

Sufficiency

Lecture 01: Introduction to Sufficiency

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31.03.23



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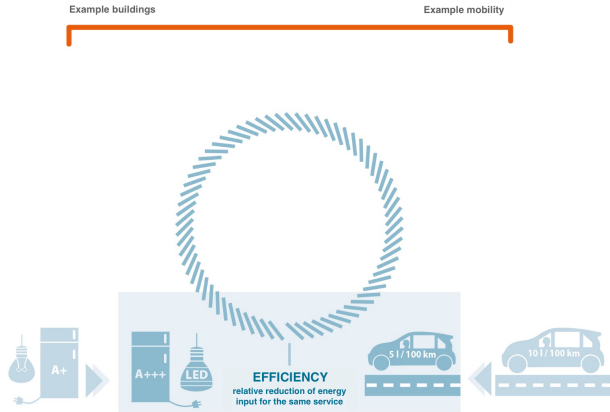
Agenda for today

- Introduce ourselves to each other
- A good life for all within planetary boundaries
- Consumption Corridors
- Strategies to reach climate neutrality: Consistency, Efficiency, Sufficiency
- Seminar content, semester overview and your tasks
- Expectations and questions

Sufficiency?

- There are a lot of definitions, descriptions, aspects, understandings around
- Different among different disciplines and discursive spheres
- We will first dive into some background and different ways to approach or explain sufficiency
- Then come back to the question what sufficiency is and get more to the energy part of it

Three strategies - efficiency



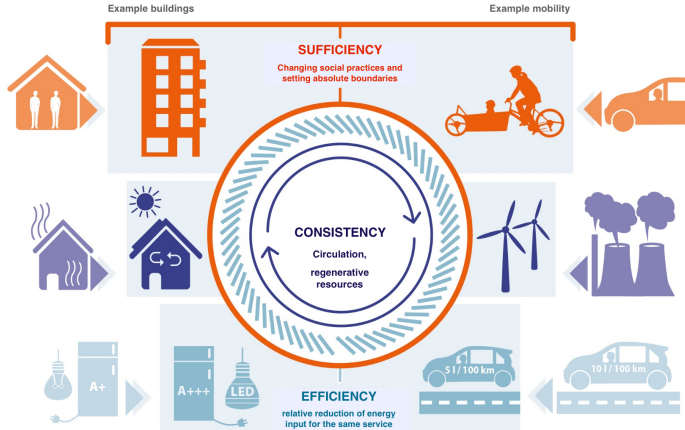
Reference: Böcker et al. (2021)

Three strategies - consistency (renewables)



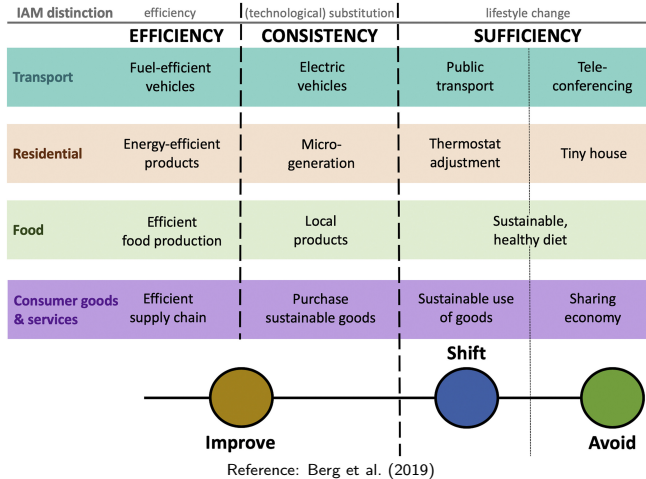
Reference: Böcker et al. (2021)

Three strategies - sufficiency



Reference: Böcker et al. (2021)

3 strategies / Avoid-Shift-Improve



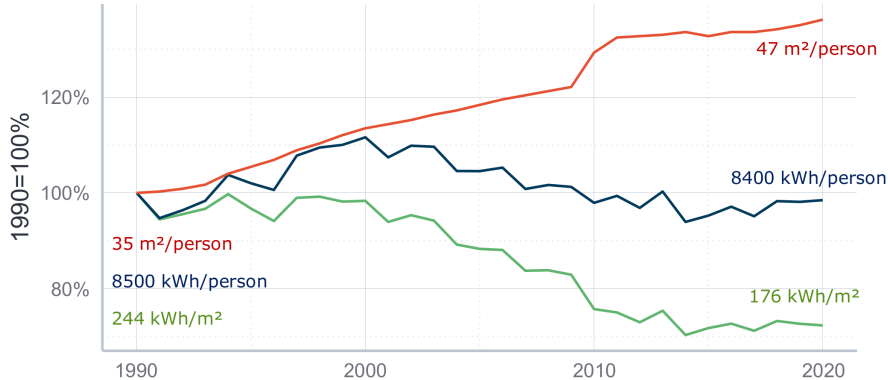
Buzz: Shortcomings of the strategies

Discuss with your neighbour (5 minutes)

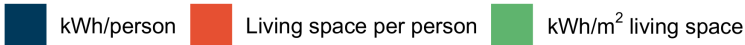
What are advantages and shortcomings of the three strategies to reach climate neutrality?

- efficiency
- consistency (renewables)
- sufficiency

Shortcomings: Example of heating in Germany



Development of **heat demand indicators** in Germany over the last 30 years



Data: German Federal Statistical Office (2000, 2021) and Working Group on Energy Balances (Arbeitsgemeinschaft Energiebilanzen 2021)

Shortcomings: Example mobility in Germany

Goal of the German
federal government
in 2009

**1 Million
electric cars
in 2020**



passenger cars: 40 Million

Status 2020

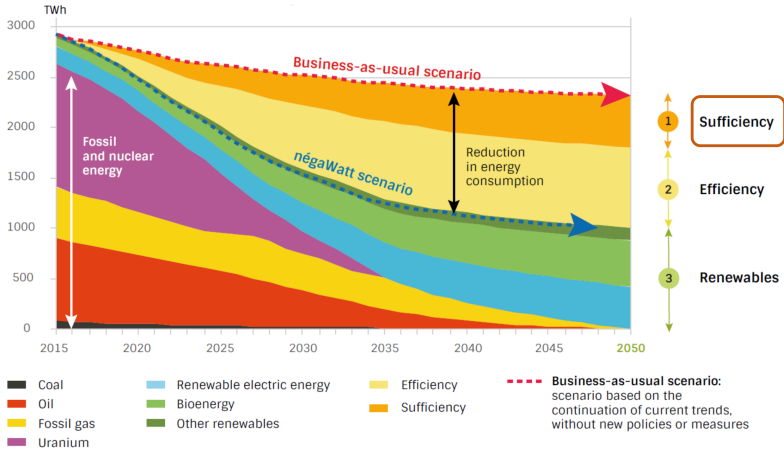


passenger cars: 47,7 Million
electric cars: 0,24 Million

Reference: Jonas Lage, Michaela Christ, Bernd Sommer, based on data from Kraftfahrtbundesamt: Vehicle Fleet - annual (Fahrzeugbestand Jahresbilanz) 2021.

Synergies to reach climate neutrality

French climate neutrality scenario by the Association négawatt



Reference: Marignac (2022)

Additional reasons for saving energy...



Energy efficiency

Could a behavioural change campaign save energy and cut Russian gas imports?

Städteutsche Zeitung

Offener Brief

"Wir alle finanzieren diesen Krieg"

9. März 2022, 16:32 Uhr | Lesezeit: 2 min

Prominente aus Politik, Kultur und Wissenschaft fordern von der Bundesregierung ein Embargo für fossile Brennstoffe aus Russland. Zu den Unterzeichnern zählen die Klimaaktivistin Luisa Neubauer, der Youtuber Rezo

A 10-Point Plan to Reduce the European Union's Reliance on Russian Natural Gas

3 March 2022

International
Energy Agency

Kein Öl für Krieg

10 Maßnahmen, wie Deutschland schnell unabhängig von russischem Öl wird

Wrap-up

- Three main strategies to reduce GHG - renewables (consistency), efficiency, sufficiency
- Shortcomings of renewables and efficiency
- Sufficiency so far underrepresented, but required

A good life for all within planetary boundaries

Buzz - Writing

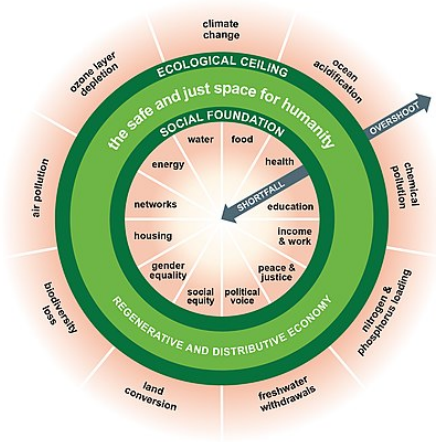
2 minutes

I guess you have heard of the concept of planetary boundaries. Write down the planetary boundaries you remember.

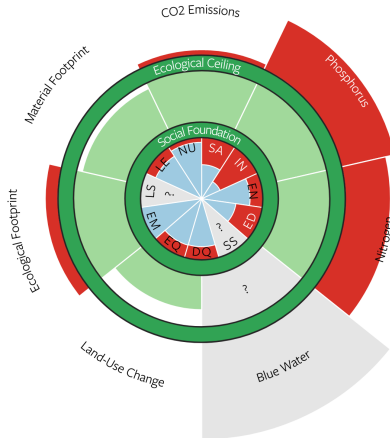
2 minutes

The concept of doughnut economics aims at reaching the safe and just space of humanity between the ecological ceiling (planetary boundaries) and social foundation. Write down aspects of the social foundation you remember or can think of.

A good life for all within planetary boundaries



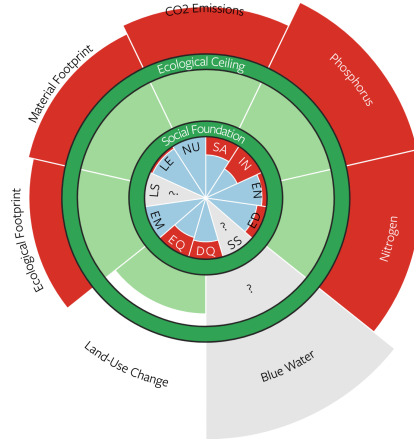
Current trend - World - 1992 - 2015



LS - Life Satisfaction
SA - Sanitation
ED - Education
EQ - Equality

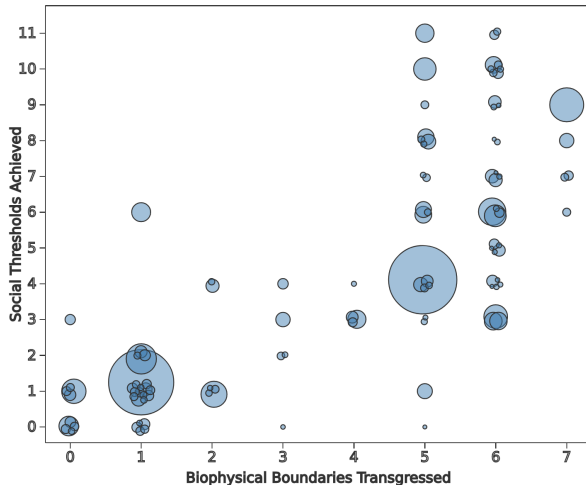
LE - Life Expectancy
IN - Income Poverty
SS - Social Support
EM - Employment

Reference: Fanning et al.
Sufficiency



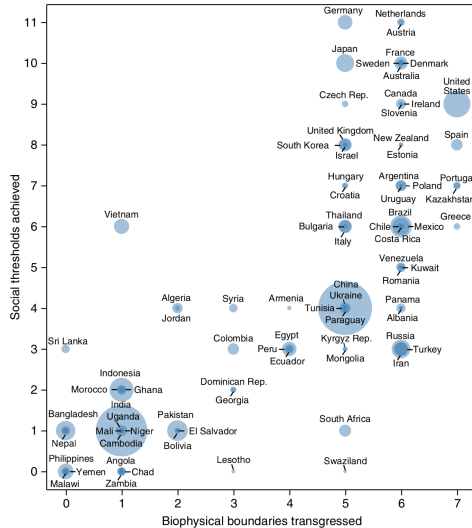
NU - Nutrition
EN - Access to Energy
DQ - Democratic Quality

Biophysical boundaries - Social Thresholds 2015



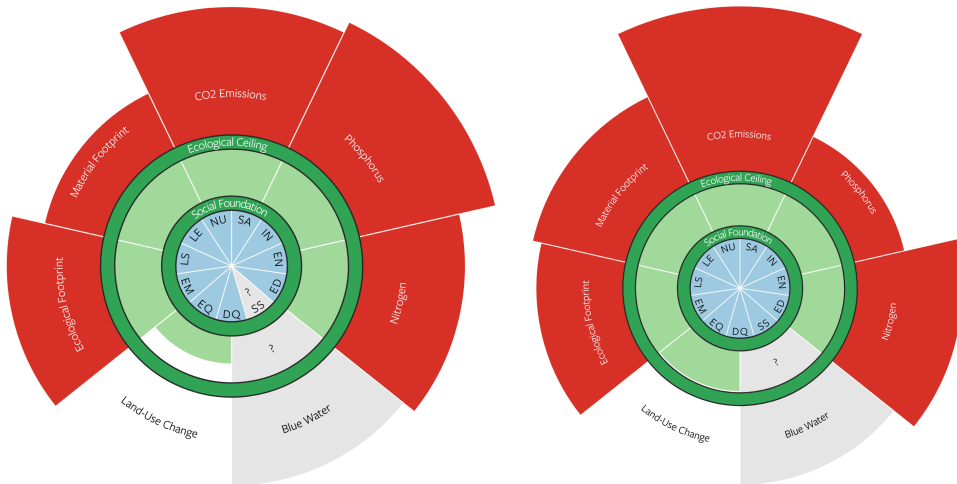
Reference: Fanning et al.

Biophysical boundaries - Social Thresholds 2015



Reference: O'Neill et al. (2018)

Current trend - Germany - 1992 - 2015



Reference: Fanning et al.

Biophysical indicators Germany - Peru 2011/2015

Biophysical Indicator	Germany	Peru	Per Capita Boundary	Unit
CO2 Emissions	10.9	2.3	1.6	tonnes CO2 per year
Phosphorus	4.8	0.6	0.9	kilograms P per year
Nitrogen	75.6	6.5	8.9	kilograms N per year
Blue Water	236	369	574	cubic metres H2O per year
eHANPP	2	3.4	2.6	tonnes C per year
Ecological Footprint	4.4	2.1	1.7	global hectares (gha) per year
Material Footprint	21.6	10.1	7.2	tonnes per year

Reference: Fanning et al.

Social indicators - Germany - Peru 2011/2015

Social Indicator	Germany	Peru	Threshold	Unit
Life Satisfaction	6.6	5.9	6.5	[0-10] Cantril scale
Healthy Life Expect.	70.8	64.6	65	years of healthy life
Nutrition	3539	2624	2700	kilocalories per capita per day
Sanitation	100	71.6	95	% with access to improved sanitation
Income	100	95.6	95	% who earn above \$1.90 per day
Access to Energy	100	91.2	95	% with access to electricity
Education	103.6	95.2	95	% enrolment in secondary school
Social Support	94.7	75.6	90	% with friends or family they can depend on
Democratic Quality	1.1	-0.3	0.8	Democratic Quality Index
Equality	72.1	49.7	70	[0-100] Scale -> $(1 - \text{Gini Index}) * 100$
Employment	94.1	96.1	94	% of labour force employed

Reference: Fanning et al.

For more graphs, country comparisons, data and details checkout
<https://goodlife.leeds.ac.uk>

Wrap-up

- For most Ecological Ceilings, the critical threshold is passed worldwide
- Social foundation has partly improved (Life Expectancy, Nutrition, Sanitation, Income Poverty, Access to energy, Education) - and partly worsened (Equality, Democratic Quality)
- There are large differences between countries, Germany has reached all social foundations while passing the critical thresholds for Ecological Ceiling of CO₂ Emissions, Material Footprint, Nitrogen, Ecological Footprint, Phosphorus (improved)
- Measuring those is difficult, but Fanning et al. and O'Neill et al. (2018) and others make important attempts to make ecological ceiling and social foundation visible in data

Buzz - discuss with your neighbour

4 minutes

Think of a climate change mitigation option.

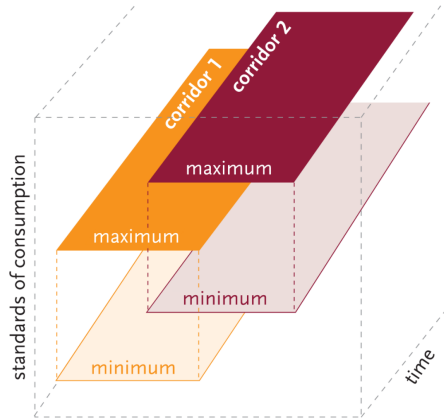
Does this option impact any of the ecological ceilings or any of the social foundations?
In which way?

Idea of Consumption Corridors

- Corridors of sustainable consumption are determined by minima and maxima of consumption.
- The space in between the minima and maxima leaves room for individual life plans and choices.
- Their number and the degree of overlap depends on how many points of reference (fields of consumption, environmental and social impact categories, etc.) will prove to be reasonable and on how much these will be disjoint.
- The corridors have to be periodically readjusted to account for cultural changes, technological developments, changes in resource supplies, and so forth.

Reference: Di Giulio and Defila (2021)

Concept of Consumption Corridors



points of reference (e.g., fields of consumption
or need, categories of impact or resources)

Reference: Di Giulio and Fuchs (2014)

Discussion

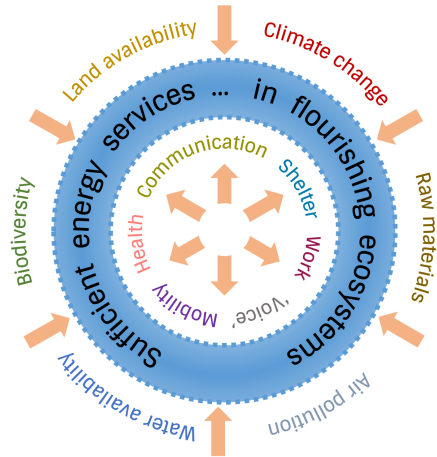
Have you seen this concept or parts of it in practice?

Connection to Sufficiency

Sufficiency is closely connected to the concept of "The safe space for humanity" and "Consumption Corridors" since it is a strategy to reach two sides of ENOUGH

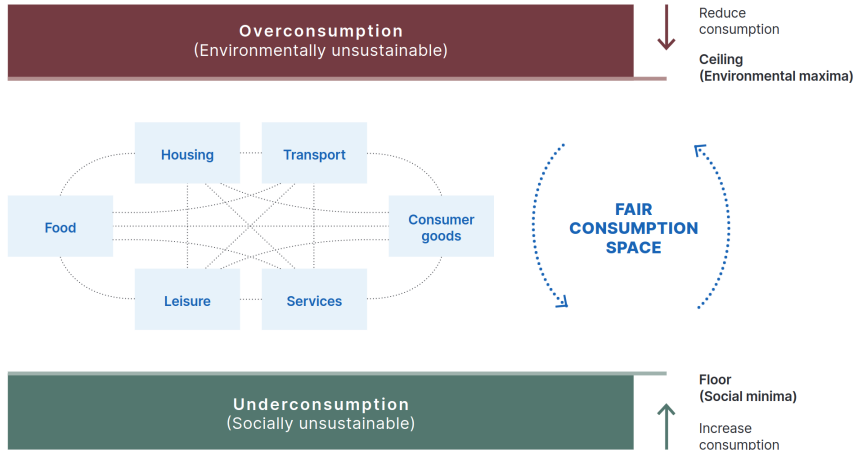
- No over-consumption beyond ecological limits
- Foundation for well-being for all

Sufficiency - Enough in two directions



Reference: Maignac (2021)

Sufficiency - Enough in two directions



Reference: Akenji et al. (2021): 1.5-Degree Lifestyles: Towards a fair consumption space for all

Sufficiency

- One currently overlooked strategy in reaching climate neutrality
- Aims at two sides of ENOUGH:
 - no over-consumption beyond ecological limits
 - foundation for well-being for all
- In contrast to the two other strategies that are focused on technical solutions (Renewables and Efficiency), Sufficiency includes
 - social innovations
 - change of social practices
 - reduction of energy service demand

What is needed?

Bringing **individual services** between sustainability boundaries:

- ▶ A **ceiling** of sound collective levels: the ecological limits beyond which living conditions are threatened
- ▶ A **foundation** of decent living levels: the social minimums below which life in society is degraded
- Moderate global consumption while reinforcing solidarity and redistribution

Energy services



Reference: Marignac 2022

Kaya Identity - a simple equation

GHG-emissions =

Products and services

x

Energy demand

per product/service

x

GHG-emissions

energy generation

-

Negative emissions



SUFFICIENCY



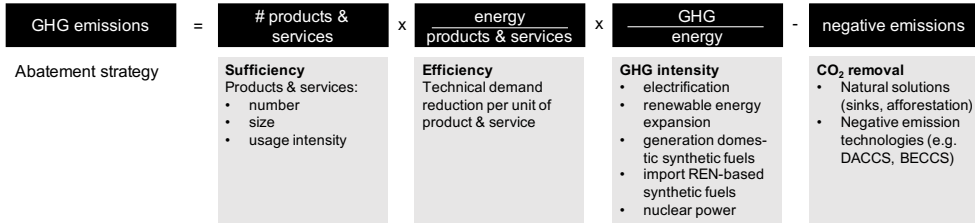
EFFICIENCY



RENEWABLES

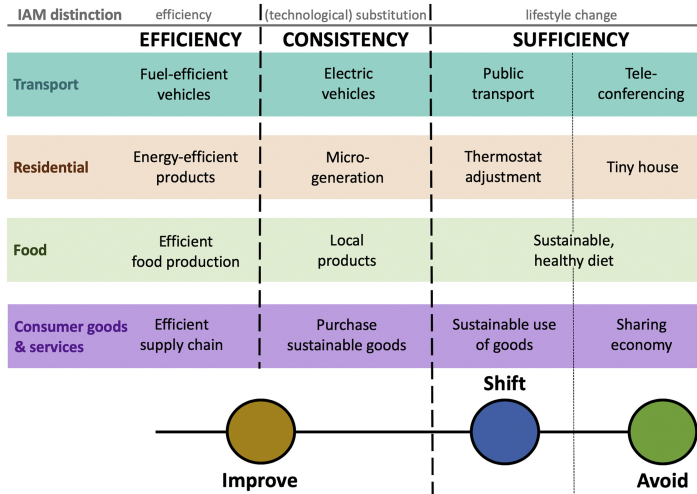
Reference: Kaya Identity / Kai Kuhnhenh, own editing

Kaya Identity - Some more details on strategies



Reference: Wiese et al.

3 strategies / Avoid-Shift-Improve



Reference: Berg et al. (2019)

Task - Mitigation strategies

Go to this Link: Which climate change mitigation options and strategies do you know?

Write down all you can think of.

One option - one line

Get inspired by what others write

Please fill the columns:

- Which sector does the option belong to?
- Is this mitigation option a technical or social innovation?
- Which strategy does this option belong to?
- Is this already implemented somewhere? Where?

5 minutes

Task - Mitigation strategies

Go back to the Link

Tell your neighbour about your mitigation strategies and discuss:

Are there any sustainability issues/problems and/or co-benefits (other good effects besides GHG emission reduction) of your mitigation option?

Add them in the Google Sheet in the respective columns.

10 minutes

Task - Mitigation strategies

Report about your mitigation strategies:

Easy to find some?

Any sufficiency strategies?

One example of co-benefit and one of sustainability issue?

IPCC scenarios for limiting global warming to 1.5 degree

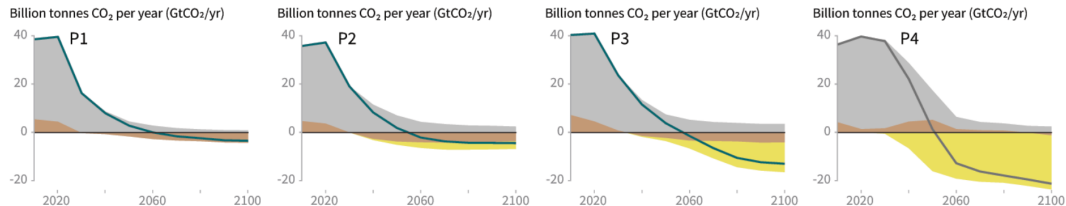
Different pathways depending on the focus:

Social innovations and **demand reduction**

Technical solutions including negative emissions

Breakdown of contributions to global net CO₂ emissions in four illustrative model pathways

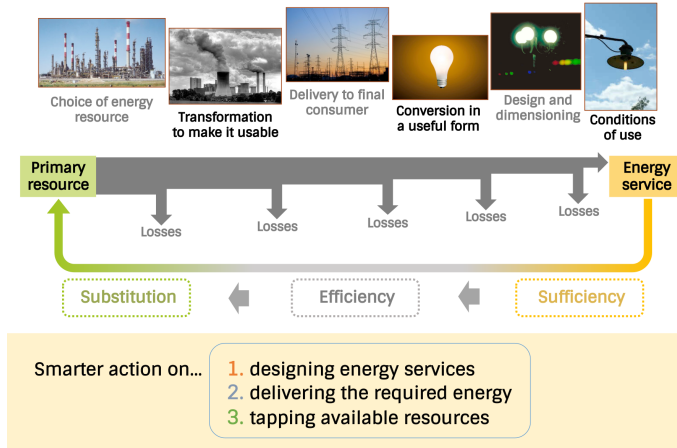
● Fossil fuel and industry ● AFOLU ● BECCS



Reference: IPCC (2018, Figure SPM3P Summary for Policy Makers)

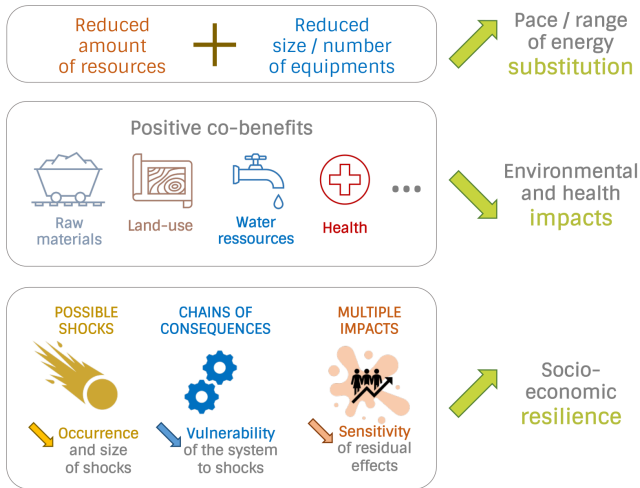
Sufficiency can be...

A pragmatic approach to address a systemic issue



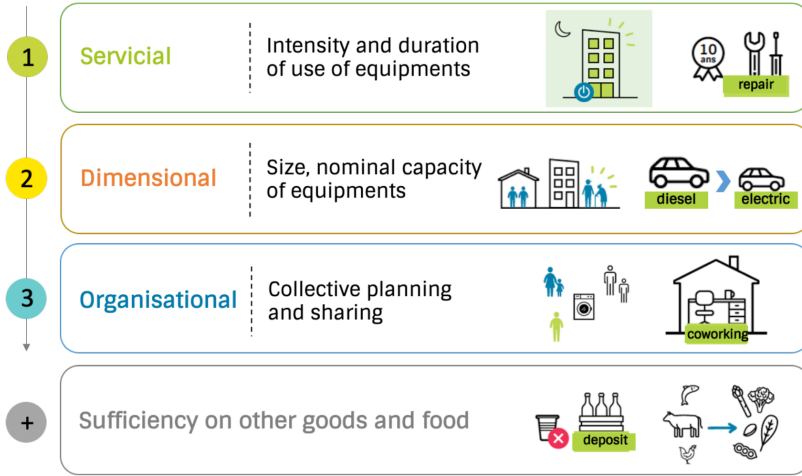
Reference: Marignac (2021)

Sufficiency can be a key enabler



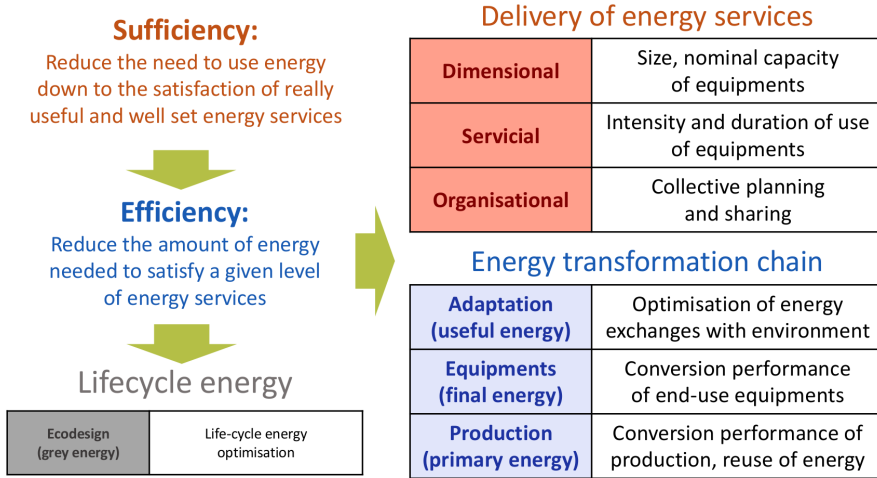
Reference: Marignac (2021)

Sufficiency can have different levels



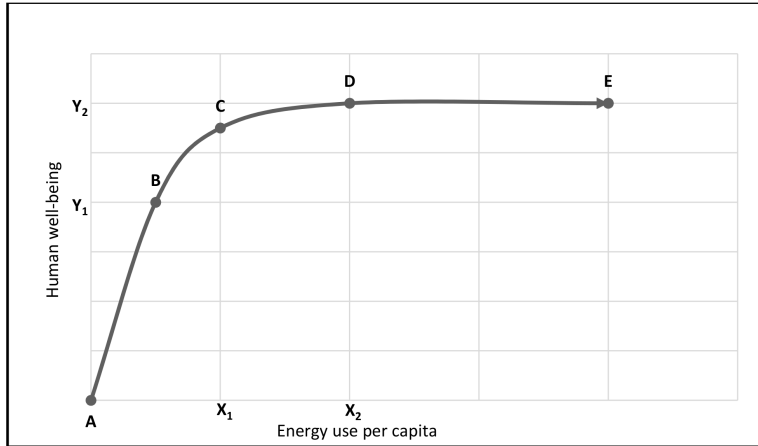
Reference: Marignac (2021)

Energy conservation: Efficiency + Sufficiency



Reference: Marignac (2021)

Energy sufficiency saturation curve



Reference: Burke (2020)

Y_1 lowest acceptable level of human well-being

Y_2 highest level of well-being attainable

\overline{AB} energy poverty

\overline{BD} energy sufficiency

\overline{DE} energy excess

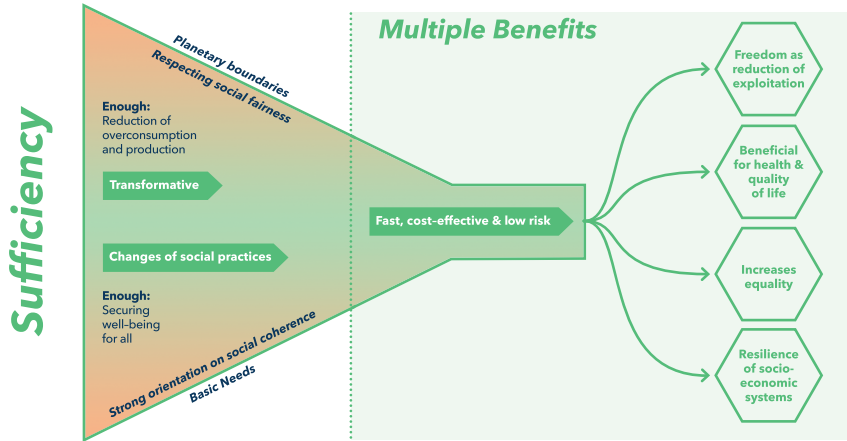
\overline{BC} minimum range of energy sufficiency

\overline{CD} maximum range of energy sufficiency

X_1 to X_2 range of energy use per capita for the energy sufficiency

maximum \overline{CD}

Why Sufficiency?



Reference: Wiese et al.

Summary

- Sufficiency aims at **two sides of ENOUGH**: no over-consumption and foundation for well-being
- Energy use supports human well-being, but only to a certain extent, **excessive energy use does not support human well-being** anymore
- **Consumption Corridors** suggests to derive minima and maxima consumption levels
- Sufficiency is one **yet sparsely employed** strategy to combat climate change
- Efficiency and Renewables are also essential strategies, but **other ecological limits** have to be carefully considered
- We **need all strategies** to reach the save and just space for humanity

Idea of this lecture/seminar

- Gain a basic understanding of sufficiency
- Role, comparison and synergies of different strategies for the energy transition: consistency, efficiency, sufficiency
- Potential of demand-side solutions including well-being effects
- Practical examples of sufficiency in the sectors transport, housing, industry and cross-sectoral
- Role of sufficiency in scenarios and modelling
- Sufficiency policy – status, options, barriers, effects
- Barriers for sufficiency
- Implications of a sufficiency economy: questions of independence of growth

Task until next lecture

Read one of the following texts (can be found on Moodle):

- O'Neill et al. (2018): *A good life for all within planetary boundaries*
- association négawatt (2018): *Energy sufficiency - Towards a more sustainable and fair society*
- Spangenberg (2018) - *Sufficiency: a pragmatic, radical visionary approach*

Optional: short video on "Why sufficiency?"

If you are interested in a Science Slam on Energy Sufficiency, watch (sorry, only in German):

<https://youtu.be/G0Eppx0YI6s?t=2697>

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doi:<https://doi.org/10.1016/j.esr.2019.100420>.
- Burke, M.J., 2020. Energy-Sufficiency for a Just Transition: A Systematic Review. Energies 13, 2444. doi:10.3390/en13102444.

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- Marignac, Y., 2021. Sufficiency scenarios in France (and Europe). URL: <https://energysufficiency.de/en/publications/#talks>.
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