



Designing for system-level and behaviour change

Martin Sjöman, PhD
martsjo@kth.se



Get the dissertation here:

Sjöman, M. (2023). *Living the Change: Designerly modes of real-life experimentation*.
Doctoral dissertation, KTH Royal Institute of Technology.

<https://urn.kb.se/resolve?urn=urn:nbn:se:kth:diva-334934>



Design Research at KTH

Product & Service Design

+ Sustainability

=> Integrating Transition Design & Systemic Design

=> Green Leap research group

Today:

Background:
The challenges
that require new
types of research

Limitations to
current modes of
experimentation

Our design-
driven Living
Labs approach

Learnings and
Design Moves



≈ 7 real-life experimentation
research projects since 2014



2 doctoral dissertations
in 2019 and 2023
presenting a new
approach to design
research



Stockholm, Sweden, 2023



Challenges that require new types of research



Electric SUVs won't save us



Lifestyle changes are needed too



Biofueled planes and drone deliveries don't help



Design can no longer be about fulfilling desires

How to use less energy

By making simple changes, you can make your home more energy efficient, helping reduce bills and lower your carbon footprint. Now that is smart!

Bathrooms

Reducing your shower time by one minute will reduce your bills. Further energy savings can be made by fitting tap inserts and aerating shower heads.

Bedrooms

Do you have spare rooms? Adjust your radiator controls so you don't heat rooms that are unused.

Kitchen

Make sure your washing machine always has a full load. Energy can be saved by using a 30°C wash.

Don't over-fill your kettle and only boil the water you need.

Don't keep water running whilst washing dishes.

Choose the eco setting on your dishwasher and ensure it is full before every wash.

[sms-plc.com/smartnomes](https://www.sms-plc.com/smartnomes)

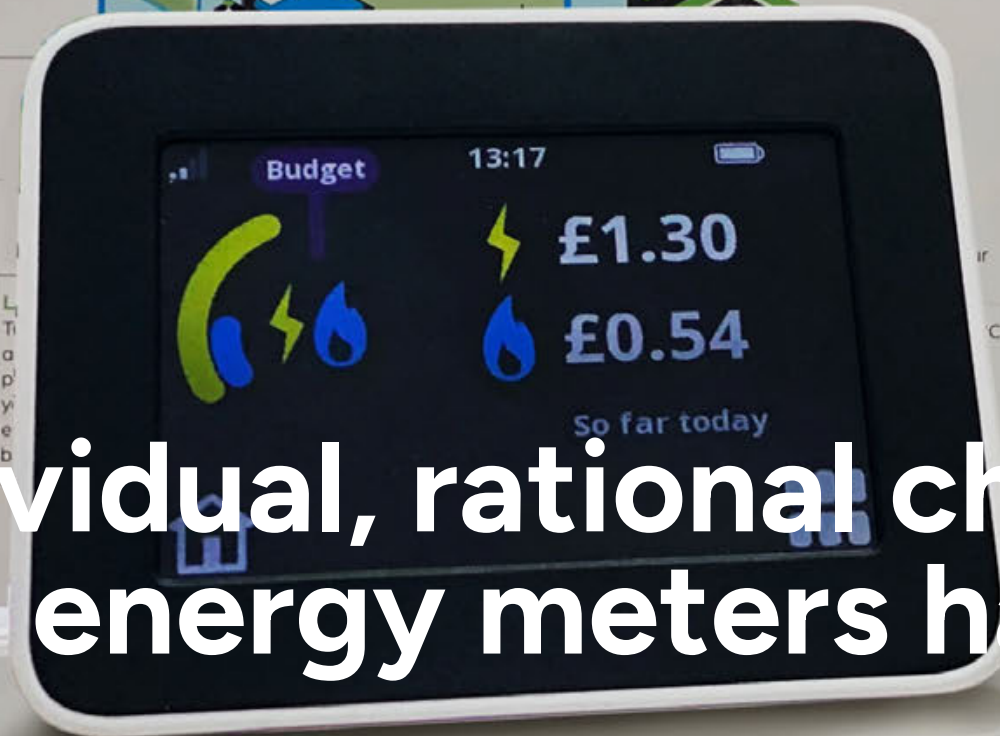


Insulation

Consider loft and wall insulation to prevent heat leakage.

Garden

If the sun is shining turn off the tumble dryer and dry your clothes naturally.



Individual, rational choice and smart energy meters have little effect

How to use less energy

By making simple changes, you can make your home more energy efficient, helping reduce bills and lower your carbon footprint. Now that is smart!

Bathrooms

Reducing your shower time by one minute will reduce your bills. Further energy savings can be made by fitting tap inserts and aerating shower heads.

Bedrooms

Do you have spare rooms? Adjust your radiator controls so you don't heat rooms that are unused.

Kitchen

Make sure your washing machine always has a full load. Energy can be saved by using a 30°C wash.

Don't over-fill your kettle and only boil the water you need.

Don't keep water running whilst washing dishes.

Choose the eco setting on your dishwasher and ensure it is full before every use.

[sms-plc.com/smarthomes](https://www.sms-plc.com/smarthomes)

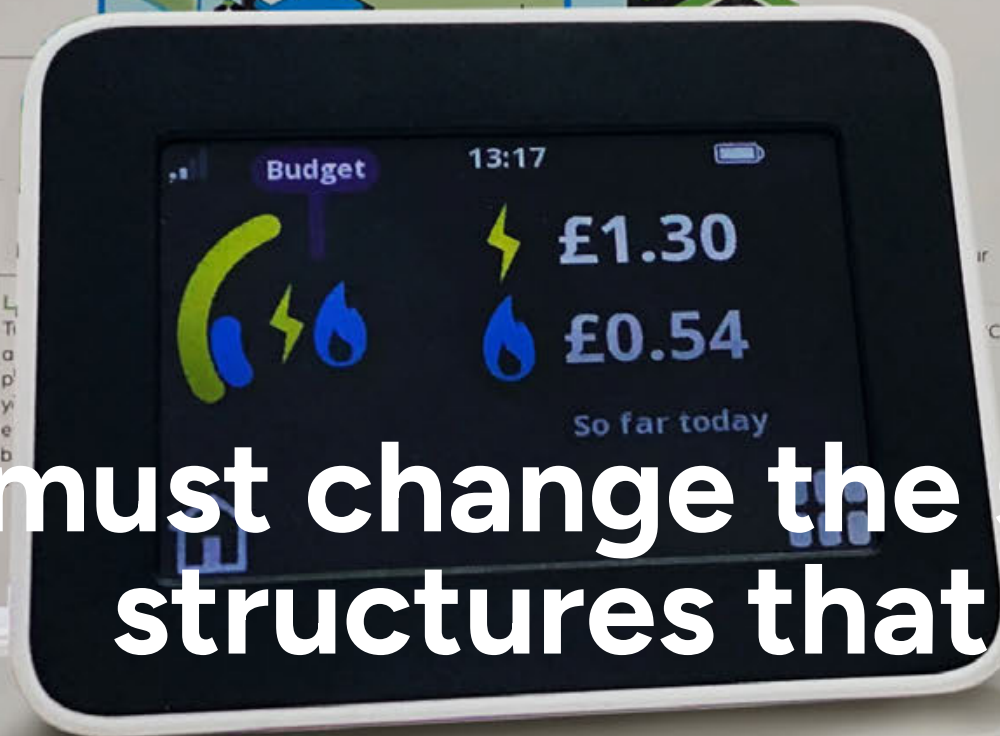


Insulation

Consider loft and wall insulation to prevent heat leakage.

Garden

If the sun is shining turn off the tumble dryer and dry your clothes naturally.



We must change the socio-technical structures that guide behavior

**For this, real-life
experimentation is needed**

What type of research is asked for?

Many calls for:

- More action-, experience- and learning-oriented forms of research¹.
- Shifting focus from individual behaviour and rational choice to social practices and societal structures².
- Research to explore desirable and sustainable futures and lifestyles³.

“ ... climate change policies most of the time refer to not doing things or doing things in ways that require extra efforts ... /... like ‘eat less meat’, ‘reduce your car use’ and ‘fly less frequently.’ ”

1. Loorbach et al., 2017; Hildén et al., 2017; Fazey et al., 2020, Caniglia et al., 2021
2. Shove & Watson, 2006; Shove & Walker, 2009; Spaargaren, 2011; Scott et al., 2012
3. Jackson, 2005; Dauvergne, 2008; Spaargaren, 2011, p. 820; Irwin et al., 2015



Modes of real-life experimentation research

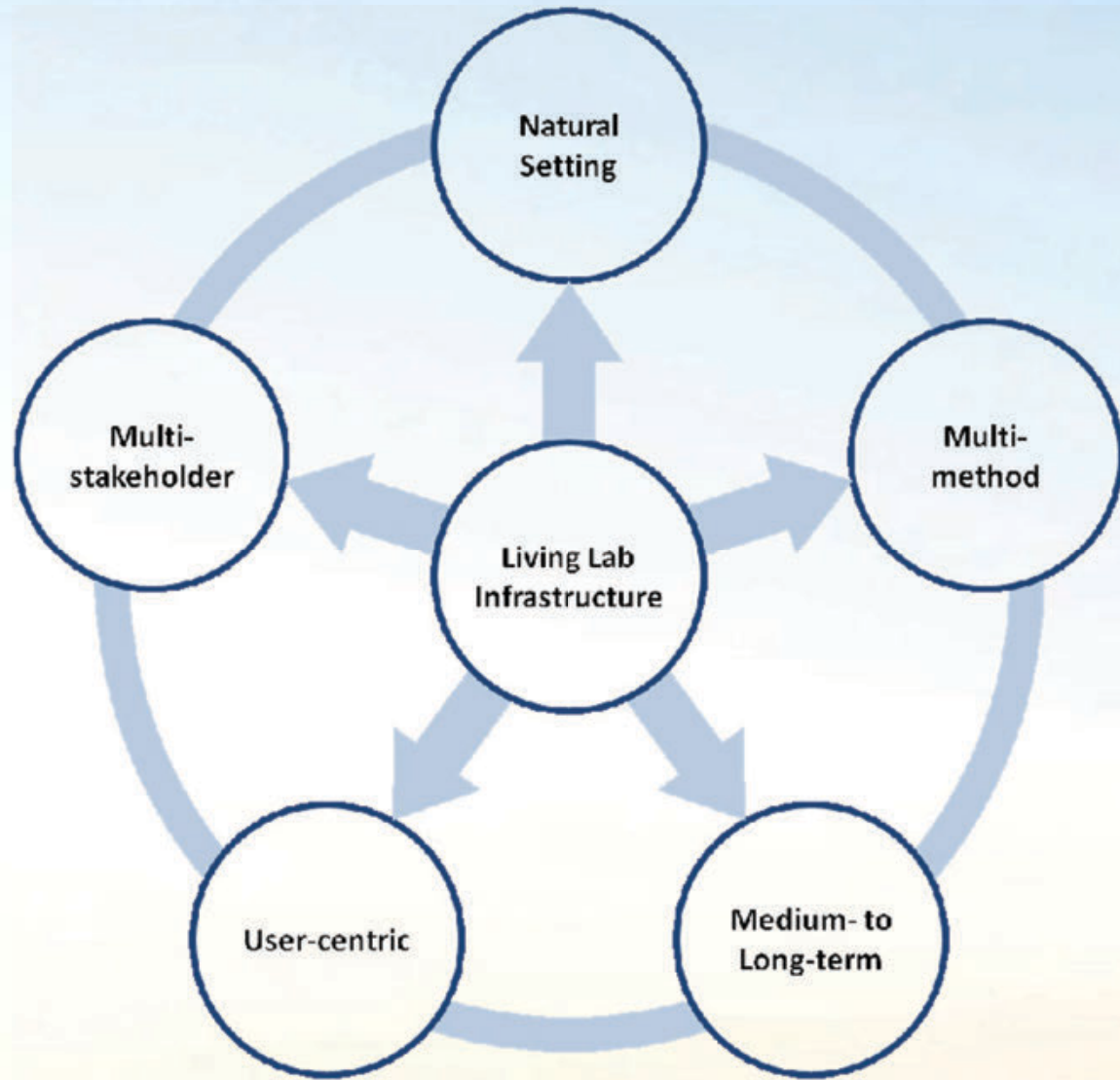


An experimental turn

Sustainability solutions must be explored in real-life to understand socio-technical system relations, and how innovations are used and adopted by people ¹.

Ongoing shift towards more real-life experimentation approaches, known as living labs, transformation labs, urban- or real-world laboratories, pilots, testbeds and demonstrators ².

1. Dourish and Button, 1998; Elzen et al., 2004; Spaargaren, 2011; Edwards & Bulkeley, 2017; Loorbach, 2017
2. Corsin Jimenez, 2013; Schöpke et al., 2018; Sengers et al., 2019; McCrory et al, 2020



The growth of living labs

Graphics: Schuurman, Marres & Ballon, 2018.

Photo: HSB Riksförbund, Sveriges första organiska flödesbatteri i pilotskala installeras i hsb living-lab (press release)



Common characteristics of pilots and living labs

Mostly viewed as part of a development process, for evaluating, refining and implementing new technologies¹.

Earlier stages of explorative research are rarely included, and social aspects often neglected².

Due to late research stages and stakeholder agendas, objectives are often narrow³.

=> Limited open-ended exploration

1. Leminen et al., 2014; Hossain et al., 2019
2. Steen and van Beuren, 2017; Puerari et al., 2018;
3. Kommonen & Botero, 2013; Hakkarainen, 2017; Tironi, 2020



Common characteristics of pilots and living labs

User-centricity often relates to gaining user/consumer acceptance and adoption¹.

=> **Perceived user needs and current lifestyles are rarely challenged.**

1. Puerari et al., 2018; Ryghaug et al., 2018; Marres & Stark, 2020

Common characteristics of pilots and living labs

Users/citizens are often engaged either for:

- testing a technology in real life
- or as co-creators in workshops
- or to take ownership in grassroots action

= > In real-life contexts, open-ended exploration or experimentation is uncommon¹.

1. Chilvers et al., 2018; Marvin et al., 2018; Compagnucci et al., 2021; Brons et al., 2022; Sjöman, 2023



**So how did we design our
design-driven labs differently?**

Car-free living

Intervention:

Three suburban families were recruited to live one year without their cars, replacing them with LEVs. To experiment and learn new ways.

Aim:

To explore and demonstrate car-free life. Understand what a car-free city would look like if this lifestyle would be the norm.

Learnings:

Many barriers to car-free life were revealed. The families had to experiment, learn new ways, go against norms and conventions, and make changes to their lifestyles.

Many societal structures were found to be missing or unfit for supporting car-free life.



New mobility playing-rules

Intervention:

Nine participants tried out a set of possible future economic mobility policies with real money. This while logging all their travel and seeing the exact cost of each trip by car.

Aim:

To learn about people's everyday travel, understandings of travel costs, motivations and limitations for making changes.

Learnings:

People's strategies for not knowing the car's real costs may limit travel mode shifts.

Only congestion and parking trouble seem to affect car-driving.

"Middle-sized flows" are an opportunity for new travel services.



A super-local workhub

Intervention:

People in an outer suburb, with long commutes, got access to an office space close to home.

Aim:

To understand the real effects on daily travel, especially potential rebound, health and lifestyle effects.

Learnings:

Many participants expressed plans to use it a lot. Those that did described increased well-being, but very few participants used it regularly.

By asking some to use it more, many types of barriers were identified, that halted the shift to remote work.

Very difficult for some of the employers.



Trying out coliving

Intervention:

Building a coliving apartment in a building permit free testbed. Recruiting 4 students to live there for one year.

The students were challenged by designing for very little private space but great shared spaces, while supported by an onboarding workshop, social dinner kits and cleaning schedules.

Aim:

To try it out for real, while carefully following and monitoring the social sharing experience and evolving sharing practices.

Learnings:

The students developed family-like relations that were very supportive. Things that are commonly seen as non-attractive proved to be no issue at all.





So how did we design our design-driven labs?

Envisioning a future sustainable concept that challenges current norms and lifestyles and enables new practices.

Viewing the concept as provisional, and as a learning device. Not a solution to be developed.

Staging it as a design intervention, within the complexity of everyday life, and over time.

Ask users to engage as “co-researchers” to explore this future.

Support and encourage the co-researchers in experimenting with changing their daily practices, and reflecting upon their lifestyles.

Engage relevant societal actors both in staging and exploring the concepts, to provide actionable learnings.

Open-endedly identify barriers and motivators for people and society to move towards this future.



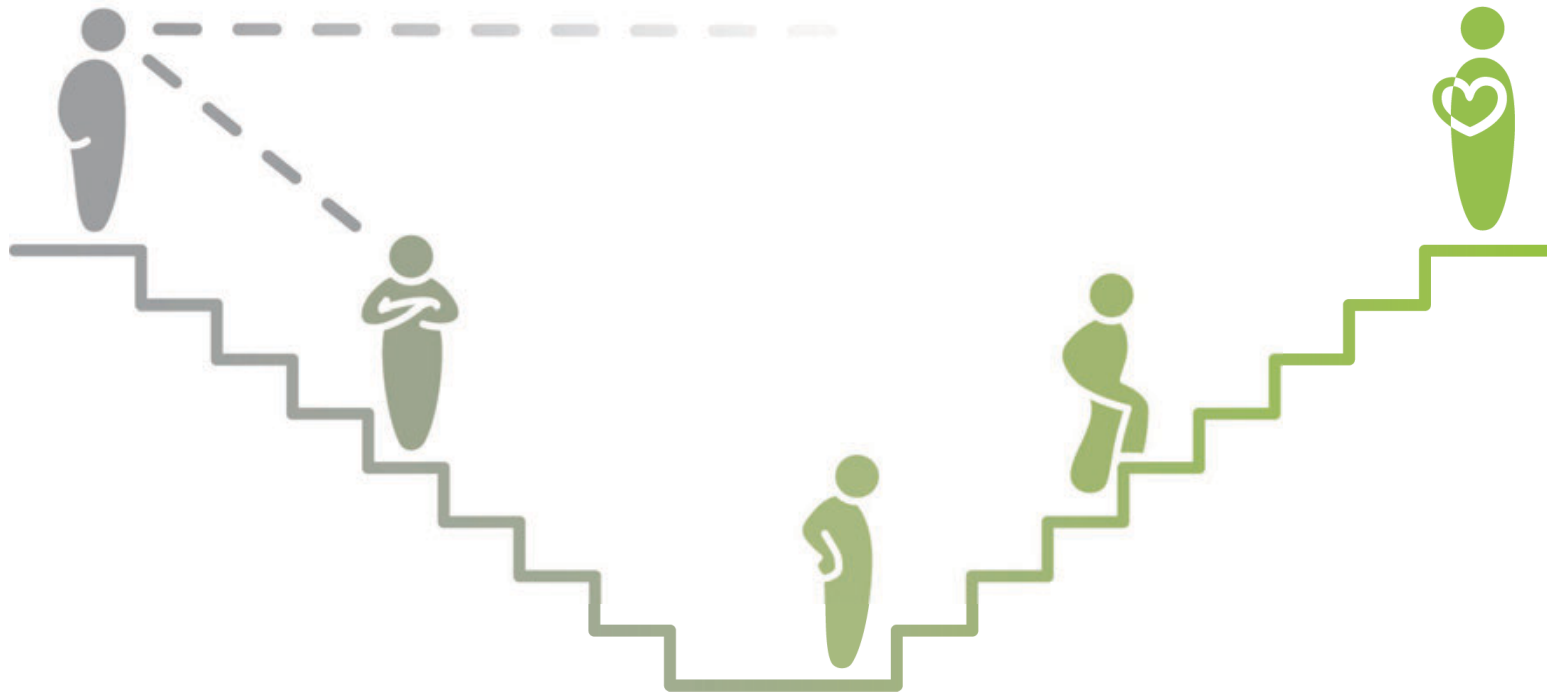
So how did we design our design-driven labs?

- ✓ Viewing concepts as **provisional** allowed for more open-ended exploration and learning
- ✓ A **practice-oriented** mindset let us challenge perceived user needs and current lifestyles
- ✓ Engaging people as **co-researchers** allowed for experimentation in everyday-life contexts

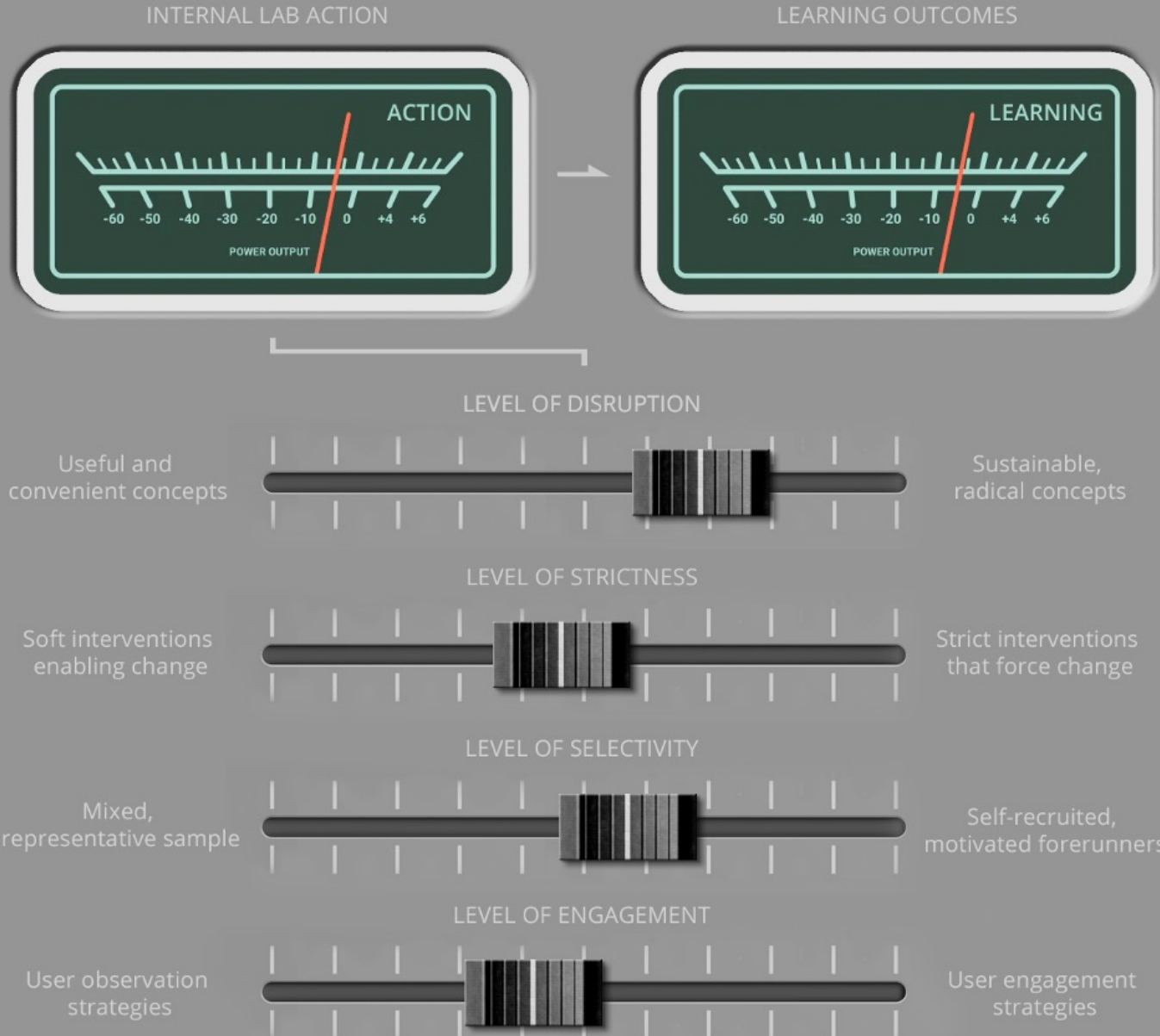
Backcasting in real life



Exploring desirable and sustainable lifestyles: Passing the 'Valley of Inconvenience'



"Balancing"





How to design YOUR study or project

1. In what research stage are you?

Learning and framing a complex issue? – Developing or even testing a solution?

Explore & frame ——— Innovate ——— Design/develop ——— Test & evaluate

Main aim is learning

Early research stages

Open-ended
exploration

Mostly design or
research-led

Mostly small scale

Main aim is solving

Later research stages

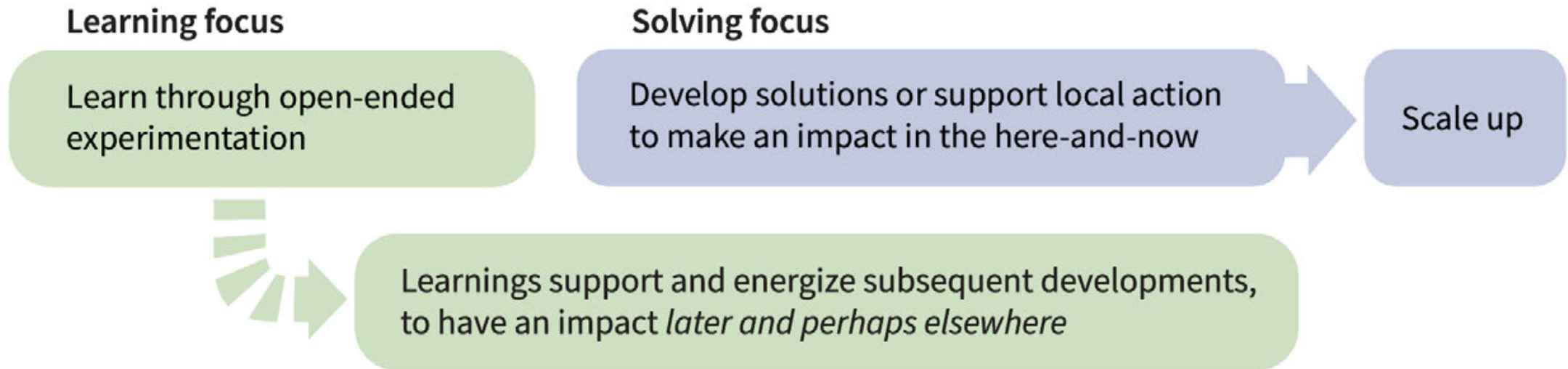
Answer well-defined
questions

Mostly market or
policy-led

Mostly large scale

2. Are you learning or solving?

Solving is less future-oriented and less open-ended.
Participation and ownership may become important.





3. Why and how do you engage users?

Passively providing sourced user data?

Testing and evaluating solutions?

Informants during development?

Ideating and generating concepts?

Exploring, experimenting and reflecting?

Taking ownership in grassroots action to make change?

+ What will take place in everyday-life?



Design moves

What's new for designers?

	Product Design	Human Centered and Participatory Design	Human De-Centered Design
Aim:	Add value	Drive innovation	Enable societal transformation
Scope:	Insular product	Product-Service System	Socio-Technical System
Objectives:	Design to fulfill explicit and practical user needs	Understand (and exploit) latent user needs and desires	Explore future sustainable lifestyles. Change societal structures and user needs
User roles:	User as subject	User as co-designer	User as co-researcher
Designer roles:	Design <i>for</i> the user	Design <i>with</i> the user	Design for the planet, explore with the user



Transition Design & Systemic Design

Open-endedness and findings on a socio-technical level means entering a higher level, 4:th “Design Domain” of systems and policies.

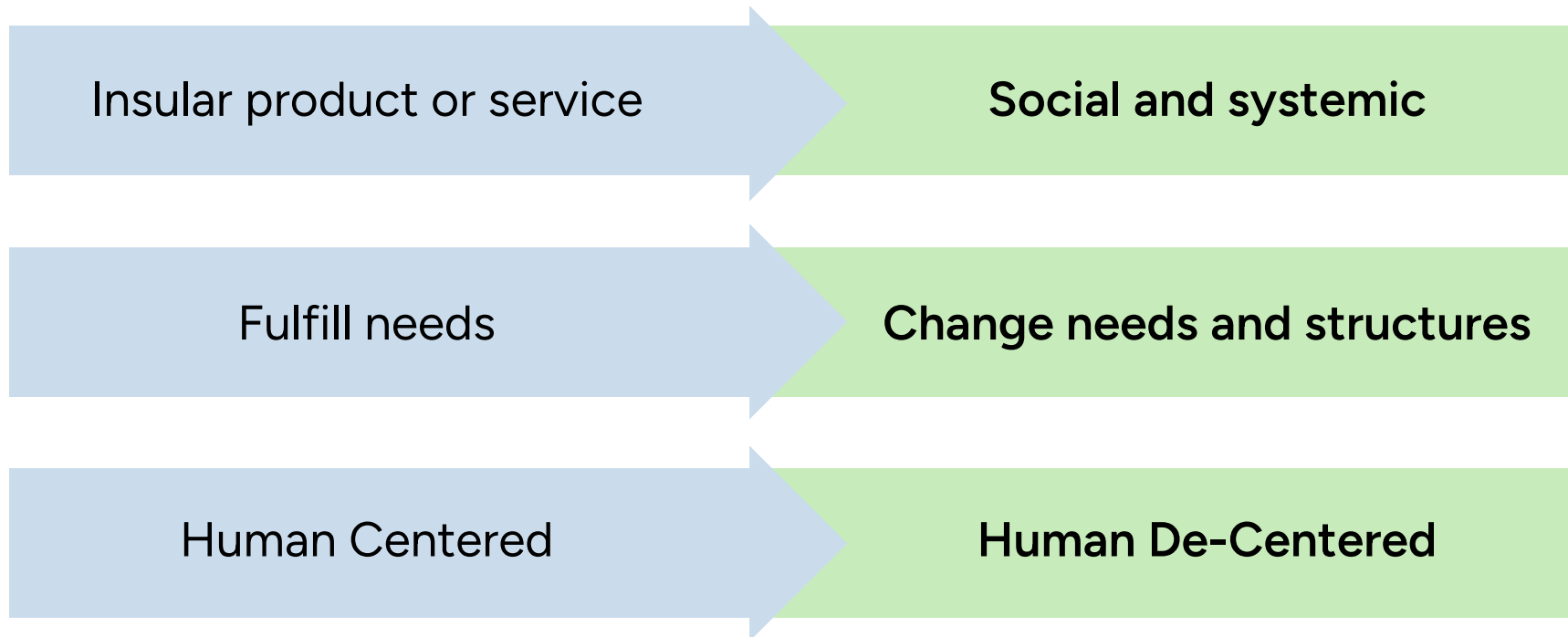
Addressing unbounded, complex, social and “messy” problems:

- Requires framing and making sense of the system
- Requires gaining commitment from a broad diversity of stakeholders and facilitating shared understanding
- Requires envisioning desirable futures

New design research fields and practices, transition design and systemic design: Going from products to service systems, and on to sociotechnical, societal or cultural systems means designing on a higher level of complexity. Here, problems are unbounded, and as I mentioned – our lab findings have often been outside of the scope of the project, outside the configuration of the service concept, and outside the action-space of our partners. We often find that we are moving “upstreams”, zooming out, or crossing organizational boundaries.

This work requires more focus on framing and understanding, putting more focus on the early research stages. It requires engaging stakeholders, and we have found that engaging them in the labs has been a working strategy. It requires envisioning sustainable futures, which has been the start and ending of all the designerly labs.

Design moves



To summarize: While still innovating, developing and implementing new energy saving technologies (that are needed!) new research approaches are needed to understand and to catalyse social and systemic change. We must change the guiding structures behind the needs people perceive, and enable more sustainable practices. We must decenter the individual human to be a part of society and the planet's ecology