Aalto University
School of Arts, Design
and Architecture

Sustainable design S1

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19.4.2022

Agenda

9.15 - 10.00 Course schedule and teacher introductions.

‘Were do you think change comes from’ exercise *https://flinga.fi/s/FQJP4ZQ*

10.15 - 10.30 What is sustainability? How did you approach it in the previous courses?

10.45 - 11.15Sustainability approaches and priorities

- *Planetary boundaries, ‘Radar’*
- *IPAT, ‘Equation’*
- *Circular economy, ‘Butterfly’*
- *Safe and just space for humanity, ‘Donough’*

11.15-11.45 Design – ‘on demand’ / ‘ at root causes’ / ‘for priority materials’

Teaching:

Creative Sustainability

English BA Design

Research: Time use, renewable energy, energy efficiency, DIY

Emerging interests: Energy justice,

Dynamic pricing

Eco-welfare state

ORSI

TOWARDS ECO-WELFARE STATE

Pirjo Kääriäinen
Professor of practice, Design driven fibre innovation
ARTS Design + CHEM Bio^2

My heart:
Nature
Creativity
Culture

My background:
Textile industry
Design + Management
Entrepreneurship

My passion:
Materials research
Design + Science
Interdisciplinarity

Teaching:

English BA Design

CS Eco-Auditing

Research: Transition research, strategic codesign, ecodesign

Emerging interests: Renewable energy, Circular economy

CORE NONTOX

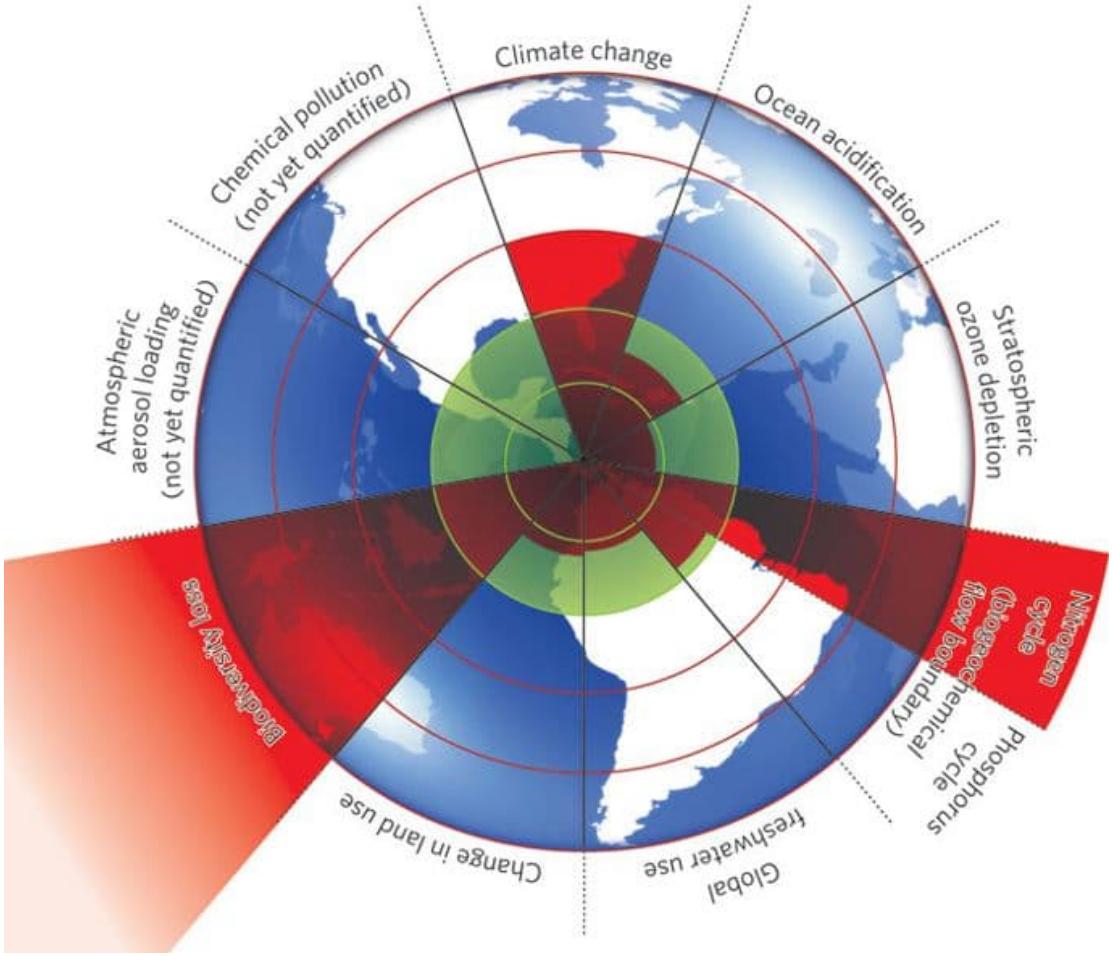
SMART ENERGY TRANSITION

Where do you think change comes from? Driving forces of sustainability?

- **Consumers and value change**
- **Innovative business**
- **Science and technology**
- **Regulation**

Go to Flinga *https://flinga.fi/s/FQJP4ZQ* **and place a sticker on the whiteboard with your name. Instead of a sticker, you can place your photo with your name on it. Use the Presemo Chat to comment (anonymously)** *https://presemo.aalto.fi/artx1008sustainabledesign*

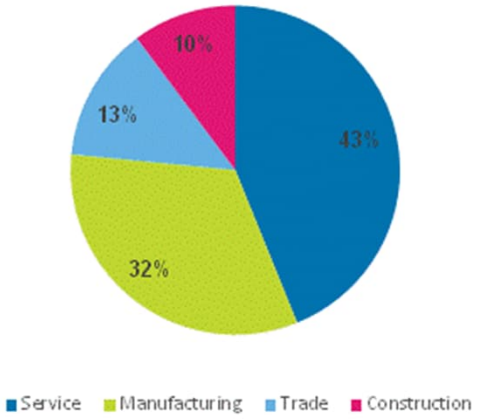
Planetary boundaries



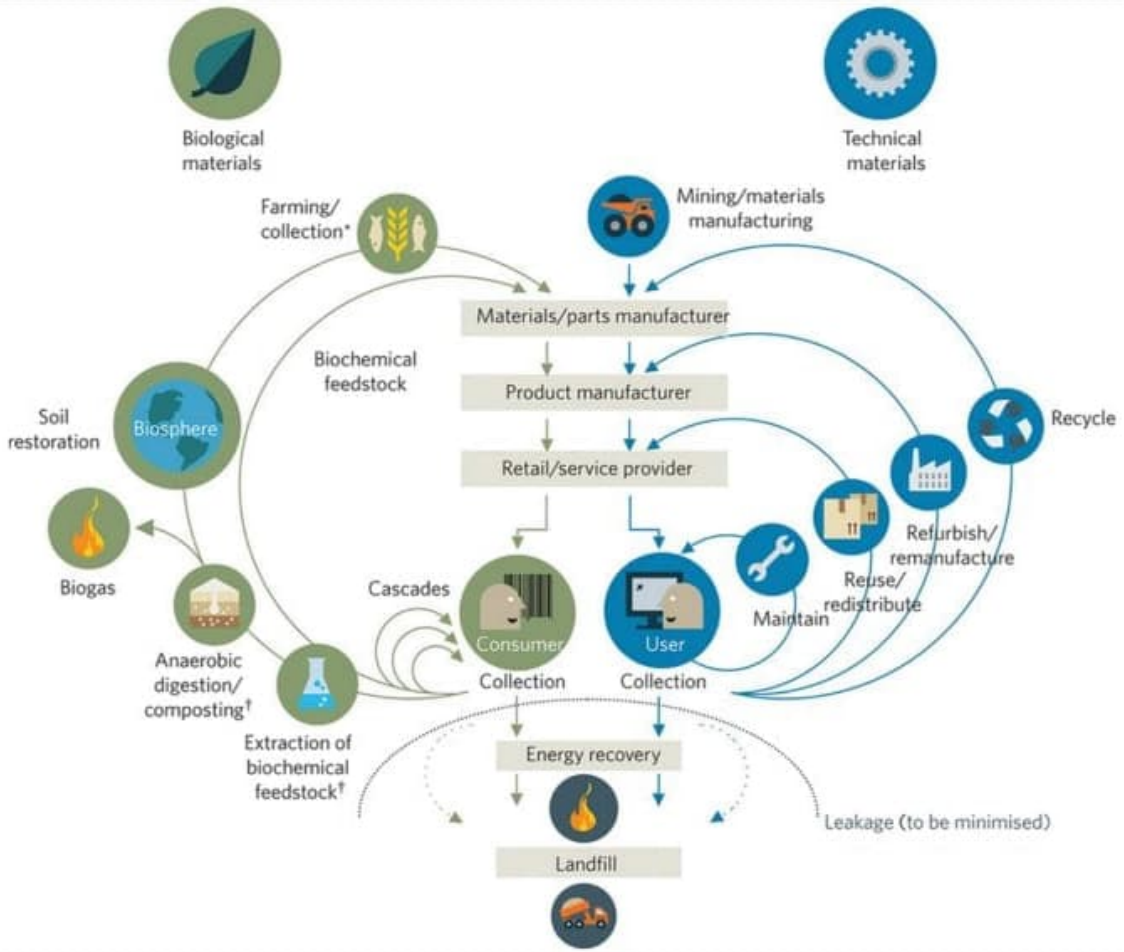
Short description of the logic and dimensions:
https://www.youtube.com/watch?v=8dCU6jd-S9Y
A view on how the economic and political systems are connected to the PP's
https://www.youtube.com/watch?v=qLV4wjdac8A

I=PAT

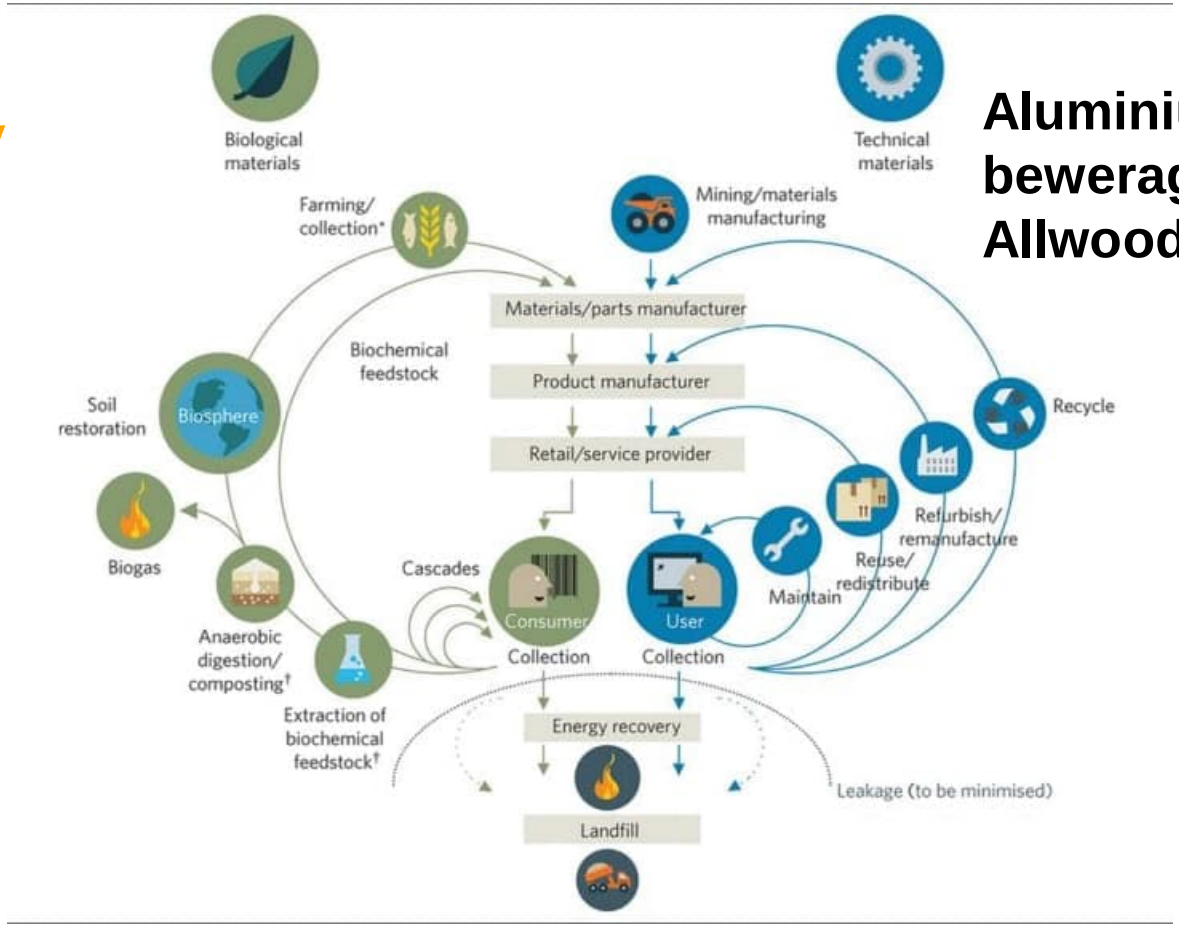
$$I_{mpact} = P_{opulation} \times A_{ffluence\ [€]} \times T_{echnology\ [impact/€]}$$



Circular economy



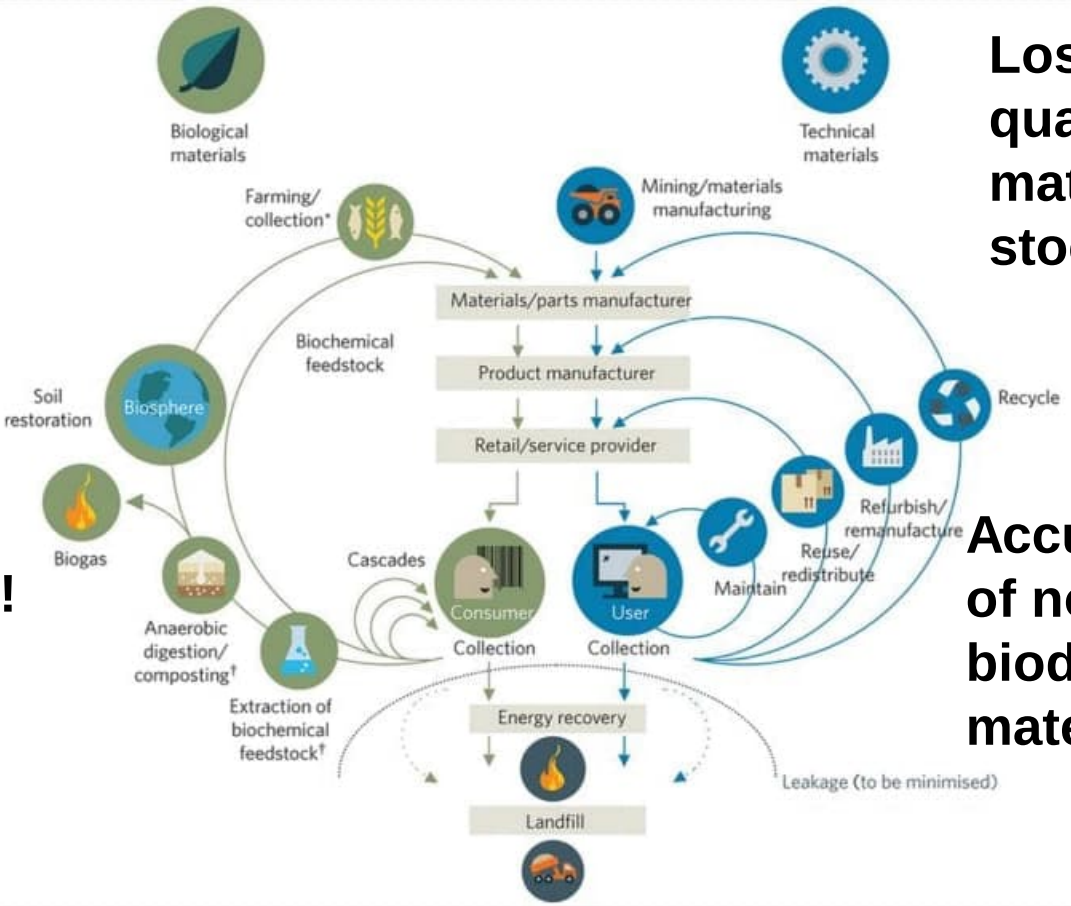
Circular economy



Aluminium bewerage can in Allwood et al ?

Circular economy

Biodiversity!
Land use!
Bio-accumulation!
Soil health!

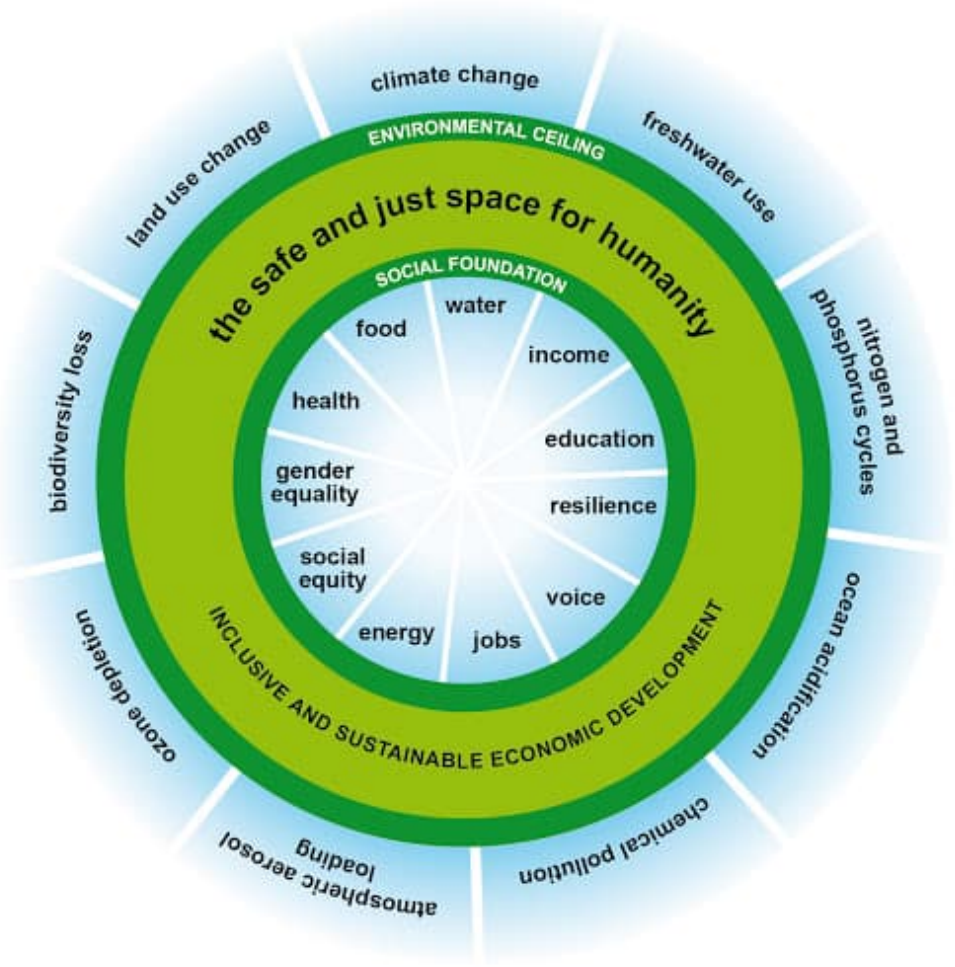


Loss/ quality of the material stock!

Accumulation of non-biodegradable materials

Safe and just space for humanity

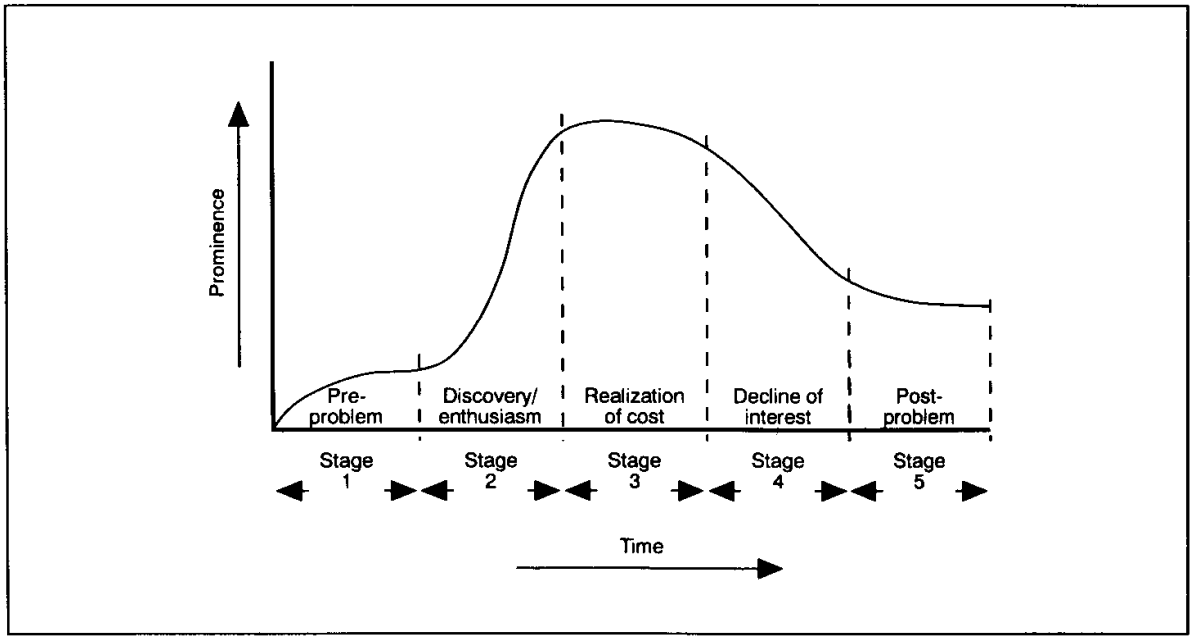
Raworth 2012



What issues to address: what is topics, when to get engaged

Caught in the ‘topical’

‘News’ as entertainment



Downs, A. (1996): The “Issue-Attention Cycle”. *The politics of american economic policy making*, 48.

Emergence of microplastics discourse

The scientific ‘discovery’ took place in 2005.

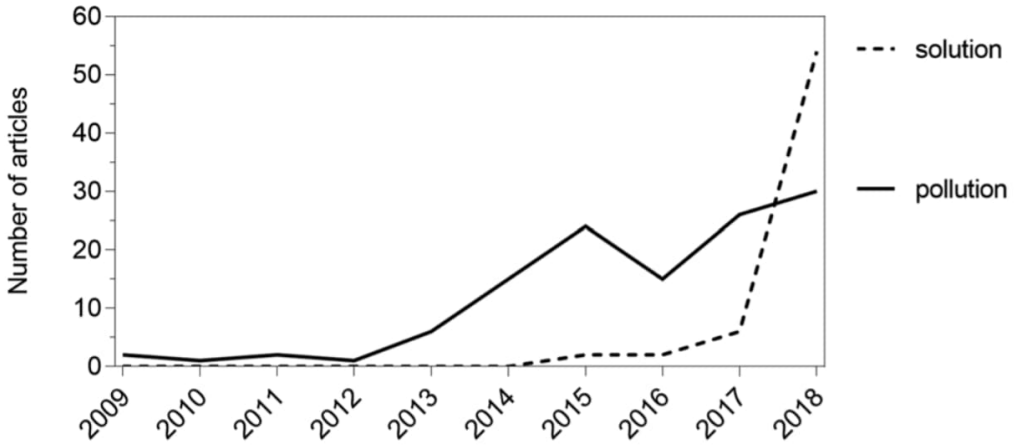


Figure 2. Number of published media articles on (micro)plastics per year addressing two main topics, $n = 186$.

The Guardian (UK), The New York Times (USA), and HuffPost (UK + USA) as quality newspapers and The Sun (UK) and USA Today as tabloids

Völker, C., Kramm, J., & Wagner, M. (2019). On the Creation of Risk: Framing of Microplastics Risks in Science and Media. *Global Challenges*, 1900010.

How to address issues?

A systemic view to microplastic pollution can be found by studying the laundry practices of people and what cleanliness means for them.

Svartström A. (2019): Towards reducing microplastic fiber pollution in local and global waterways. Master thesis in Creative Sustainability.

Flickr: Kasia

Flickr:Йоана Петрова

Allwood et al on materials
(and the embedded CO2 emissions)

Material use is the hidden source of unsustainability.

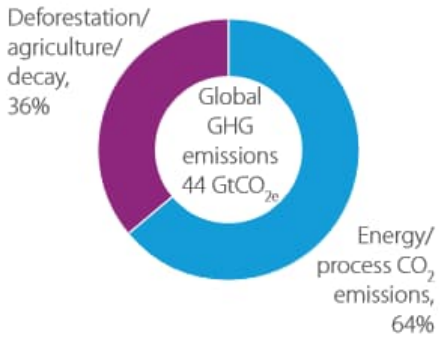
Fundamental for modern/urban lifestyles
High in volume and space
Toxic by-products
Rare and subject to conflict

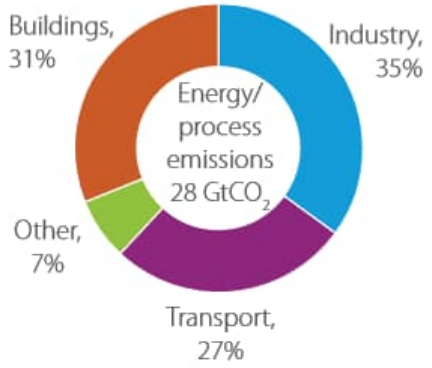
Why ‘With two eyes open’?

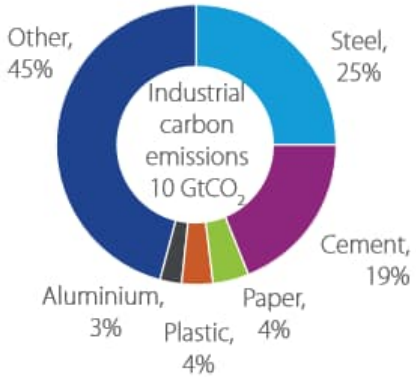

Flickr: Malin and Espen

Allwood et al ch2

- **Most of CO2 emissions are due to energy use and processes.**
- **Industrial processes are the single biggest source of CO2**
- **Steel, cement, aluminum, paper and plastics are most important materials ‘behind‘ CO2 emissions.**

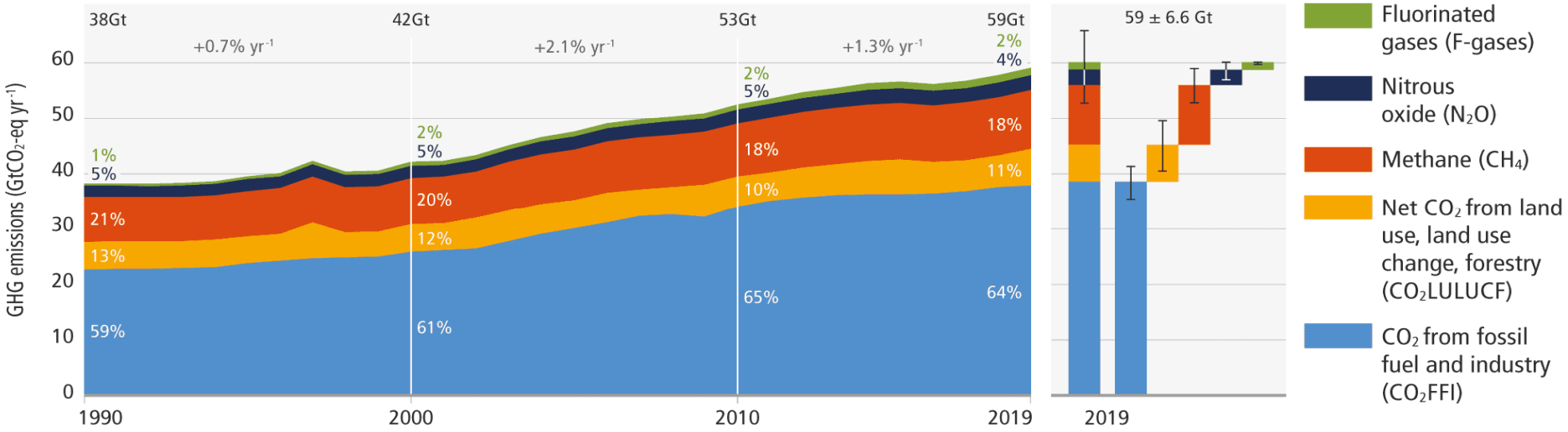




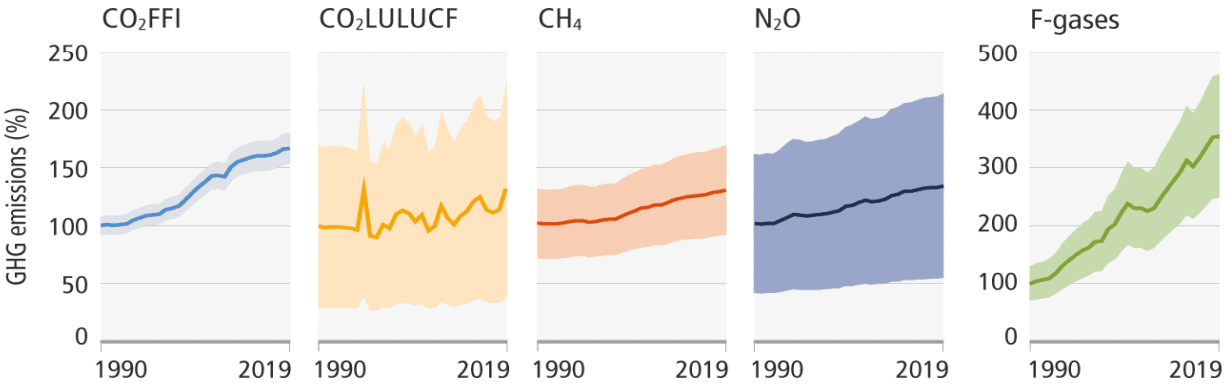


Global net anthropogenic emissions have continued to rise across all major groups of greenhouse gases.

a. Global net anthropogenic GHG emissions 1990–2019 [5]

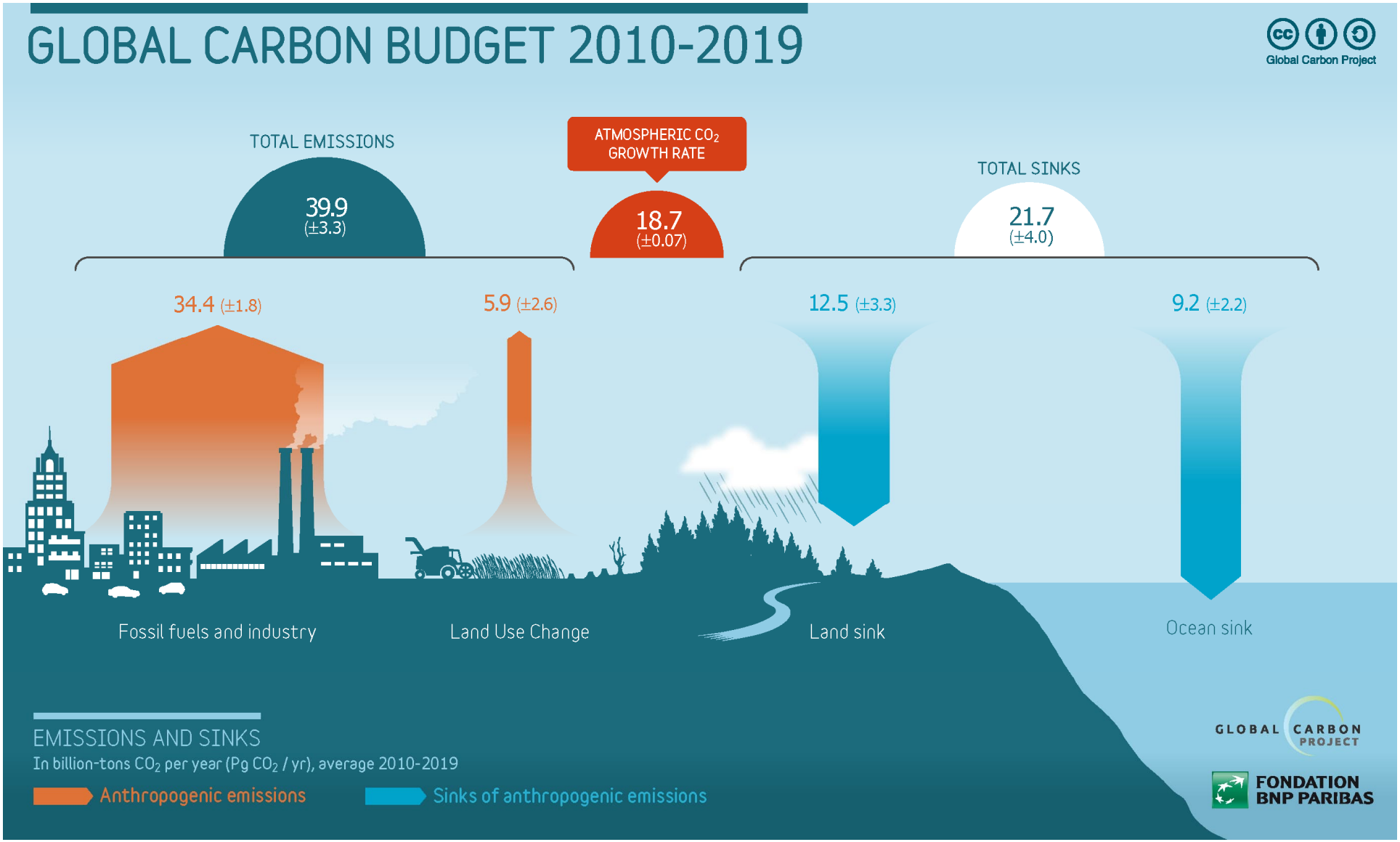


b. Global anthropogenic GHG emissions and uncertainties by gas – relative to 1990



	2019 emissions ($GtCO_2$-eq)	**1990–2019 increase** ($GtCO_2$-eq)	**Emissions in 2019, relative to 1990** (%)
CO_2 FFI	38±3	15	167
CO_2 LULUCF	6.6±4.6	1.6	133
CH_4	11±3.2	2.4	129
N_2O	2.7±1.6	0.65	133
F-gases	1.4±0.41	0.97	354
Total	59±6.6	21	154

The solid line indicates central estimate of emissions trends. The shaded area indicates the uncertainty range.


GLOBAL CARBON BUDGET 2010-2019
Global Carbon Project
TOTAL EMISSIONS
39.9
(±3.3)
ATMOSPHERIC CO_2 GROWTH RATE
18.7
(±0.07)
TOTAL SINKS
21.7
(±4.0)
34.4 (±1.8)
5.9 (±2.6)
12.5 (±3.3)
9.2 (±2.2)
Fossil fuels and industry
Land Use Change
Land sink
Ocean sink
EMISSIONS AND SINKS
In billion-tons CO_2 per year (Pg CO_2 / yr), average 2010-2019
Anthropogenic emissions
Sinks of anthropogenic emissions
GLOBAL CARBON PROJECT
FONDATION BNP PARIBAS

Allwood et al ch2

Industrial production and treatment of materials accounts for half of worlds CO2 eq emissions.

A further breakdown of emissions in China give a proxy for the whole world.

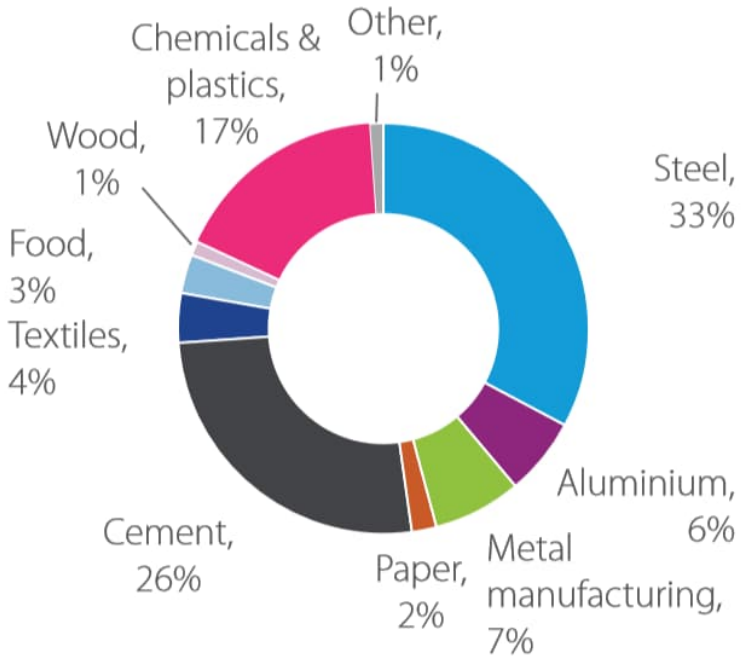


Figure 2.4—**Sources of Chinese CO_2 emissions**

Allwood et al Ch23

What are the problems and solutions to increase business contributions?
E.g.

- **Importance of material costs**
- **Lack of management of product life-spans and reuse**
- **Risk aversion**

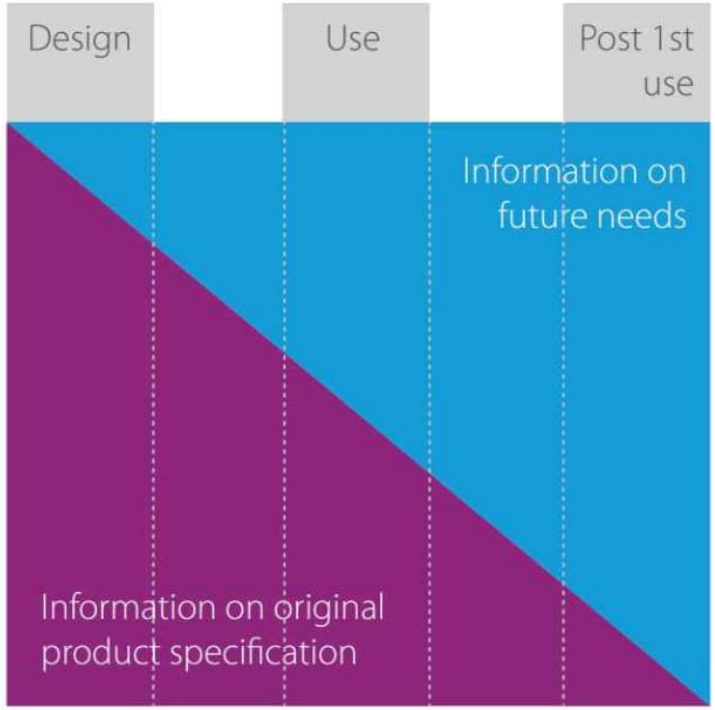
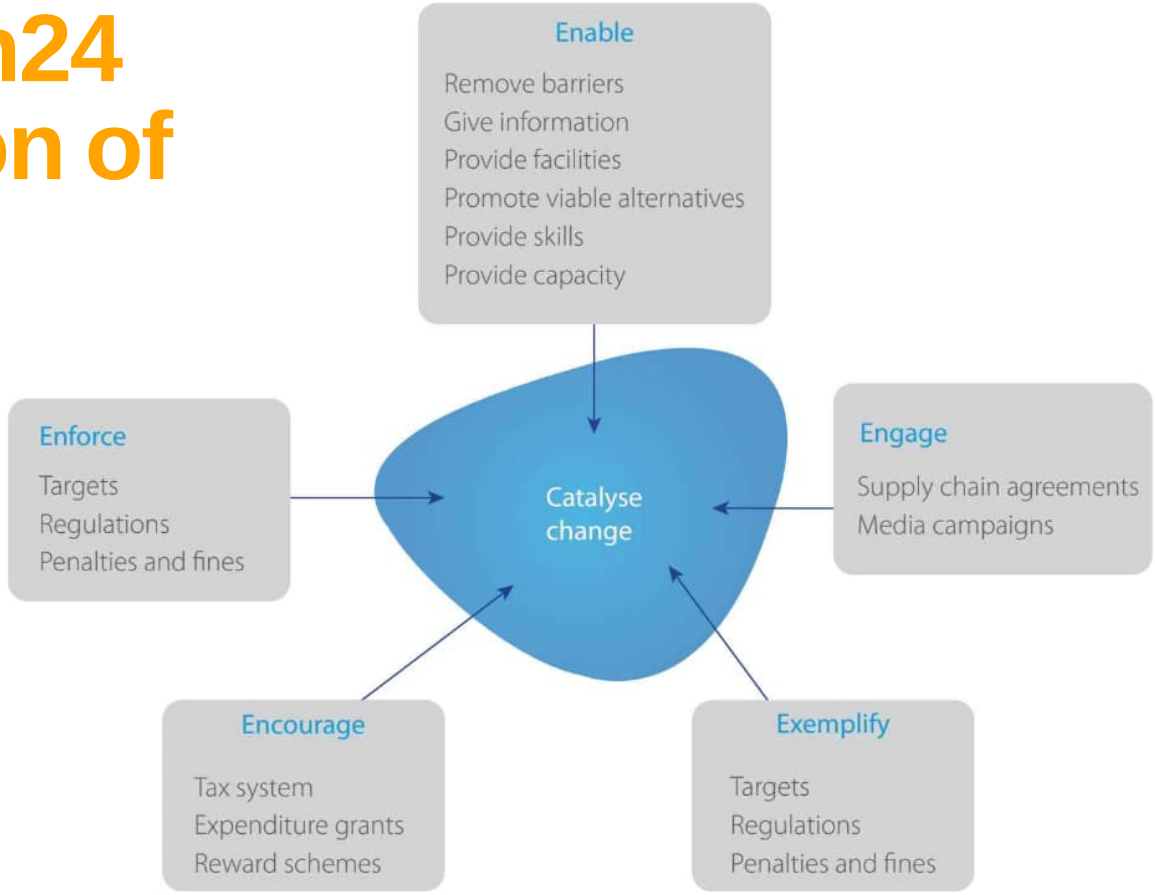


Figure 23.2—**Information availability over the product life cycle**

Allwood Ch24 Contribution of policy



Allwood et al Ch 25

Working in different positions (including product design)

Acting as a consumer

For next time

Read the text by Ceschin and Gaziulusoy

Calculate carbon footprint with SITRA's lifestyle calculator
https://lifestyletest.sitra.fi/

Place your footprint score at https://flinga.fi/s/FQH5S2W

You are also free to choose to place an anonymous score at Flinga. If so please report your score in your learning diary.