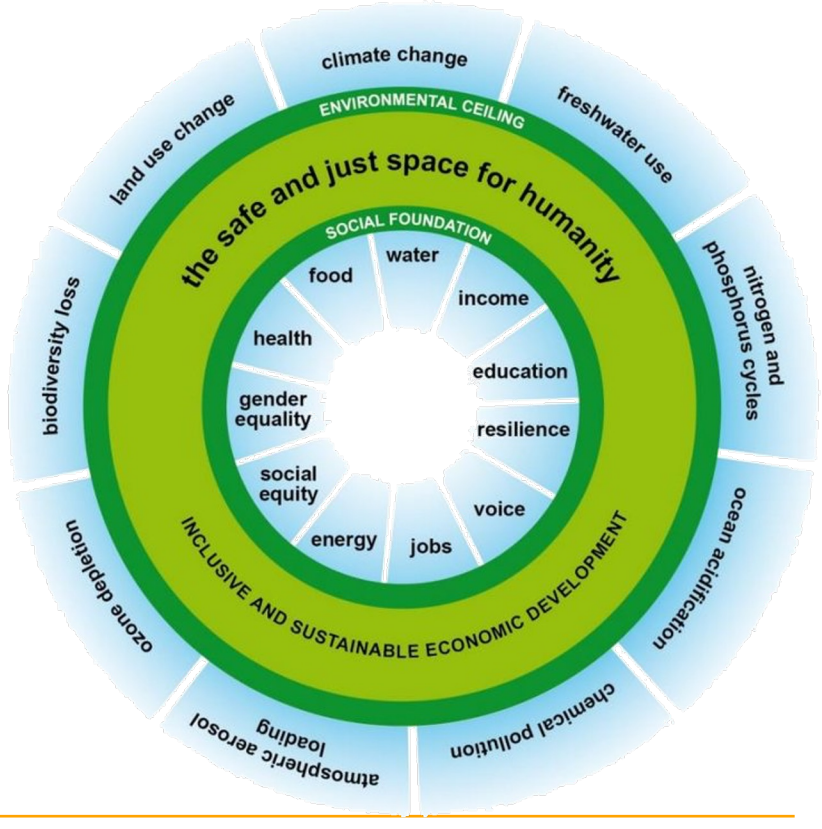
Nudging is about fostering a voluntary change: making the preferred choices easier and the non-preferred more difficult with design solutions

Introduction to Design for Sustainability

Aalto University
School of Arts, Design
and Architecture

Context of action: facing the planetary boundaries



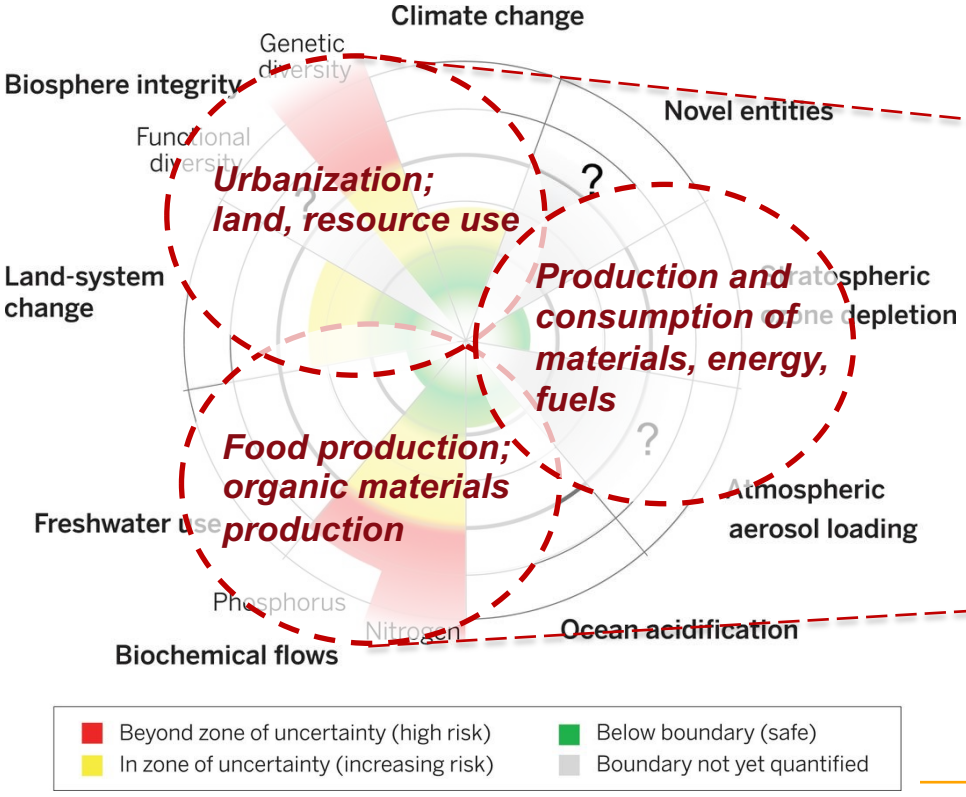


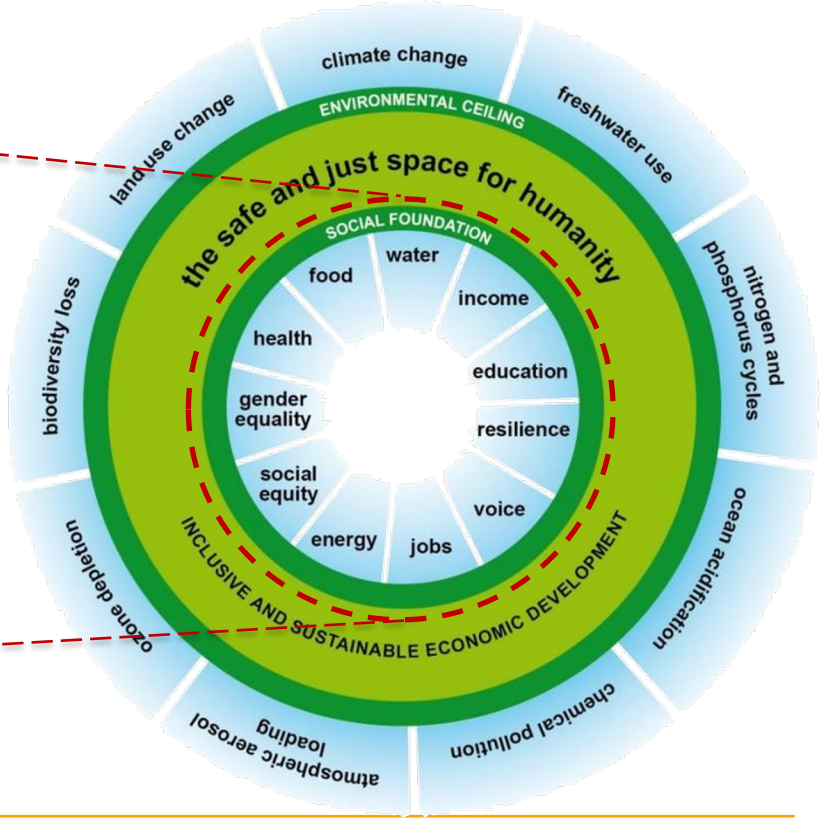
Aalto University
School of Arts, Design and Architecture

Image on left from Steffen, W. et al. (2015). "Planetary boundaries: Guiding human development on a changing planet." Science (347/6223). https://doi.org/10.1126/science.1259855

Image on right from Raworth, K. (2017). *Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist.*

Context of action: facing the planetary boundaries



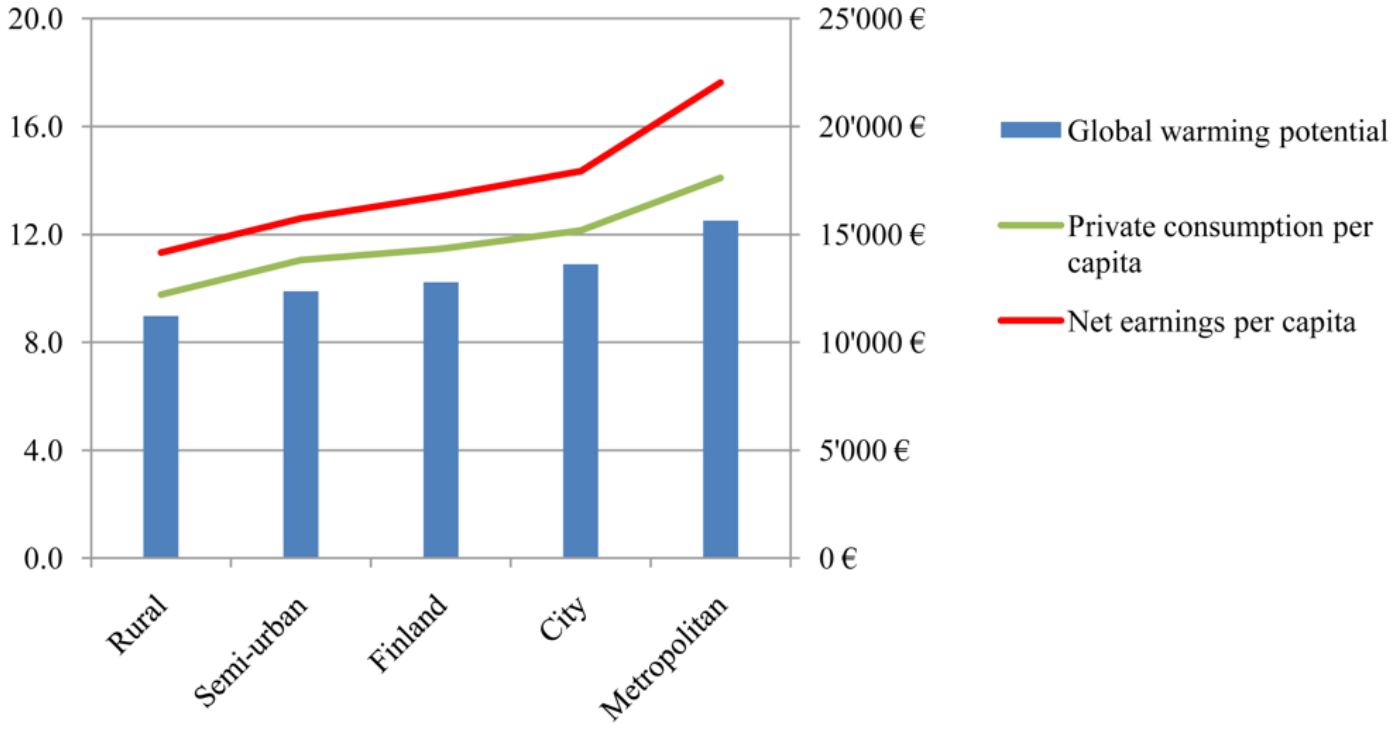


Aalto University
School of Arts, Design and Architecture

Image on left from Steffen, W. et al. (2015). "Planetary boundaries: Guiding human development on a changing planet." Science (347/6223). https://doi.org/10.1126/science.1259855

Image on right from Raworth, K. (2017). *Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist.*

Wealth = More GHG emissions?



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

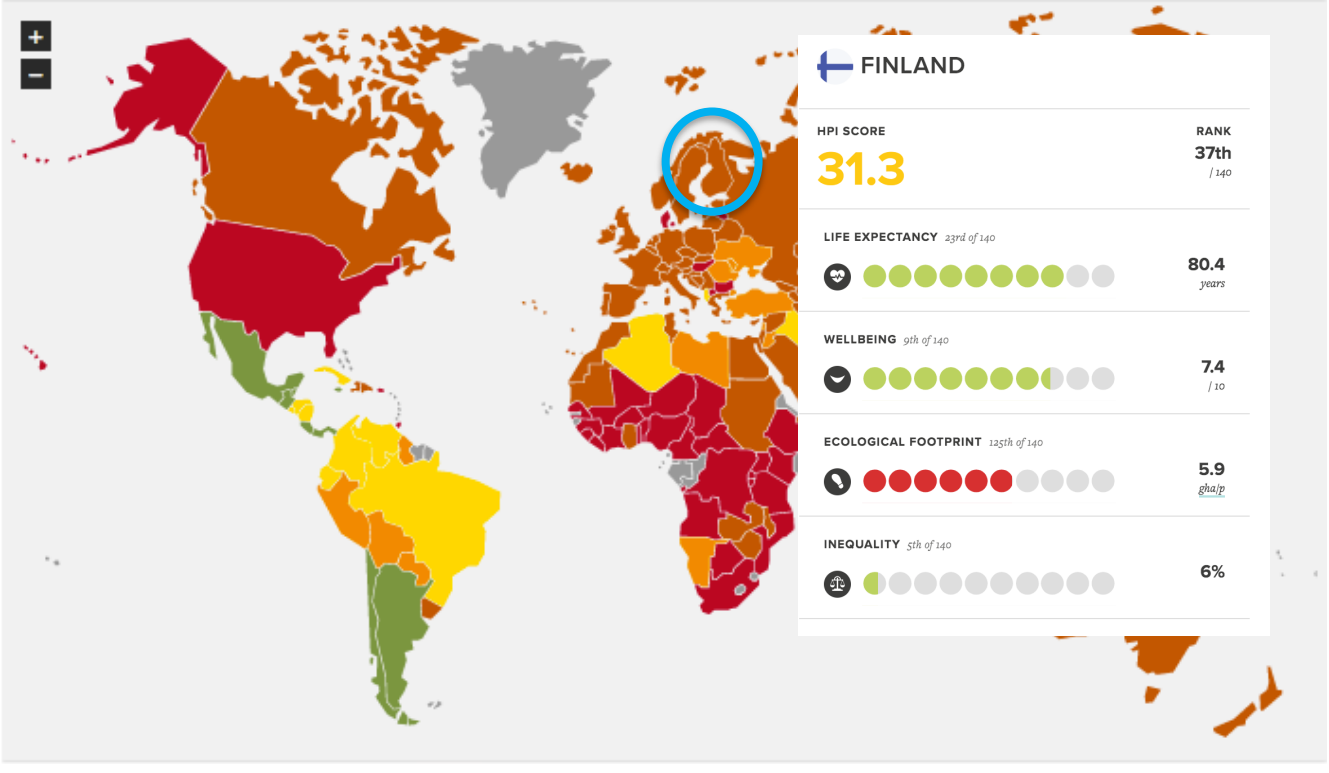
THE HAPPY PLANET INDEX 2.0

nef
economics as if people and the planet mattered

Home | Learn | Explore | Engage | News

Search GO

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



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

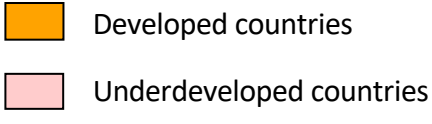
Factor thinking: Increasing efficiency by ‘factor 10’

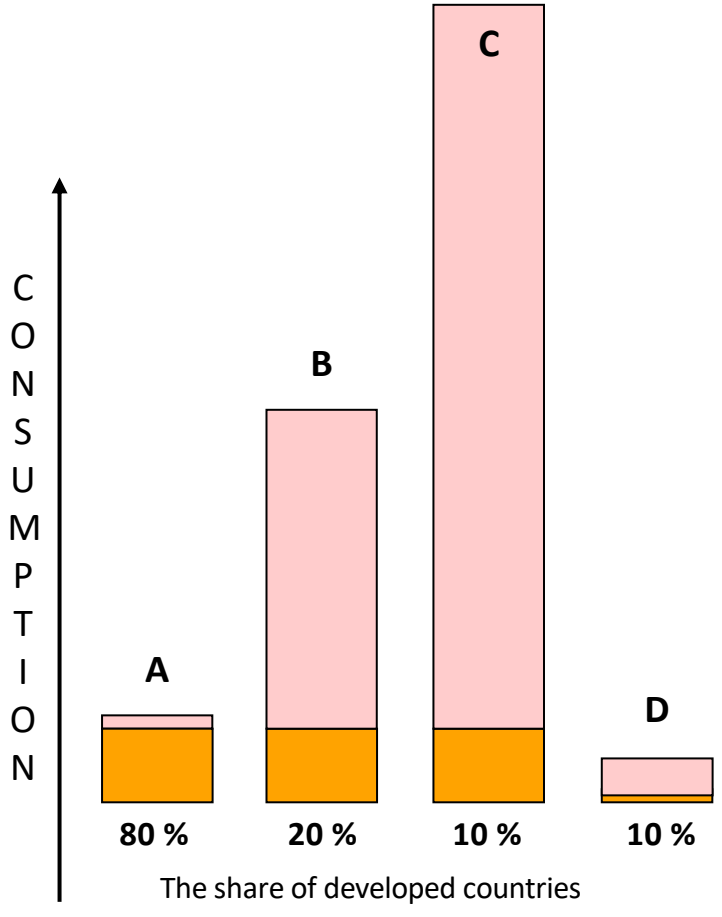
A = current level of consumption

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





Source: Wuppertal-institute

Design for Sustainability – starting points

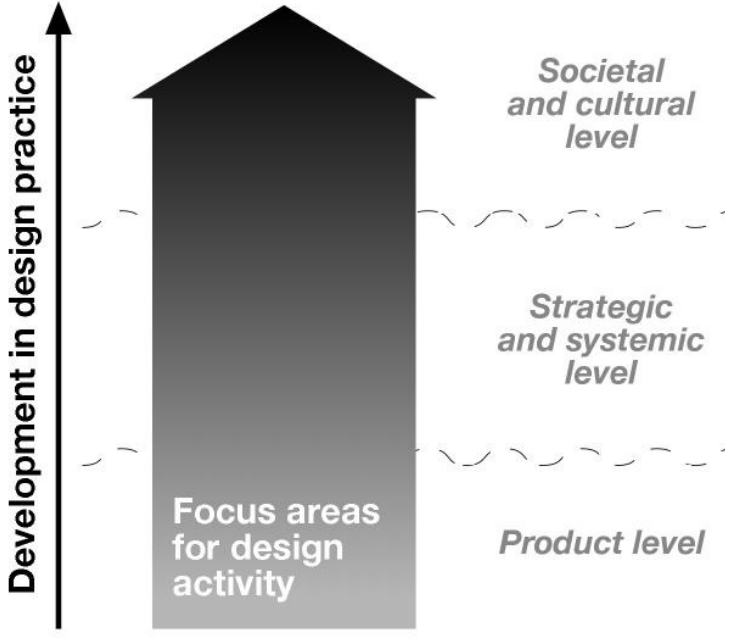
Initial notions very early on (19th century), popularized first by Buckminster Fuller (concept of ’Spaceship Earth’), later for example by Victor Papanek and his book *Design for the Real World*

Discussions have continued first in promoting **ecodesign** in the 1990’s and then increasingly with **system focus in design** (PSS design). Lately **Circular Economy** (CE) has been increasingly in focus.

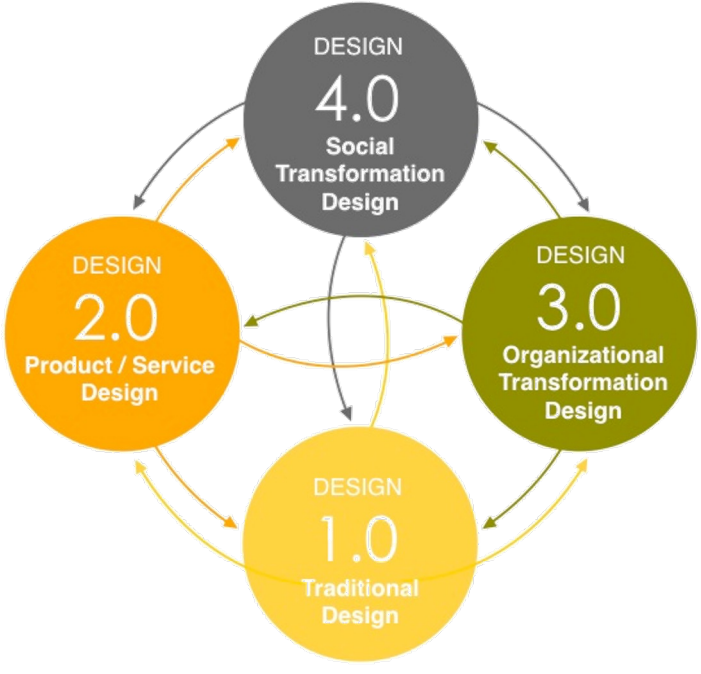
UN development on sustainable development since 1987, and several strategies and frameworks by different organizations, including OECD and the EU; Also visible in Sustainable Development Goals (SDG)

Current discourse is also connecting increasingly with technical and social innovation, open design, discussions on the role of ’Global North’ and developing contexts, etc.

Contemporary design action: Extending focus from products to transitions



Source: Author



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

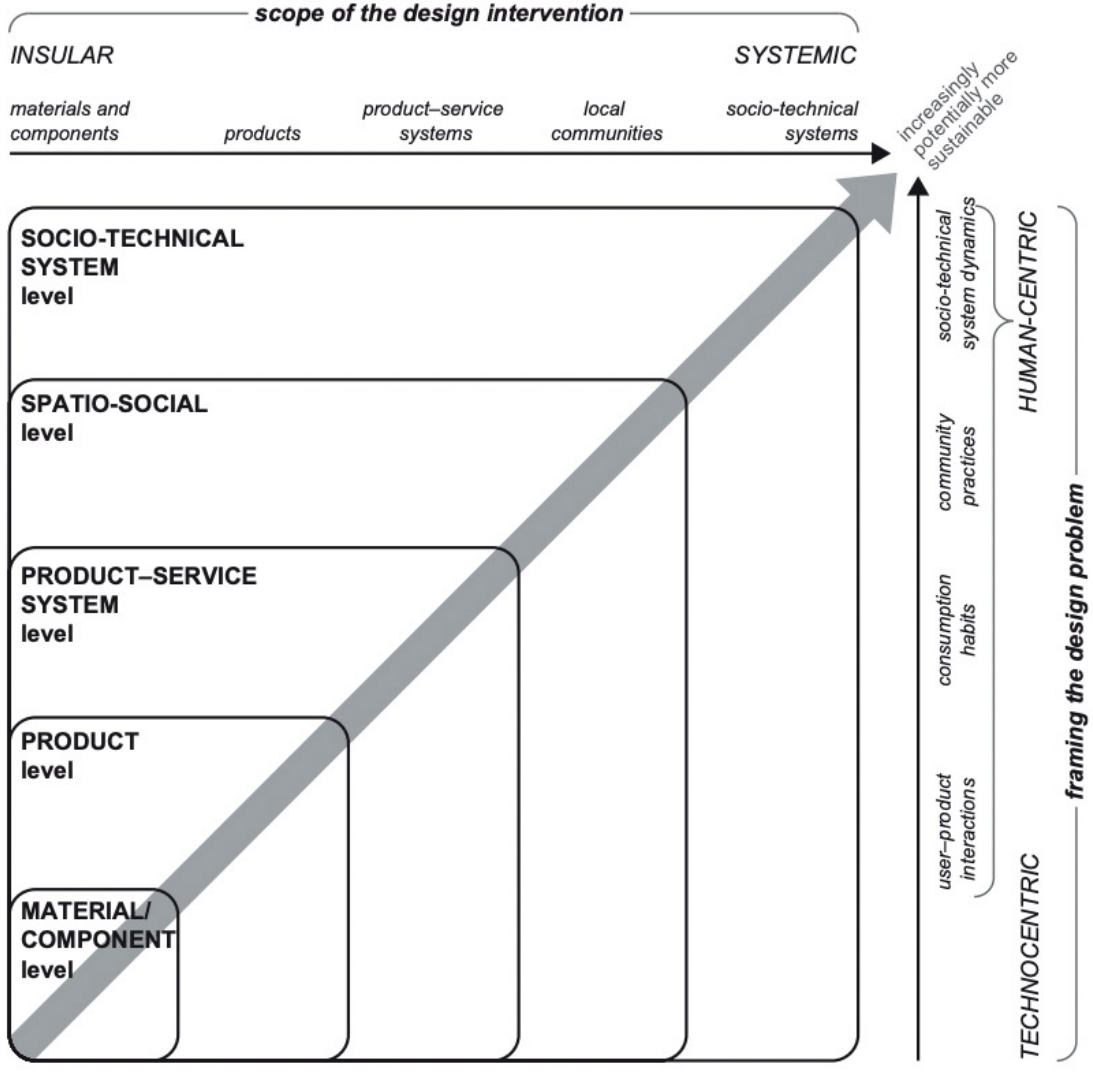
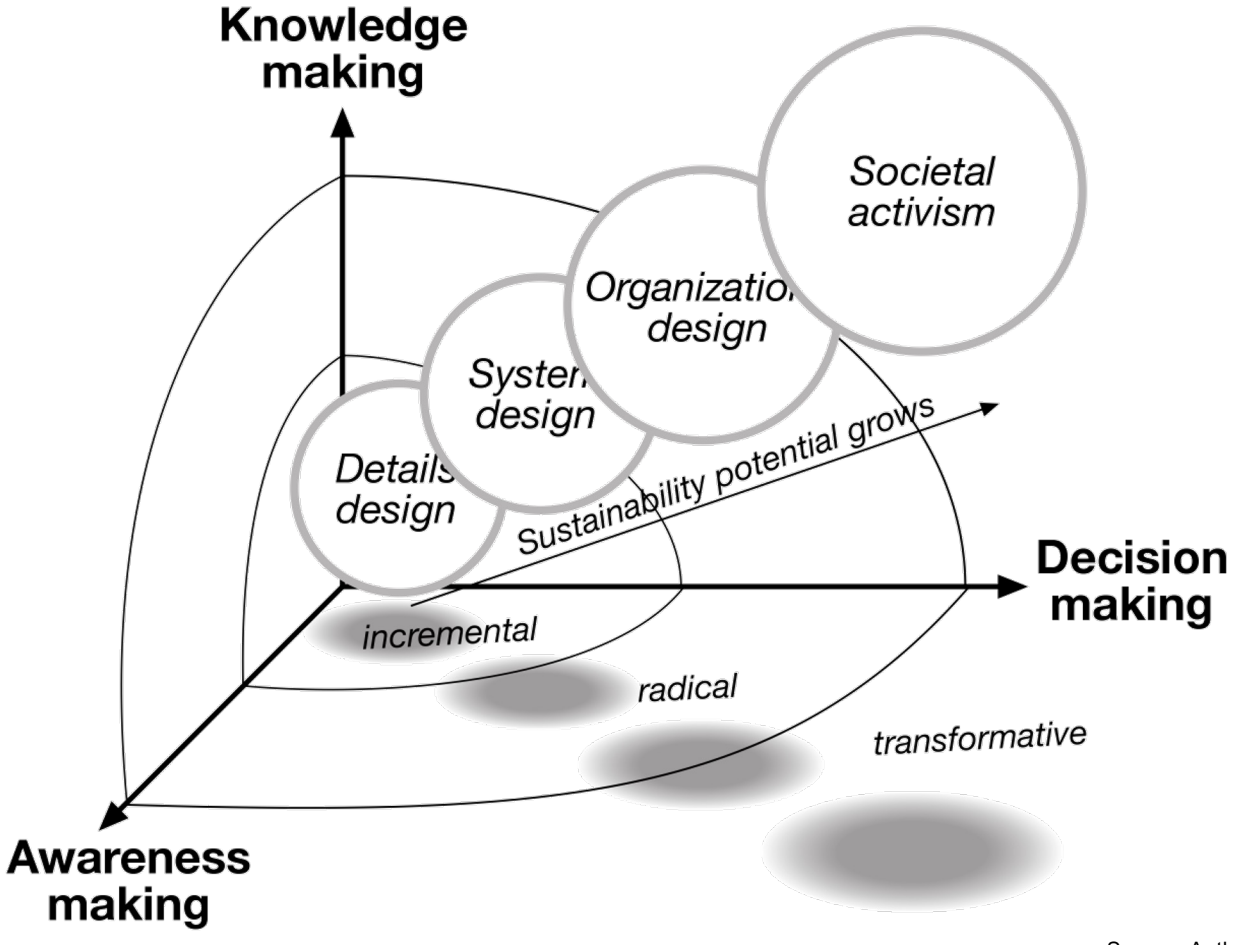


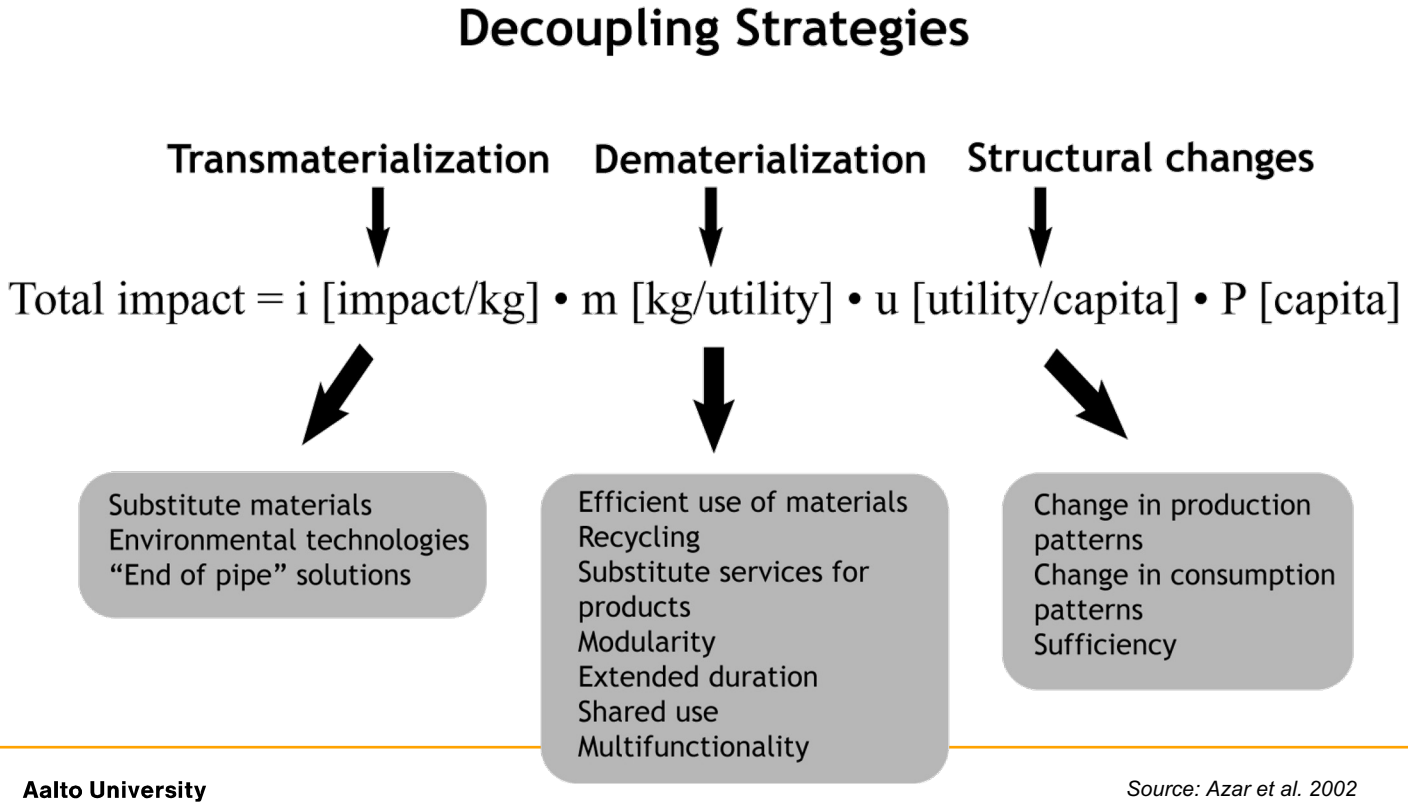
Figure 12.1 The DfS innovation framework

Expanding design action for transformative innovation:



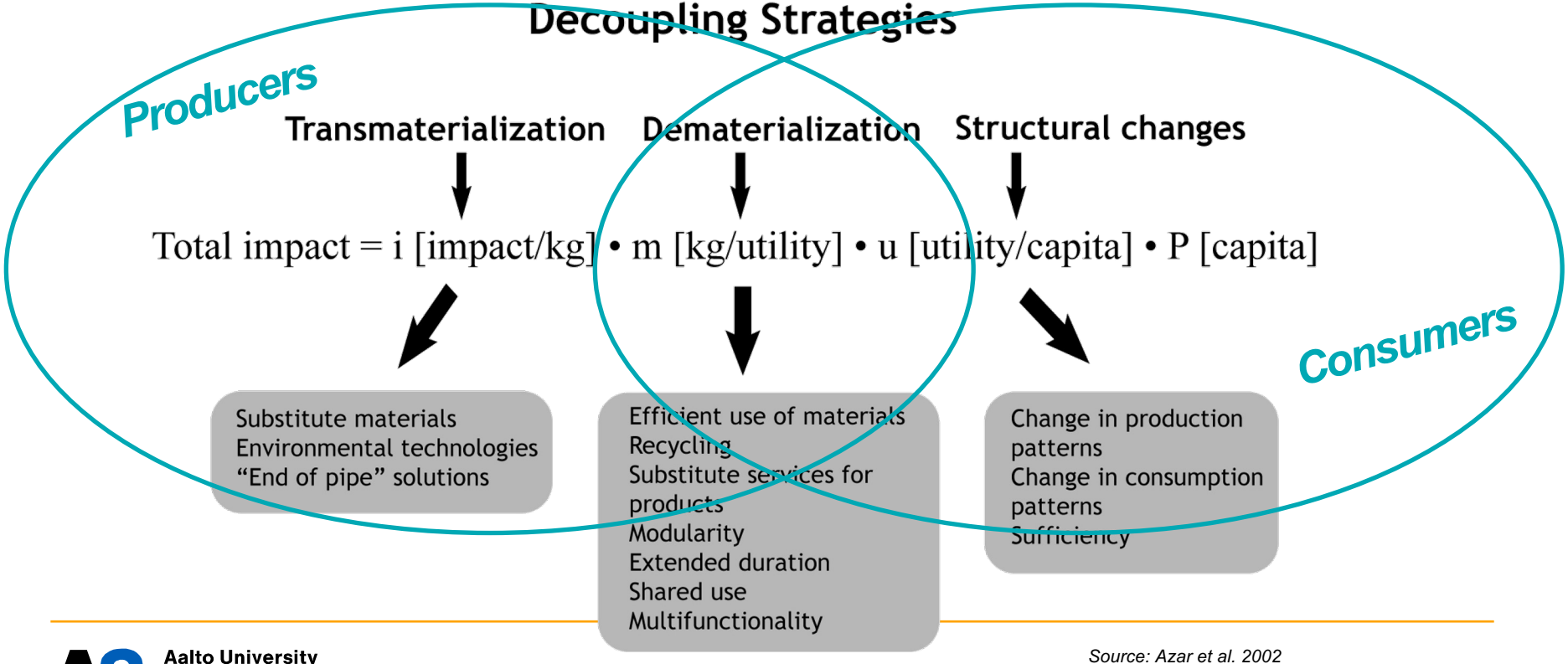
Source: Author

Strategies for Sustainable Consumption and Production



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'

Summary

Expanding focus of Design for Sustainability (DfS) action

Initial DfS efforts in the early 90's were focused on material and/or component redesign ('**Green design**')

Ecodesign moved focus to cover all life-cycle phases of a product, from raw material extraction to end-of-life.

Product-Service System (PSS) design continues to expand to systemic direction, moving the focus towards the 'functional' service offering, and systemic efficiency and/or value addition within.

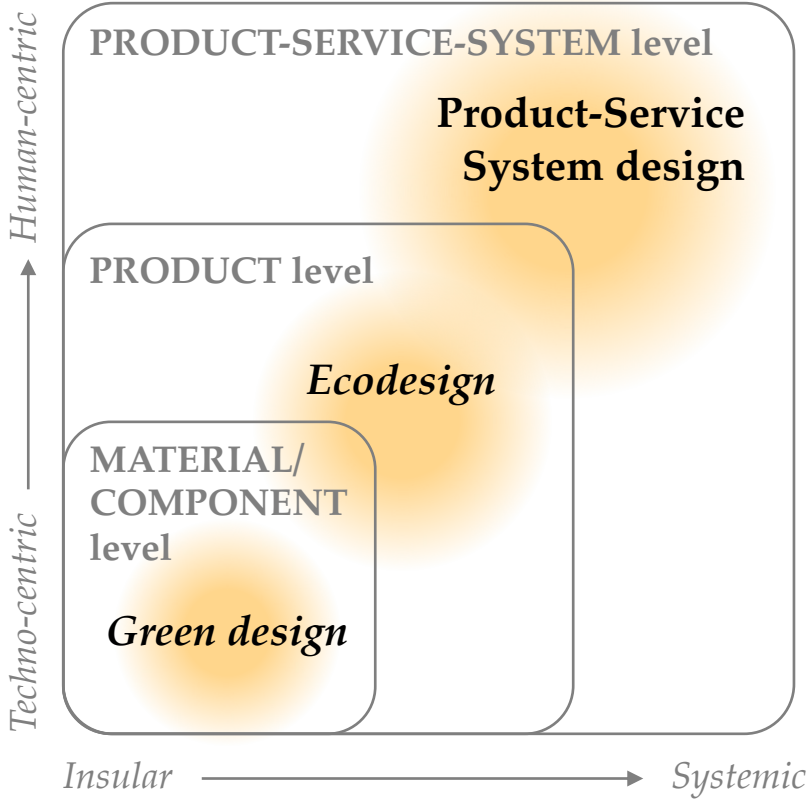


Diagram on right based on DfS innovation framework in Ceschin, F. & İ. Gaziulusoy (2020). *Design for Sustainability – A Multi-level Framework from Products to Socio-technical Systems.* Routledge.

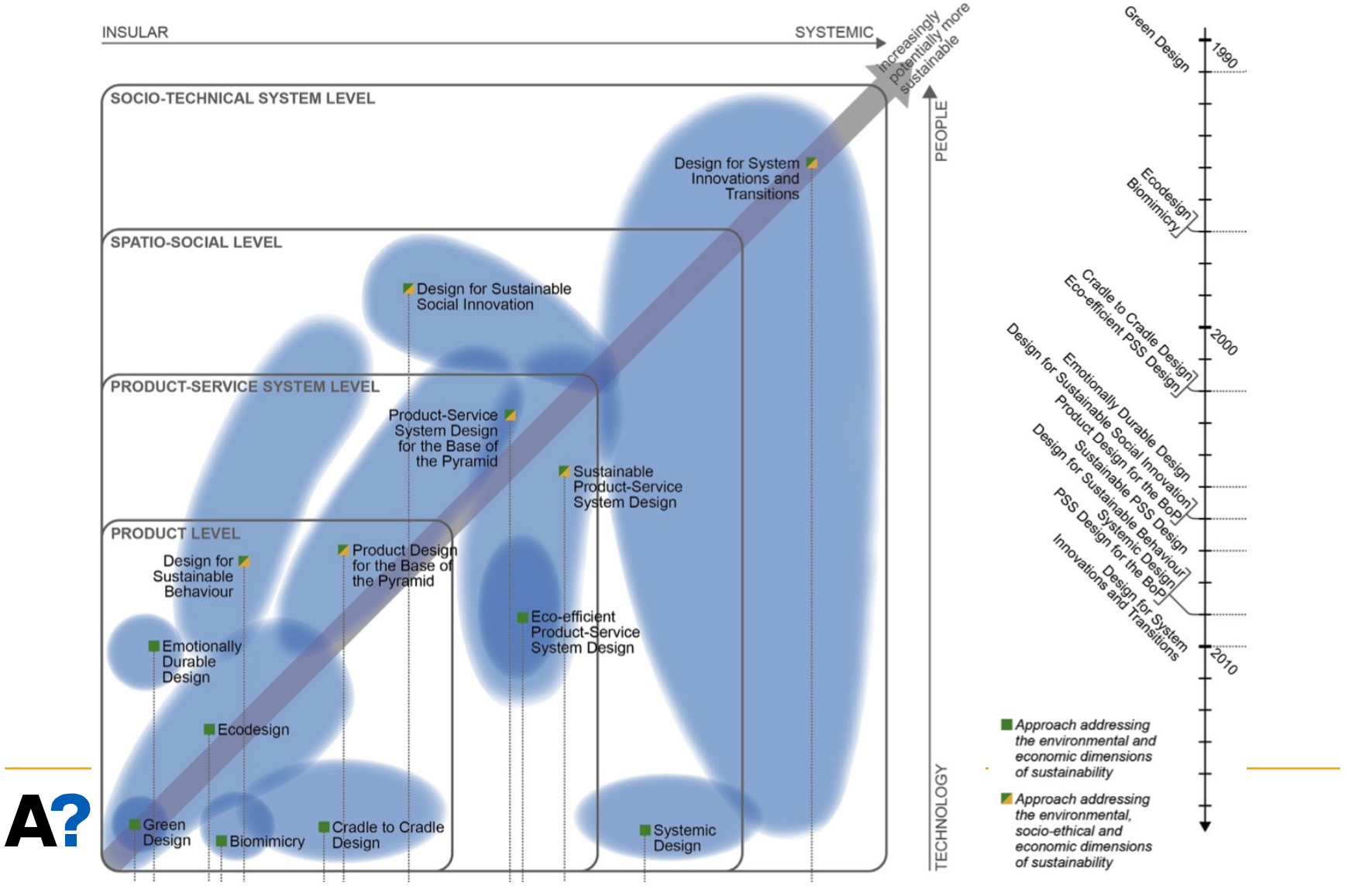
Summary: Strategies for DfS action

Reading for the session concludes (Ceschin & Gaziulusoy, 2019):
Design can (…) act as a catalyst to trigger and support innovation, and can help to shape the world at different levels: from materials to products, product–service systems, social organisations and socio-technical systems.

- There exists a multitude of DfS strategies, orientations, & methods;
  the right approach is a question of context, framing, aim and focus, and so on…

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

- 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


INSULAR
SYSTEMIC
increasingly potentially more sustainable
PEOPLE
TECHNOLOGY
SOCIO-TECHNICAL SYSTEM LEVEL
SPATIO-SOCIAL LEVEL
PRODUCT-SERVICE SYSTEM LEVEL
PRODUCT LEVEL
Design for System Innovations and Transitions
Design for Sustainable Social Innovation
Product-Service System Design for the Base of the Pyramid
Sustainable Product-Service System Design
Design for Sustainable Behaviour
Product Design for the Base of the Pyramid
Eco-efficient Product-Service System Design
Emotionally Durable Design
Ecodesign
Green Design
Biomimicry
Cradle to Cradle Design
Systemic Design
Green Design
1990
Ecodesign
Biomimicry
Cradle to Cradle Design
Eco-efficient PSS Design
2000
Emotionally Durable Design
Design for Sustainable Social Innovation
Product Design for the BoP
Sustainable PSS Design
Design for Sustainable Behaviour
Systemic Design
PSS Design for the BoP
Design for System Innovations and Transitions
2010
Approach addressing the environmental and economic dimensions of sustainability
Approach addressing the environmental, socio-ethical and economic dimensions of sustainability

Session activity

Session readings

Hopefully you had time to check the readings for the session:

Ceschin, F., and İ. Gaziulusoy (2019). *Design for Sustainability – A Multi-level Framework from Products to Socio-technical Systems.* Routledge.

Besides Introduction, you were reading topics on:

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

Session readings

- **Green design & product ecodesign** (Chapter 2) focuses on the negative sustainability impact of a product aspect and/or material use, ultimately covering all life-cycle phases of a product, from raw material extraction to end-of-life.
- **Emotionally durable design** (Chapter 3) aims to extend the use / mitigate sustainability impacts of products (and services) by connecting to feelings, sensations, memory, etc.
- **Design for sustainable behaviour** (Chapter 4) aims to develop systems that are effectively able to steer people's (and organizations') actions towards more sustainable choices
- **Cradle-to-cradle design** (Chapter 5), similarly than ecodesign, puts focus on mitigating the negative sustainability impact of a product-service-system; However, the ultimate aim is to connect end-of-life phases with material production, aiming into closed loop production

Session activity

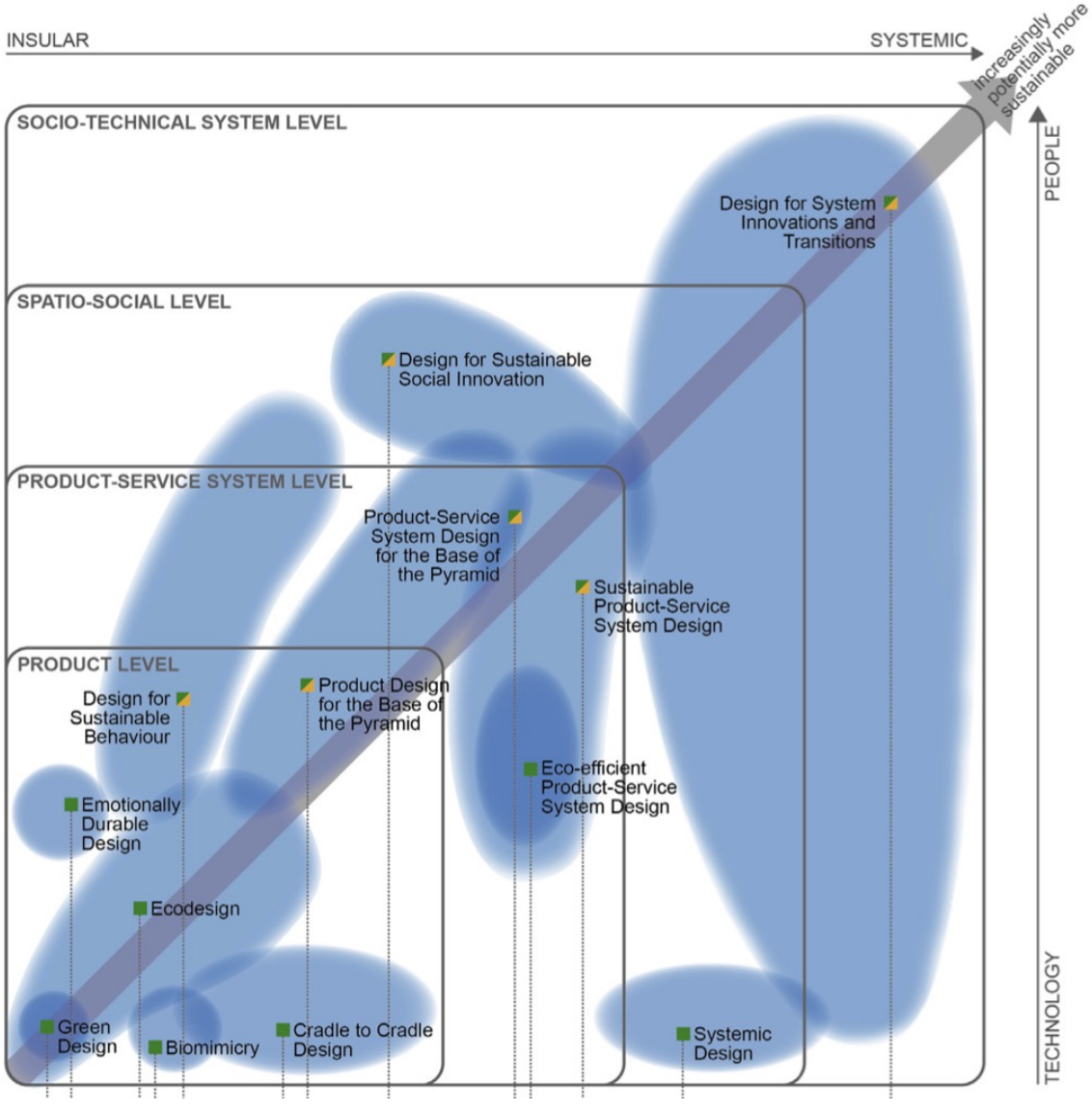
Based on the readings and topics of this session:

- Let's split into 6 random groups (by taking numbers from 1–6)
- Based on your group number, see your focus area of consumption and production below:

1. **Mobility systems; transport**
2. **Energy and heating systems**
3. **Housing systems**
4. **Tourism and recreation**
5. **Fashion consumables**
6. **Mobile & ICT**

- **Get together with your group and begin discussion**
- Think of important drivers that affect in your focus context, and ideate/bring in examples of design solutions that promote sustainability
- **Also consider DfS strategies that were discussed in readings,** how are they visible?

- **Discuss in groups, ideate few examples (30 mins)**
- **Present the strategy and examples to others after 15:30 (5 min each group)**



(Random) groups:

1. Mobility systems; transport
2. Energy and heating systems
3. Housing systems
4. Tourism and recreation
5. Fashion consumables
6. Mobile & ICT

- **Consider design solutions; remember also strategies from readings**
- **Discuss in groups, ideate few examples (30 min)**
- **Present (5 min) main points and examples to others after 15:45!**

Next session & tasks
Case work theme selection

Course and case work schedule

Working days	Tuesdays (13-17)	Thursdays (9:15-12)
Week 1 (10. & 12.1.)	Introduction to course; DfS introduction (F101)	**Case introduction:** **Food system sustainability** (Q201)
Week 2 (17. & 19.1.)	Systemic (PSS) design and circular economy (Q201)	Design for sufficiency (Q201)
Week 3 (24. & 26.1.)	**Presenting case work ideas** (F101)	Assessing and communicating sustainability impacts (Q201)
Week 4 (31.1. & 2.2.)	Scaling-up: socio-technical experimentation(Q201)	Changing consumption and production patterns (Q201)
Week 5 (7. & 9.2.)	One planet game session (L1–241, Puunjalostustekniikka 1)	**Case work tutoring** (Q101) ***Concept poster by Friday!***
Week 6 (14. & 16.2.)	**Final presentations** (F101)	Summary discussion (Q101)

Case work

Besides lectures, the course includes a case assignment in which the students work in 5-6 person teams

Teams work independently but in contact with tutors, and produce design concept ideas that are communicated in presentations, a concept poster, and a more detailed project report

Case presentation days:

- Idea presentations on 24.1. (10 minute presentations)
- Final presentations on 14.2. (<15 minute presentations)

Teams formed for Thursday based on your preference of theme/topic, voting today!

Form to add your theme preferences: https://forms.gle/nXrkupa4RhuCp2xu5

Fill up after today session!

Case themes & topics

Food system sustainability – How to develop design solutions to improve sustainability in food production, consumption and retail?

1. **Rules** – Rules (laws, regulations, recommendations, commitments) can govern citizens', producers', and retailers' activities
2. **Money** – Monetary incentives (both carrots and sticks) can be used for governing choices
3. **Information** – Information can help citizens in making sustainable choices
4. **Selection** – Innovations in the production, availability, and retail can lower co2 emissions
5. **Nudging** – Nudging is about fostering a voluntary change: making the preferred choices easier and the non-preferred more difficult with design solutions

See case topics also in MyCourses…

Theme 1

Rules

Rules (laws, regulations, recommendations, self-made commitments) can govern citizens', producers', and retailers' activities

Bans: smoking is prohibited by law in workplaces and in public spaces

Restrictions: speed limitations can be used for both safety and sustainability

Self-made committments: Companies committ to reducing the number of plastic bags / citizens committ to meatless Mondays

Regulations: waste management legistlation says how waste is to be sorted and handles

Theme 2

Money

Monetary incentives (both carrots and sticks) can be used for governing choices

Tax rewards: in Sweden, you pay less tax for repairing services

Rewards: the CityCap system in Lahti gave rewards for favoring sustainable transport options

Environmental tax: several countries have introduced a flight tax

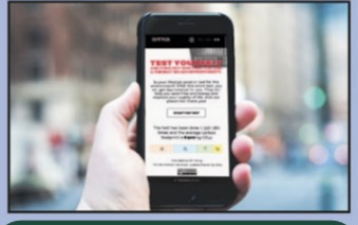
ÖLJY-
LÄMMITYS
VAIHTOON
tukea tarjolla

Economic aid for the change: The government has granted monetary support for households updating their heating systems

Theme 3

Information

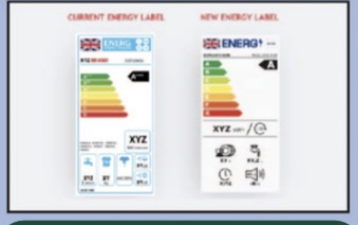
Information can help citizens in making sustainable choices



Carbon footprint calculators, such as the one from Sitra, can provide and overview of emissions and give hints for making changes

Education can build sustainable habits from early on, such as the climate education in the schools of Helsinki

Councelling: Tampere has a energy, water use, and waste management councelling service for citizens



Eco-labelling:
EU directive has made the energy labelling mandatory for household appliances

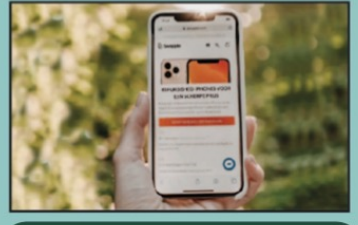
Theme 4

Selection

Innovations in the production, availability, and retail can lower co2 emissions

Assortment of product options: LED lamps for all purposes

Low carbon production R&D and energy efficiency agreements between the producers and the state



E-commerce platforms for green products such as second hand clothing and donations

Public procurement innovations, such as sourcing used furniture for the offices in Malmö city, Sweden

Theme 5

Nudging

Nudging is about fostering a voluntary change: making the preferred choices easier and the non-preferred more difficult with design solutions

Revise infrastructure to support the low carbon options, such as with cycling and public transport

Placement: make the low carbon options salient and visible, with easy access, such as replacing car parking with bicycle parking and bus stops

Bonuses for green choices and coupons: rewarding for the preferred options

Accessibility: making the low carbon options easily accessible such as placing the flea markets and recycling facilities in shopping centres

For next session…

Voting on case theme preferences today – mark your 3 preferences!
https://forms.gle/nXrkupa4RhuCp2xu5

Reflect readings and session topics, interaction in your learning diary…

Thursday (12.1.) agenda (room Q201):

9:15–9:45	Short recap of first session
9:45–10:45	ORSI project and food system sustainability themes (Sanna Tiilikainen)
10:45–11:00	Presenting student groups for each theme
11:15–11:45	Groups meet together and agree on next steps
11:45–12:00	Closing session

Contact your tutor immediately after Thurday session to arrange the first meeting!

Thanks!