Deliverable 1.1. Futures Literacy Laboratories: Cross-cutting insights from workshops in Denmark, Latvia, Poland and Norway

Session in Denmark. Photo credits: Julie Landboe-Christensen Hvid

Date: 1. version published February 6th 2026

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Focus of deliverable (D1.1)

This report is the result of T1.3 (work package 1, deliverable D1.1) and presents cross-cutting insights from four Futures Literacy Laboratories conducted in the TransScale project.

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AI Declaration: The summaries of the sessions and cross-cutting insights between the four countries have partly been developed using an AI-tool (Microsoft co-pilot). All text have been adjusted and validated by the authors.

Summary

This report presents crosscutting insights from four Futures Literacy Laboratories (FLLs), conducted as part of work package 1 (*Futures literacy labs*) in the TransScale project. FLLs are learning by doing/action-research workshops to enable participants to reveal, reframe and rethink the assumptions they use to imagine different futures, with the aim of broadening participants' understanding of what is possible. All partners carried out their own laboratory in Norway, Denmark, Poland and Latvia, between May to September 2025. The report draws on literature on transformative learning in sustainability transitions and the interdisciplinary field of Futures Studies. It presents the theoretical and methodological principles of FLLs, highlights from all sessions in the four laboratories, cross-country exploration of three sessions (hope, realism and reframing), methodological reflections and what we may learn from conducting FLLs.

1 Introduction

1.2 TransScale Project Description

Sharing and reusing different types of material in urban areas is vital for reducing emissions and using scarce resources efficiently. In the TransScale project (2024-2026), we investigate circular and sharing economy initiatives related to different products – building materials, furniture, food, clothes and electronics – in four European cities/urban areas; Oslo/Asker in Norway, Poznan in Poland, Riga in Latvia and Copenhagen in Denmark. We study the role of municipalities, NGOs, volunteer groups, and other stakeholders in scaling such initiatives. The goal is to develop the cities' capacity and ability to take part in the circular and sharing economy in new areas, and to scale up existing initiatives.

1.3 WP1 Guideline Description

This report presents crosscutting insights from four Futures Literacy Laboratories (FLLs) carried out as part of WP1 in the TransScale project. FLL's are learning by doing/action-research workshops to enable participants to reveal, reframe and rethink the assumptions they use to imagine different futures, and not least to broaden their understanding of what is possible. They provide an inclusive and creative method of future exploration. In TransScale, all partners have carried out their own laboratory, following (more or less) the same "recipe"

under the main topic of sharing and reuse in urban areas. The goal of the laboratories was to challenge participants' habitual thinking and create awareness that what we do today is largely shaped by our expectations for the future. Through the laboratories, participants were introduced to socio-technical perspectives of sharing and reuse in the future by being challenged to discuss the interconnectedness of social, cultural, technological, and economic aspects of reuse practices.

The laboratories were carried out as part of work package 1 (WP1) in TransScale. WP1 has a more experimental character and stands out a bit from the rest of the WPs in TransScale. It consists of the following tasks and deliverables: Training workshop on FLLs with Riel Miller (UNESCO/NIFU), development of guidelines for conducting FLLs in all four countries, short workshops with NIFU and each of the TransScale partners to plan for each FLL, conducting FLLs in all four countries summarized by laboratory reports, report presenting crosscutting insights the four FLLs (*D1.1 – this report*), conference paper presenting preliminary results (to be submitted to panel in EASST2026 conference), comparative scientific article on FLLs in different urban contexts, publishing four magazine articles about FLLs in the different countries.

2. Background

2.1 Futures literacy for transformative change

In a world with numerous societal problems, we must question business-as-usual approaches to plan and prepare for the future, such as forecasting, expert advice and horizon scanning. Instead, tools that foster imagination, empathy, and systemic insight are urgently needed. As part of this, futures literacy may be one crucial skill (Larsen et al., 2019).

But what does it mean to be futures literate? 'Literacy' originally referred simply to the ability to read and write, but today, the term covers a much broader range of both competencies and knowledge in specific contexts such as 'financial literacy' and 'digital literacy' (Larsen et al., 2019). As pointed out by Larsen and colleagues (2019), human imagination is at the core of futures literacy, as the future can only be imagined. The ability referred to by the term 'futures literacy' is therefore the capacity to know how to imagine the future, and why it is necessary.

Futures Literacy is a capability rooted in the Discipline of Anticipation and the broader context of Futures Studies - an interdisciplinary field which, very briefly, is concerned with diverse aspects of society's relationship with the future – for example how futures are imagined, produced, debated, and governed in the present (see e.g., Polak, 1961/1973; Inayatullah, 2008; Miller, 2018). Futures Studies draw on different fields and different knowledge traditions about the futures of cultures and societies, science and technology, economics and politics, environment and the planet. It focuses on plural futures with reflexive awareness and normative orientations concerning whose futures dominate and whose futures are excluded.

UNESCO defines Futures Literacy as a "capability and a skill that allows people to better understand the role that the future plays in what they see and do"[1]. This capability is important because "Imagining the future is what generates hope and fear, sense-making and meaning. The futures we imagine drive our expectations, disappointments and willingness to invest or to change" (Miller, 2018). Being futures literate means being aware that our choices and actions in the present are largely shaped by our assumptions and expectations about the future. For example, people tend to extrapolate from certain trends in the present (Miller, 2018), e.g. when imagining future urban areas.

Futures Literacy is, in part, created to address such "poverty of imagination" (Miller, 2018). Described as a basic competency alongside other literacies (reading, writing), futures literacy captures the idea that the ability to anticipate can be enhanced through reflective learning practices. Making our implicit ideas about the future explicit enables people and organizations to critically reflect on these ideas and the ways in which they shape our understanding. Through encouraging the creation and exploration of alternative images of the future, futures literacy training further aims to enhance peoples' ability to use their imagination to discover novel possibilities for transformative change.

2.2 Transformative learning in sustainability transitions

We consider the four futures literacy laboratories carried out in WP1 in TransScale as potential experimental arenas for training futures literacy. Such literacy is a learning process closely connected to transformative learning – the ability to step back and reflect on one's

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[1] See UNESCO website Futures Literacy | UNESCO

thought processes, values, prejudices, and habitual actions (Mezirow, 1996; Klein, 2022). The idea of transformative learning was originally developed in the 1970s and connected to adult learning (Mezirow and Marsick, 1978). It recalls the distinction between single- and double-loop learning as developed later in organisational learning theory: single-loop learning means to detect and correct errors within an existing set of rules, while double-loop learning means to step back and question the set of rules behind actions and thinking (see Argyris and Schön, 1997). In the case of, for example, food waste, single-loop learning could mean to «tame» consumers not to waste edible food by new ways of food labelling. Learning in double-loop would rather be questioning the practice of food labelling itself, and broader systems for producing, distributing and consuming food.

Transformative learning has become one of the most prominent learning theories for explaining and accompanying learning processes related to sustainability transformations (Singer-Brodowski, 2023; Grund et al., 2024). According to Singer-Brodowski (2023), this is especially due to its emphasis on changing meaning perspectives in free discussions with others.

Experimentation and various forms of learning are considered crucial in sustainability transitions (Köhler et. al., 2019; Van Poeck et al., 2020), including transitioning towards reuse and repair societies. This also involves processes of transformative learning or unlearning. For example, van Mierlo and Beers (2020, p. 267) argue that: "a learning process conducive to a transition [..] includes developing new knowledge, routines and relations as much as doing away with the old" (unlearning). Literature on transformative learning in sustainability transitions (e.g., Singer-Brodowski, 2023) also focuses on such unlearning - the need for discarding certain routines and practices to embrace and learn new ones (van Poeck and Östman, 2021).

The TransScale project has an explicit sustainability agenda, focusing on transitioning urban areas towards more widespread sharing and circular practices. The laboratories carried out as part of WP1 were designed as experimental settings for transformative learning environments. In the following, we present and discuss insights from the four laboratories, looking into potential differences and similarities, also discussing methodological strengths and weaknesses. How do various (urban) stakeholders in different countries, including both East and West European, envision the future of a reuse and repair society? How do their preferred reuse and repair societies look like? How do they react to the laboratory sessions,

and can we find any traces of transformative learning experiences? What may we learn from such "experiments" after all?

3. Methodology

Rooted in several academic and practice-based fields, futures literacy has been nurtured through UNESCO since 2012 to raise awareness of how and why we use the future. UNESCO works with a broad set of partners to re-imagine over 50 topics, including technology, youth, gender, climate change, and value creation. Over 110 UNESCO-led Futures Literacy Laboratories have been carried out in 44 countries, and there are 35 UNESCO Chairs in Futures Literacy, Futures Studies and Anticipation[2]. NIFU is part of this network, and in 2021, NIFU, in collaboration with the University of Stavanger in Norway, was awarded a UNESCO chair in management and innovation. As part of this, NIFU has gained experience with training futures literacy in the face of major societal challenges, nationally and internationally.

3.1 Conducting Futures Literacy Laboratories

Futures Literacy Laboratories (FLLs) are conducted as a group exercise where participants talk openly about various futures within the framework of a carefully chosen theme or topic, in small, selected groups. The point is not to predict the future, but to challenge participants' habitual thinking and to explore different narratives about the future.

NIFU uses an adapted version of the UNESCO approach, where laboratories typically last for 2-3 days. Instead, we conduct one-day laboratories, normally with a duration of 5 to 6 hours. In TransScale, each partner gathered 10-20 participants having an interest in and/or were directly involved in circular and/or sharing initiatives. This included, for example, municipal-level actors, NGOs, students, industry representatives, researchers, entrepreneurs and, as encouraged by UNESCO, preferably also some 'wild cards'. The anticipation tradition has a strong focus on the inclusion of diverse perspectives and experiences, emphasizing that all participants in these learning processes are experts in some way. The time frame for the future is typically set to around 2060/2070.

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[2] See Futures Literacy & Foresight | UNESCO

In TransScale, the FLLs were aimed at giving participants a possibility to discuss social, cultural, technological and economic aspects of sharing and reuse in the future. Another objective was to identify opportunities and challenges not visible in the current debate and also identify new possible research questions.

Realism session in Denmark. Photo credits: Julie Landboe-Christensen Hvid

In preparation for the FLLs, all teams were advised to make a list of possible participants from their respective countries and make invitations describing both the actual FLL and briefly the anticipation tradition. The project partners were encouraged to send invitations well in advance because recruiting people for full-day workshops is challenging, and often, it is the "usual suspects" showing up, such as people in independent positions (Koch et al., 2026).

The internal FLL guidelines circulated by NIFU instructed the teams to carry out FLLs in five parts with three main sessions. First, participants get a short introduction to FLLs and the TransScale project. This may include information about anonymity and an invitation to speak freely. The participants are reminded that they represent themselves and not their respective

organisations or employers. Project partners were encouraged to include some warm-up activity. This could be, for example, a short round in a circle where everyone says their name and, e.g., their favourite animal. NIFU often also guide participants through "The Polak Game": here participants decide on their own feelings about the future (being more optimistic/pessimistic and belief in their own agency for change) and illustrate this by placing themselves on an axis in the room. For example, standing to the very left means being very optimistic about what the future may hold, while the right corner means being very pessimistic, and having the same logic for own agency to influence future directions.

In the three main sessions, participants are divided into smaller groups of 5-7 people, including a group facilitator. The role of the facilitator is to encourage discussions and make sure everyone can participate. In these sessions the participants are given some time to describe events from a year in the future and write these images down on sticky notes. This is individual work for about 10 minutes, and could be in the form of a quote, a newspaper headline, a description, a metaphor and the like. The group facilitator makes sure that all participants are given time to present as many of their ideas as the time allows for. The facilitator categorizes the ideas, for example, by some common themes, and puts them on a visible wall.

In the first session, the hope session, participants are asked to present the future they desire/dream about, freeing themselves from the boundaries set by realism. In this way, the participants become more aware of the ideals and values of themselves and others.

In the second realism session, they are asked to present what they think will happen in the future, whether this is something positive or negative. Doing so makes them more aware of the prejudices steering their imaginative work.

Participants may come up with various ideas of the future during the hope and realism sessions - ideas which can be used directly in the further debate on the circular/sharing economy. In this way, FLL can serve as an innovative exercise. These two sessions may also help participants become aware of their own values and preconceptions, their own limitations in how they think about the future, and their own ability to look critically at well-established ideas about the future. This has been demonstrated through many exercises of this type carried out both in Norway and in the UNESCO network for Futures Literacy worldwide (Miller, 2018).

Finally, in the third session, facilitators challenge participants' existing world view by presenting a radically different scenario, a scenario that does not have to be realistic nor desired, but which should encourage participants to explore possibilities they otherwise would not have considered. This scenario is called reframing and is done by presenting a future that in various ways breaks with today's world. For example, one can take away institutional structures and practices that seem self-evident today (e.g. national borders), or one can present a totally unrealistic and "silly" scenario. In this way, participants are free to come up with unexpected narratives which may help identify possibilities and challenges we normally would not see. The table below gives a brief overview of the three main sessions.

Table 1: overview of three main sessions in futures literacy laboratories (Koch et. al., 2026).

Session	Hope	Realism	Reframing
Description	The world as participants dreams of. No demand for realism.	The world as the participants think it will be. Demand for realism.	The world as in line with an unexpected scenario, neither desirable nor realistic.
Aim	Make participants' visions explicit	Make participants' prejudices explicit	Forcing new narratives

The last part of the laboratory is dedicated to discussion across the working groups led by a main facilitator.

4. Futures Literacy Laboratories in four countries

In WP1, all project teams carried out their own FLL between May and September 2025. As such, the FLLs have been run in different country contexts, including both East Central European and Nordic countries, with distinct historical experiences, levels of trust in institutions and possibly narratives about progress, risk, or uncertainty. Although we expect greater individual varieties in imagining the future than varieties across countries, laboratories may still reveal some cultural storylines or national myths shaping participants' ways of imagining futures. In the following, we give summaries of each laboratory, followed

by an exploration of similarities and differences between the four laboratories for all three sessions: hope, realism, and reframing.

4.1 FLL in Poland

Futures Literacy Laboratory (FLL) on urban food waste prevention held on 20 September 2025 at the Faculty of Sociology, Adam Mickiewicz University in Poznań. The laboratory was based on UNESCO's Futures Literacy (FL) methodology and was conceptually inspired by training provided by NIFU. The event was part of a broader research agenda on social imaginaries of urban sustainability and food justice. The aim of the workshop was to explore the anticipatory assumptions that individuals and communities bring to the topic of food waste and to examine how these assumptions shape visions, fears, expectations, and interpretations of alternative futures of food systems in cities.

The FLL focused on the year 2060, prompting participants to imagine possible, plausible, and radically reframed futures of food production, distribution, access, and waste. As with the UNESCO methodology, the goal was not to predict the future but to reveal how assumptions about the future shape present-day sense-making. The Poznań workshop emphasised improvisation, sense-making, and collective imagination. The laboratory was designed and facilitated by the AMU team. Invitations to four different potential participant streams were sent before the workshop, with over 100 addressees. Finally, the workshop gathered 11 participants. The Poznań FLL was organised as a one-day, four-hour laboratory. It included three plenary sessions (opening, mid- and closing sessions) and group work in two parallel subgroups (three sessions on realistic, hope and reframing scenarios).

At the outset of the workshop, the study design and the main objectives of the research were presented to the participants. This introductory phase outlined the scope of the project, the rationale for the workshop, and the role of participants within the broader research process. Subsequently, ethical aspects of the study were addressed. Participants were informed about the principles guiding the ethical conduct of the research, including voluntariness of participation, confidentiality, and data protection. The informed consent procedure was explained in detail, ensuring that participants understood the purpose of the study, the ways in which the collected material would be used, and their right to withdraw at any stage. Consent was obtained prior to the commencement of the workshop activities.

The plenary session began with a presentation of the FLL agenda by the AMU team, outlining the structure of the session, its objectives, and the planned sequence of activities. This was followed by a short warm-up exercise entitled "Which fruit or vegetable are you and why?". Its purpose was to introduce participants to one another and to foster an informal and open atmosphere conducive to collaborative work. Subsequently, participants were divided into two subgroups. One subgroup consisted of five participants and a facilitator, while the second subgroup comprised six participants and a facilitator. The division was intended to enable more focused discussion and effective facilitation during the subsequent stages of the workshop.

4.2 FLL in Latvia

The FLL in Riga, Latvia, was conducted on June 11, 2025, lasting approximately 4 hours and convening 12 participants from a diverse range of academic, public, and private sector institutions. The lab was intentionally structured as an informal transformative learning environment, guided by the belief that meaningful societal change toward sustainability requires shifts not only in behavior and knowledge, but also in underlying values, assumptions, and worldviews (Mezirow, 1996; Klein, 2022; Singer-Brodowski, 2023). The workshop format - blending scenario development, critical dialogue, and reflection - enabled participants to explore alternative futures and interrogate current trajectories through a transformative lens.

Representing varied disciplinary backgrounds and professional experiences, participants collaborated to explore three interlinked themes across three interactive sessions:

Session 1: Hopeful Future

Ideation and visioning of Latvia's sustainable future in 2060.

Prompt: "Describe your ideal, desired future – what kind of world do you want to see?"

Session 2: Reframing Scenario

Reframing scenario exploring vulnerabilities and unintended consequences. *Scenario:* "Due to the climate emergency, strict personal material and energy budgets are introduced. AI decides who gets access to resources, based on data - not desires." *Focus:* Challenges to consumption, individualism, and freedom.

Session 3: Reflection

Personal and collective reflection on what participants learned, how their views eventually shifted, and implications for personal and societal change.

Prompt: "What does this change in how you think about the future, your work, and your society?"

Participants were divided into **two interdisciplinary groups of six**, with discussions facilitated by trained moderators. Sessions were **moderated by facilitators** who encouraged engagement, guided group dynamics, and ensured inclusive dialogue.

Data from the FLL included:

- **Facilitators' notes** from group discussions, capturing dialogue, participant motivation, disagreements, and emerging themes.

- **Sticky notes** created by participants to capture spontaneous thoughts, challenges, solutions, and values during ideation exercises.

- **Audio recordings** of plenary discussions, which were later transcribed and translated from Latvian into English. These were used to identify shifts in thinking and discourse patterns.

- **Photographs** of flipcharts, post-it boards, and group materials, which served as a visual record of group ideation and for coding during analysis.

- **Workshop presentation slides**, setting the thematic frame and lab structure, which also contextualized the ideas generated.

The data collected were thematically categorized into major domains: Economic (e.g., shared value creation, resource budgeting); Technological (e.g., AI, automation, surveillance); Social (e.g., trust, collaboration, demographic change) and Institutional (e.g., governance, EU policies, education systems).

Discussions from FLL in Latvia. Photo credits: Marija Korabovska.

4.3 FLL in Denmark

The FLL in Denmark lasted 2 ½ hours and was held on May 25, 2025, as part of Repair Café Denmark's annual general assembly. The general assembly was held in a cultural community center located in Gentofte Municipality, which also houses a Repair Café (RC) twice a month.

For the general assembly, 24 participants were registered, of which 15 participated in the FLL. According to the participant list, the participants represented 14 different Repair Cafés, primarily based in Copenhagen and North Zealand. Among the participants were mainly volunteers' "fixers" from various Repair Cafés and board members from Repair Café Denmark. In addition, the organisation's chairperson and a management consultant employed by the organisation participated. The composition of the participants clearly reflected the profile found in the cafés, where the majority also are pensioners aged 60+, while about a quarter are younger and still in the labour market. In addition, two out of five participants were women, while the rest were men.

The main theme for the laboratory was **"The future of product lifetime in 2050".** The FLL was facilitated by two representatives from Aalborg University (AAU). Their role was to introduce the program and guide the participants through the three introductory rounds with group work and the last round dealing with concrete strategies and feedback on the method.

Participants were invited to investigate the question from several stakeholder perspectives, including lawmakers, manufacturers, repairers, manufacturers, citizens/users, and Repair Cafés. Due to the session's tight schedule, these inputs were presented with the purpose of getting the participants to easily and effectively evoke ideas and formulate thoughts about the scenario.

To encourage concise and creative expression, participants were asked to formulate their ideas as newspaper headlines, social media posts, quotes, or simple keywords that described events or developments. They were instructed to write one idea per post-it note and given 10 minutes for individual brainstorming. After, the participants presented their ideas one at a time, while group members with similar or related ideas were encouraged to contribute. The session concluded with a process where each group categorized and grouped their post-its under relevant thematic headings to facilitate an active discussion of the topics.

The FLL was presented with a brief introduction outlining the program, the methodical structure for the four workshop sessions, and the overall purpose for the workshop:

- To help Repair Café Denmark and other actors within product lifetime to explore and discuss possible changes and identify strategies to strengthen the focus on repair, product lifetime, and durability.

- To inspire the establishment of a future Alliance for Product Lifetime in Denmark

After the initial presentation, the fifteen participants were divided into three groups of five people, consisting of both volunteers and board members from the organization. The chairman and management consultant - who were expected to bring a broader, more strategic perspective to Repair Café Denmark - were deliberately placed in separate groups.

For AAU, the workshop also had a methodical research interest - specifically in observing how the participants engaged with the presented scenarios, whether the process was inspiring and action-oriented, and more generally whether this format was meaningful in such a project collaboration with an environmental organization.

4.4 FLL in Norway

The theme for the laboratory in Norway was "Reuse in 2060". It was held at NIFU's location at Tøyen in Oslo on 13 May 2025, from 9.30-15.00. The laboratory gathered 18 participants who all worked with the reuse of different types of materials, from different sectors and

industries: representatives from municipalities, the state, interest groups, NGOs, start-ups, academia and students. All of them worked directly with reuse and/or broader sustainability work. The age range was from the late 20s to participants in their 70s, and gender balanced. The laboratory was led by NIFU's special adviser and futures literacy expert Per Koch. The four groups were led by Koch and three NIFU employees in TransScale. In addition, two practice students at NIFU contributed.

FLl in Norway. Photo credits: Ronnie Smith.

The laboratory followed a set-up that has been developed over time at NIFU, among others by carrying out six FLLs as part of the AFINO research center (see Koch et al., 2026). The participants were first introduced to both the TransScale project and the laboratory exercise. This included providing information about participant anonymity and an invitation to speak freely. Participants were encouraged to represent themselves and not their respective organisations or employers.

Furthermore, the NIFU team carried out some exercises to get to know each other a little better. First, all participants presented themselves by their name and favorite animal in a circle. Second, they were introduced to the Polak Game (described in the introduction) designed to help people visualize their worldview. It was an optimistic group, and the vast majority placed themselves far out on the optimist side, and far out on the "agency" side. The

FLL was conducted by three main sessions which lasted from 45 minutes to one hour, in this order: hope, realism and reframing. Participants were first asked to individually write down their ideas for 10 minutes – one idea per piece of paper to describe the reality of 2060. The focus was on reuse, but they could address broader topics such as consumption, built environment and social life. Facilitators asked participants to present their notes in turn, encouraging broad discussion of the ideas presented. The laboratory ended with a plenary discussion for about 45 minutes at the end of the day.

5. Cross-country exploration of three sessions
5.1 Hope sessions

Across the four countries, participants articulated powerful hopes for futures that were ecologically responsible and socially inclusive. Their hopeful imaginaries were quite similar, envisioning transitions away from linear, growth-dependent systems toward economies where waste is eliminated, reuse and repair are normalized, and resource flows are tightly managed. A shared feature is that resources should never be lost but kept in circulation, shared, repaired, and produced responsibly.

The hope session in **Poland** presents a communal and postgrowth vision of 2060, where food systems have become the backbone of a more equal, caring, and ecologically responsible society. Participants imagine cities organized around dignity and solidarity, with local food production replacing industrial supply chains, and food treated as a right rather than a commodity. The hopes revolved around local, clean, and transparent production, such as shortened supply chains, emphasis on urban agriculture, and the elimination of environmentally harmful practices. Participants desired reduced food miles, biodegradable packaging, vertical farms, strict bans on pesticides and industrial livestock transport and mycoprotein or local plant proteins as mainstream choices. Participants also envisioned stronger welfare systems - universal healthcare, basic income, social security - and an everyday life with more time to cook, eat, and participate in community initiatives such as gardens, coops, shared kitchens, and foodsharing hubs. The visions suggested a future in which communities reinvent themselves around solidarity and mutual care. -growth vision of 2060, where food systems have become the backbone of a more equal, caring, and ecologically responsible society.-ops, shared kitchens, and food-sharing hubs.

In **Norway**, participants hoped for a fully circular society by 2060: reuse as the natural, default choice in all material flows - buildings as modular, designed for disassembly, and made of biobased or reused materials; nothing is demolished, and no nonrenewable resources are extracted. Though this session was influenced by (most) participants' background in the building sector, they also discussed challenges related to other material streams such as clothing and textiles, hoping for broad societal transformations: the end of capitalism, a drastic reduction in consumption, short working hours, global climate cooperation, and biodiversity. Their vision of "the good city" included also playful elements (e.g., more music, outdoor swimming). In many visions, technology and especially AI tools supported practices from scanning buildings for reusable materials to automating construction, while personal consumption becomes minimal and tied to circular values.-based or reused materials; nothing is demolished, and -renewable resources are extracted

Session in Norway. Photo credits: Ronnie Smith.

Participants in **Latvia** expressed a strong desire to preserve the country's unique green identity, envisioning Latvia as the greenest country in the world, exporting clean air and peaceful natural experiences (e.g. starwatching, quietude). They hoped for lives in harmony with nature. The emotional tone was hopeful and imaginative, with an openness to radical new societal structures: The state as we know it dissolves into decentralised self-organizing and

selfsufficient communities supported by hightech tools such as AI assistants and datadriven systems that help reduce overconsumption. Moreover, circularity is embedded in everyday life: all materials are biodegradable or traceable, reuse is the economic default, and zero waste is achieved through citizen-led innovation. Participants aimed for societies with high trust and intergenerational learning, where people work flexibly, often as independent creators or entrepreneurs, and live long, healthy lives. -sufficient -tech tools such as AI assistants and data-driven systems that help reduce overconsumption.

In **Denmark**, the hope session came after the realism session. Several utopian AI-generated images were presented to participants as introduction to this session. These images showed, among other things, large amounts of electronic waste, with a green tree growing on top of the pile of electronic waste and another of a green globe surrounded by a recycling symbol and electronic waste. A third was an actual photograph from a Repair Café, showing a group of young people repairing a product - which was to symbolize a hopeful future for repair. The intention behind presenting these visualizations was to inspire, provoke, and thus stimulate an engaging discussion about such a hopeful future scenario.

Sticky notes from hope session in Denmark. Photo credits: Julie Landboe-Christensen Hvid

Participants outlined a future where durability, repairability, and social well-being were highly prioritized and where strict legislation and responsible production shaped the entire material economy. Participants hoped for strong global and national regulations that eliminated planned obsolescence, ensuring 100% recycling, holding producers accountable, and making all products durable, repairable, and environmentally priced. New ownership models - shared, community-based, or collective - replace individual consumption, and access to highquality products becomes the norm. In parallel, repair is both democratized and professionalized: tools and knowledge are freely available for self-repair, while repair professionals and repair cafés are prominent institutions (or, in some visions, no longer needed because products simply last). Education at all levels includes repair skills, and circular design is standard. Globally, participants hoped for increased global consensus driven by the UN, fairer resource governance, CO_2-equalized pricing, and wellbeing-based success metrics. Overall, the vision centered on durability, resource responsibility and mindful consumption, transparency, and a culture that values repair over replacement.-quality products becomes the norm. In parallel, repair is both democratized and professionalized: tools and knowledge are freely available for self-repair, while repair

Across the four laboratories, community and social trust were central pillars in every vision; participants in Poland imagined neighborhood food coops and shared kitchens; in Norway they highlighted collaborative resource management; Latvian participants pictured autonomous, hightrust microcommunities; and the Danish groups emphasized shared ownership models, and globally coordinated resource responsibility. -ops and shared kitchens; -trust micro-communities; and

Technology (especially AI) was embraced across countries, but always conditionally, and useful only when it supports community autonomy or transparency rather than profit maximization or surveillance. All participants expressed desire for system-level change by major economic or political shifts, in a move away from growth-oriented systems toward regulated, equitable, ecological models. Their visions shared an emphasis on quality of life: shorter workdays, time to cook and eat, healthier living, wellbeing, and the rediscovery of time, meaning, and care.

Despite the overlaps, the four laboratories were colored by different overall topics, some broader than others: Poland: Food and food systems; Norway: reuse with particular emphasis

on building materials; Latvia: Circular and Sharing Economy and Denmark: Products & Repair. Participants in the four countries thus explored the future through a unique lens:

- Poland presented the most socially grounded vision, centering food as a fundamental right and imagining urban life where waste is eliminated, industrial agriculture disappears, and communities operate through shared infrastructures, cooperatives, and universal welfare. This laboratory foregrounded social justice and everyday practices - how people eat, care, and live together.
- The session in Norway was a bit narrower topic wise. Mainly shaped by the construction sector, participants in Norway focused on infrastructure and material flows emphasizing complete circularity in building systems, regenerative architecture, zero extraction and biodiversity.
- Participants in Latvia provided perhaps the most radical ideas by reimagining governance and social structure. They envisioned Latvia as a world-leading green society organized around decentralized "modern villages," AI-enabled autonomy, lifelong learning, and nature-based identities, effectively dissolving traditional state structures in favor of digitally supported, self-organizing communities.
- The Danish laboratory was the narrowest, concentrating on how laws, design standards, and economic systems could lock in long lifetimes and responsible consumption: it imagined strict global and national legislation mandating repairability, durability, transparency, and closed material loops. Visions included new ownership models, repair-centered education systems, and a combination of self-repair democratization and professional repair industries.

While their emphasis differed, the hope sessions collectively depicted a future in which sustainability is not a technical addon but the organizing principle for society - supported by community, fairness, shared responsibility, and meaningful lives within planetary boundaries. -on but the organizing principle for society

While the hope sessions imagined sustainable, equitable, and communitydriven futures, the realism sessions, carried out in Poland, Norway and Denmark, highlighted all the forces that make such transformations difficult - driven futures, the realism sessions, carried out in Poland, Norway and Denmark

5.2 Realism sessions

In **Poland,** realistic expectations demonstrated a convergence toward scepticism about systemic change, driven by perceived structural barriers, economic interests, and persistent inequalities. Many participants shifted from utopian optimism to skepticism, anxiety, and a sense of structural constraint. Although some improvements were still seen as possible, the dominant tone was captured by one participant's pessimistic headline: "There are no major or visible changes - things are even worse". Participants widely expected deepening social inequalities and frequently expressed distrust toward large-scale food industries and the global economic system ("Food remains under corporate control"). Even strict regulations or sustainability initiatives were perceived as insufficient to counterbalance global corporate interests. Environmental degradation and health consequences were repeatedly mentioned, such as obesity epidemics, diet-related diseases and ecological disasters. Some modest improvements were seen as plausible, such as expanded food education in schools and grassroots initiatives using food that would otherwise be wasted but participants consistently described these as fragments - not systemic transformations. The Realistic scenario thus revealed a strong collective intuition: the current political-economic trajectory is unlikely to yield profound change, crises may intensify before they recede, and the system will continue to serve the interests of the wealthiest few.

Some participants in the **Norwegian** laboratory expressed that the realism session was more challenging compared to the previous hope session. They moderated their earlier hopes but remained cautiously optimistic, expecting progress toward circularity, reuse, and climate solutions. Still, they imagined these advances would be driven by crisis, resource scarcity, and geopolitical shocks rather than proactive policy. The groups expected worsening global conditions and late societal realization that preventive action would have been cheaper than repairing the damage. Participants expected greater standardization of reuse, circular supply chains, digital material registries, and tightened regulations, but also stressed increased stress levels, environmental strain, and new inequalities. The realism scenario still imagined a functioning circular economy by 2060 - around 80% circularity - supported by scarcity, technology (including AI), stronger institutions, and a cultural shift toward durability and quality.

Session in Norway. Photo credits: Ronnie Smith.

In **Denmark**, the session began in the groups with the overall question: "How do you think the future of product lifetime will look in 2050?" Participants did not struggle with the realism exercise, the atmosphere was focused, and each participant wrote approximately 3–6 ideas individually within the 10-minute time frame. When the participants were asked to present and group their post-its, the atmosphere became slightly more hesitant. It seemed that all three groups were unsure how to categorize their notes, and more discussions arose about which notes belonged together. The session reflected a mix of hope and skepticism. For example, participants contrasted two future scenarios: one with "weak" legislation, influenced by corporate lobbying and failing to extend product lifespans, and another with "strong" legislation, increasing producer responsibility, such as mandatory sustainability pledges and stricter recycling requirements. These visions were articulated as: "Corporate lobbyists have repeatedly weakened repair directives and regulations, so even as legislation increases, its impact remains minimal" And: "Producers are held to stricter accountability for what they produce."

Participants in Denmark anticipated stronger repairoriented legislation - longer warranties, mandatory spare parts, bans on software obsolescence - but also feared that corporate lobbying, political instability, and economic pressures would undermine regulatory impact. They were

more positive and hopeful about the development of legislation in 2050 compared to development of products, which contained more critical statements - especially in relation to business models for products not supporting longer product lifetime. Moreover, participants predicted continued growth in Repair Cafés and repairrelated businesses ("Repair Cafés become in! And everyone knows them."), though constrained by shortages of volunteers, expensive labor, and increasingly miniaturized electronics that are hard to repair. Consumption was a major uncertainty: some foresaw continued global overconsumption ("Consumption is increasing globally at the same rate as the last 30 years."), while others predicted reduced consumption ("Political parties will (still) want to curb consumption."). Globally, participants expected rising transport costs, climate pressures, and resource constraints that could either incentivize repair or make it more difficult. -oriented legislation-related businesses

The realism sessions in **Poland, Norway, and Denmark** shared some notable similarities. In all countries, participants expressed that systemic transformation is unlikely without major pressure, whether from crisis, scarcity, or political struggle. They anticipated present barriers – corporate power, weak regulation, political inertia, or geopolitical instability – to slow or obstruct sustainability transitions. Furthermore, all three sessions showed a tension between what participants understood as progress (more repair, more reuse, more public awareness) and broader systems that remain resistant to change. Even when participants foresaw improvements - like school food education in Poland, expanded reuse in Norway, or stronger repair legislation in Denmark - they framed these improvements as uneven and insufficient.

Still, there were some differences between the three sessions. Poland's realism session was the most pessimistic, dominated by expectations of worsening inequality, health decline, ultraprocessed food dominance, environmental disaster, and corporate capture of the food system; participants largely doubted that meaningful progress was possible at all. Norway's realism was more balanced, combining moderate optimism with the belief that crises and scarcity would force society toward circularity and reuse. Unlike Poland, Norwegians anticipated substantial progress by 2060. Denmark occupied a middle position: more optimistic than Poland, but more skeptical and ambivalent than Norway. Danish participants foresaw genuine regulatory improvements and expanding repair infrastructures, but also persistent barriers such as corporate lobbying, political inconsistency, volunteer shortages, and increasingly hardtorepair products. -processed food dominance, environmental disaster, and corporate capture of the food system; participants largely doubted that meaningful progress

was possible at all. Norway's realism was more balanced, combining moderate optimism with the belief that crises and scarcit-to-repair products.

Across countries, the hope sessions put forward circularity as the organizing principle, but in the realism sessions, only partial implementation were seen as likely: participants in Norway imagined 80% circularity, in Denmark they expected better repair law but not systemic change, and in Poland, participants anticipated only local-level actions like community gardens. Moreover, while the hope visions pointed towards wide transformations, e.g., by postgrowth, universal basic income, end of capitalism and no traditional state, the realism sessions highlighted major governance barriers, in which corporate power blocks reform and legislation weakened by lobbying. Communities looked very different in hope vs the realism sessions: hope sessions painted caring communities, while realism sessions anticipated limited or fragmented community-building (e.g., "Community gardens only in wealthy areas"; "Repair Cafés expand but face volunteer shortages"). This also influenced expectations regarding the quality of life; envisioned as meaningful, slow, healthy, and cooperative in hope sessions, but more ambivalent in realism, and some expected worse health, obesity and stress. Across all four countries, participants hoped for radically sustainable, cooperative, and just futures, yet realistically expected partial progress overshadowed by inequality and crisis-driven adaptation. -growth, universal basic income

5.3 Reframing sessions

In the reframing sessions, participants were introduced to an unexpected world prepared by the facilitators. These world descriptions were not aiming for realism nor desire – just something different.

Possible reframings were discussed in the FLL planning meetings between NIFU and each of the project partners. We discussed some possible techniques for this (Miller, 2018; Koch et al., 2026), such as removing something participants perceive as essential in everyday life (e.g., nation states, different industries, languages, etc.), imposing some clear restrictions (e.g., introducing a new law), or presenting them with a future that today seems completely unlikely (e.g., all animals and humans speak the same language). Different reframings were suggested in the planning meetings, including the collapse of global trade, the introduction of a quota system for the purchase of goods like that of World War II, or a ban on extracting more resources from the land and building down more nature. We ended up with slightly

different reframing techniques. For example, in Denmark and Latvia, we introduced new laws, in Norway we removed the waste industry while in Poland, we banned any form of food waste.

Across Poland, Denmark, Latvia, and Norway, the reframing sessions pushed participants into unfamiliar and destabilizing futures. Still, we find some distinct trajectories shaped by the various national contexts. In **Poland,** the reframing scenario was constructed as follows:

> *By 2060, global crises have forced cities to ban any form of food waste. All food is rationed, tracked, and redistributed through community kitchens and digital platforms. Cultural values shift because there is no choice. How does urban life feel under these conditions?*

The reframing elicited the widest range of emotions – fear, fascination, moral discomfort, but also creativity and hope for new forms of community. As such, this session generated the most emotional, conflicted, and imaginative responses. Participants were compelled to explore worlds where familiar institutions had collapsed, allowing both creative and dystopian possibilities. The collapse of global supply chains forced societies to radically localise food production such as family allotments, barter systems, ration cards, and communal gardening. Transport operates on city-scale only; no money is used in food trade, and communities become stewards of food – with no waste and shared meals as the social norm.

Participants anticipated moral dilemmas emerging from extreme scarcity reflecting deep fears about what happens when social systems that regulate fairness break down, for example in the form of food mafias, gang violence, feudal structures, and moral transgressions driven by survival. In contrast, many participants imagined that scarcity would inspire new ethical frameworks and spiritual transformations, including veganism and animals becoming "members of society", rooted in respect for non-human life, slow living, and revived communal bonds. Yet participants struggled with the idea that even in a radically altered world, inequality may persist or worsen, with elites securing bunkers, access to technology, and exclusive food banks. This revealed a profound concern: that collapse does not automatically produce solidarity, and that older hierarchies may reappear in more brutal forms.

The team from AAU in **Denmark** had prepared these four reframing scenarios:

GLOBAL TRADE COLLAPS!

Due to conflicts around the world, global trade collapses, making it difficult to import goods. What will this mean for legislation, manufacturers, repairers, retailers, consumers – and Repair Cafés?

AI AND ROBOTS TAKE OVER!

AI and robots can repair EVERYTHING! What consequences will this have for legislation, manufacturers, repairers, retailers, consumers – and Repair Cafés?

THIRD WORLD WAR!

World War III breaks out and leads to a shortage of all products. A quota system is introduced for the purchase of goods, corresponding to the rationing during World War II. How will this affect legislation, manufacturers, repairers, retailers, consumers – and Repair Cafés?

TAX ON WASTE!

Legislation is passed requiring a tax on all bulky waste (furniture and hard white goods), electronics and textiles. There will also be large fines for incorrect sorting and non-payment of the tax. What will this mean for legislation, manufacturers, repairers, retailers, consumers – and Repair Cafés?

The Danish reframing centered on the last "Tax on Waste" scenario – a legislative shock that imposed steep taxes on bulky waste, electronics and textiles – as waste management and taxation did not appear to be topics that had been discussed in the previous sessions.

This session was carried out without the usual 10 minutes of individual writing due to lack of time. Instead, the groups went directly into open discussion. Overall, it was not difficult for participants to comment on the scenario on the common sheet, and participants' post-its were subsequently organized for this session under the themes of legislation, products, consumption, repair, Repair Cafés, and global. Education was not a topic addressed this time.

The post-its from this session mainly contained critical reflections related to the presented scenario. Overall, the participants were highly critical of this "unexpected scenario." It is unclear whether it succeeded in provoking new insights and active discussion on repair and product lifetime, or if it merely sparked rejection without contributing to a deeper

understanding. Many participants seemed tired after the previous sessions, and some even nodded off (most participants were older and may have had lower energy levels than typical participants in such a long workshop). It was also clear from the number of post-its that there was less to add to this scenario, probably because it was more narrowly focused compared to the previous sessions.

Discussions focused on how such taxation could push vulnerable groups into fines (where the last user, the poorest, may pay the cost), encourage illegal dumping - creating "trash everywhere" in forests, parking lots, streets - and require "monitoring everywhere" plus high administrative costs. The participants offered several design ideas for how legislation within this scenario could be structured. Ideas included a national product registry with ownership quotas, value-based taxes tied to raw-material scarcity, deposit systems for gadgets, and suggestions to adapt the existing deposit system – like those used for cans and bottles, by "free if split for recycling" incentives. This would push design for easy disassembly as a key competence for engineers and return-to-dealer logistics as a sales argument. Some pointed to that incorporating repair into waste management with greater municipal responsibility would represent a paradigm shift. Others worried that secondhand shops could become overwhelmed with discarded items or that repair infrastructure might not scale. Despite these concerns, participants also saw potential benefits: increased repair incentives, municipal support for repair cultures, expanded community workshops, and stronger circular design requirements. Globally, participants worried such tax system might export waste elsewhere, simply shifting the problem instead of reducing it. Despite challenges, participants generally believed that such a scenario could stimulate an increase in repairs due to the economic incentives it would create.

Latvia's reframing placed society under AI-enforced personal material and energy budgets:

> *Due to the climate emergency, strict personal material and energy budgets are introduced. AI decides who gets access to resources, based on data - not desires.*

Participants across groups were intellectually stimulated but emotionally unsettled by the dystopian scenario, provoking debate about "climate apartheid," surveillance, and algorithmic governance. They discussed a society where AI decides access to resources, where digital rating systems determine services, data economies replace money, and local autonomy is weakened as platforms and tech corporations become de facto governments. Participants

foresaw underground markets, barter economies as resistance, rebellions over digital inequality, and social stratification based on tech compliance (in-groups vs out-groups), with marginalized rural/low-tech populations. Participants' ideas included centralized waste management with limited access, regulated circularity, scarcity of energy and materials, hydroponic food dependence, and migration waves. Concrete "pressure points" included AR glasses tracking sustainability violations, overreliance on predictive models vulnerable to cyberattacks/blackouts, and citizens protesting AI-driven policies they cannot influence.
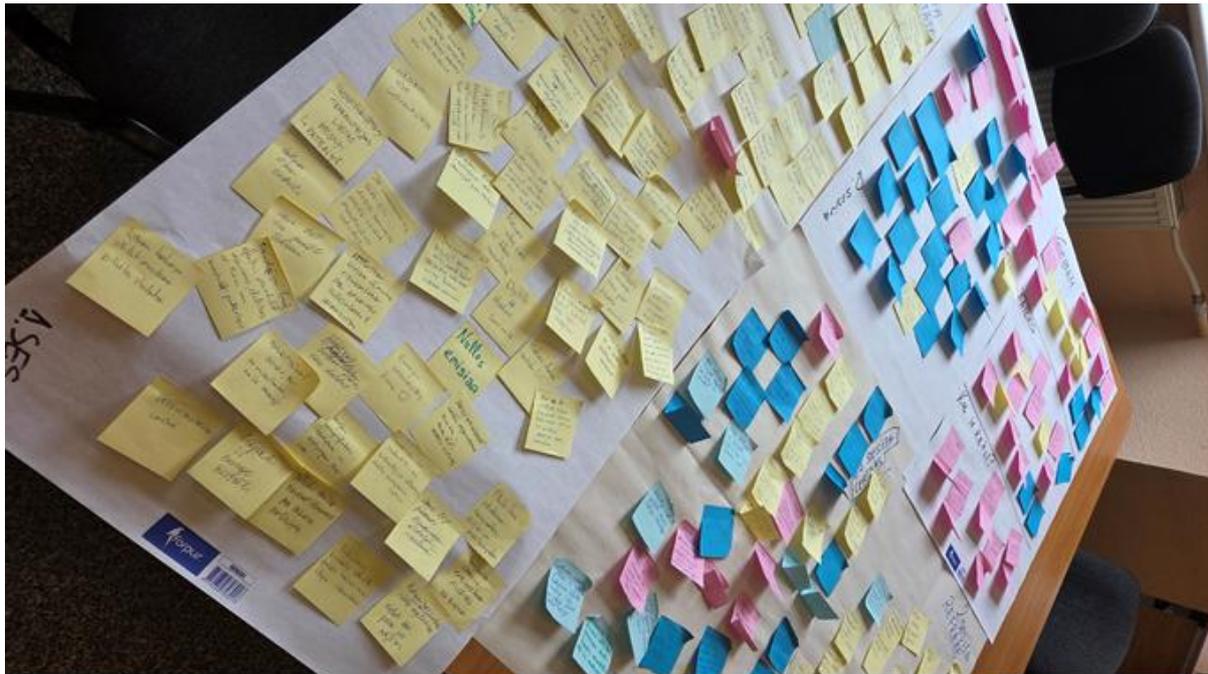
Sticky notes from FLL in Latvia. Photo credits: Marija Korabovska.

The scenario served as a mirror, pushing participants to examine current trajectories and hidden risks in digitalization and governance. It provoked critical reflection on blind optimism about AI and control systems, surfaced fears and distrust in technology as sole governance tool and pushed participants to imagine themselves in both complicit and resistant roles. It also sparked discussion on fairness, identity, and intergenerational ethics.

In **Norway**, the NIFU team had a longer discussion about the reframing scenario in advance with several alternatives. This included a 2060 in which the Norwegian authorities had tightened their grip to speed up the circular economy through a ban on both commercially producing and buying new products from Norway and abroad, and that the monetary system had collapsed globally, and we were all back to some form of barter economy. In the Norwegian session, we chose to remove an essential industry for products, the waste industry, in the following scenario:

We are in 2060 where the waste industry does not exist globally. This means that everyone is responsible for managing their own waste, both private, commercial and public actors. Littering is not an option in this scenario.

Communities without a waste industry was mentioned in one of the previous sessions, but we kept the scenario, believing there could be interesting discussions when everyone got to explore this further. The reframing was well received (a couple of participants expressed "yes" when it was read out) and was probably not such a foreign thought to most of the participants. The energy level in the groups was somewhat lower when we returned after lunch, but as soon as participants were asked to start writing, they quickly became engaged and produced many ideas.

The ideas in this session went in many directions; some largely related to the system and "the big picture", while others were very concrete examples: 100% biodegradable materials, no plastics in clothing or packaging, all sales in bulk/loose form, and restaurant-based meals with take-back logistics (e.g., suppliers collect packaging). Some participants imaged digital registries of all global raw materials and a national "resource-registrar" (in a kind of "material folk register") with material passports and producer responsibility across the whole lifecycle (repair, take-back, on-site maintenance).

In this reframing, everyday life became circular: 10% of time is paid to repair/maintain/redesign at home; half the population works in redesign; barter economies and product-as-a-service spread; deposit schemes cover many material streams; urban mining is normalized; local composting (e.g., bokashi) is required; medical disposables are robot-sterilized and recycled; 3D printing quickly repurposes products; and building components are designed for disassembly, repair, and reuse (with sawmills collecting timber, steel yards capturing metals). Moreover, people consume far less, live simply, share more, travel less but better, and work shorter days - with repair and maintenance embedded in schools and daily routines. The tone was strikingly positive: less stress, more harmony, community-based living, and even a "Norwegian Championship in reuse".

Across Poland, Denmark, Latvia, and Norway, the reframing sessions pushed participants into unfamiliar and partly destabilizing futures. A key similarity is that all groups responded by imagining forms of localization, resource responsibility, and new community structures. In Poland and Norway, food and materials became local out of necessity; in Denmark, waste taxes triggered local repair systems; and in Latvia, resource quotas forced households to

ration and adapt within constrained infrastructures. Across countries, participants envisioned shifts away from consumption toward circularity, self-sufficiency, and shared responsibility. For example, Poland's family allotments, Norway's neighborhood-level composting and repair, Denmark's return-to-dealer systems and municipal repair hubs, and Latvia's underground barter markets emerging as resistance to algorithmic rationing.

At the same time, there were some clear differences between the four sessions. In Poland and Latvia participants moved toward collapse scenarios, emphasizing breakdowns in governance, morality, and social order. Their images included food mafias, AI-driven climate apartheid, and extreme inequalities. Denmark's reframing remained anchored in institutional critique - highlighting the unintended consequences of top-down legislation, surveillance risks, and administrative burden. Norway's scenario, in contrast, produced mostly positive imaginative energy: participants embraced a world without waste management as an opportunity for minimalist living, product longevity, and circular practices embedded in everyday life. Together, the four reframing cases revealed a spectrum from dystopian collapse (Poland, Latvia) to critical institutional reform (Denmark) to optimistic circular reinvention (Norway).

Although the goal with FLLs is not primarily to generate ideas to implement, some of the ideas presented could have served as interesting interventions in resource governance. For example, shifting responsibility upstream by returntodealer obligations, building local capacity by repair education integrated into schools, introducing localized barter pilots, shorter working days to free time for repair/care, or consumption reports modeled on tax statements. -to-dealer

6. Methodological reflections across laboratories

Leading WP1, NIFU developed and distributed guidelines to all teams in advance. This included descriptions of futures literacy as capability and philosophy, Futures Literacy Laboratories (FLL) as methods, how to set up and carry out an FLL and how to write up summaries from laboratories. Nevertheless, the four laboratories were conducted in somewhat different ways, in terms of duration, number of sessions and order of these, as well as the composition of participants. There was also, naturally, somewhat different feedback and reflections from the participants. This part focuses on methodological variations and participants' reflections on FLLs in the four countries.

6.1 FLL variations across the four countries

NIFU uses an adapted version of the UNESCO approach for FLLs, with one-day laboratories instead of two or three days. With these shorter FLLs, our experience is that there is less time for a thorough debriefing where the participants from the various groups can learn from each other and reflect on the process (Koch et al., 2026). Also, the shorter version of FLLs means there is no time to do proper co-design before laboratories, where participants themselves are active in deciding on the topic and getting prepared for this type of experience. Instead, participants are served a pre-chosen theme, which again has implications for recruitment, as the topic itself naturally attracts a certain type of participants. In our previous experience with FLLs, this lack of "prepping" the participants in advance has in some cases made it more challenging to make them understand and accept the premise of the reframing.

The **Latvian** FLL did not include a realism session, but instead a separate session dedicated to structured reflection. The goal was to stimulate personal and collective reflection on what participants learned, how their views eventually shifted, and implications for personal and societal change. The guiding question was: "What does this (workshop) change in how you think about the future, your work, and your society?" Participants were encouraged to draw conclusions based on insights from the laboratory, synthesize ideas, and begin envisioning actions they could personally or institutionally support. In this way, the participants in Latvia were more encouraged, for example compared to the Norwegians, to reflect on both possible lessons learned from the FLL and more concrete ideas to follow up on.

During this session, they explored some cross-cutting themes from the two previous sessions. Among others, behavioral incentives (e.g., points for sustainable actions, rewards for sharing) were frequently mentioned, but so were the ethical limits of nudging and monitoring. AI was seen as a double-edged sword: both an enabler of sustainability and a threat to freedom, depending on how it is governed. Participants repeatedly emphasized preserving human dignity, choice, and trust, even in highly automated futures, where flexibility, adaptability, and co-creation emerged as preferred strategies to build resilient futures.

In general, participants in the Latvian FLL found the diversity of perspectives – coming from academia, policy, business, and NGOs - enriching the dialogue with cross-sector insights. Moreover, they were eager to identify what should guide Latvia's development path and distinguish desirable futures from likely outcomes. For example, Latvia's small scale and

cultural specificity were recognized as unique assets for prototyping community-based innovations. Participants aimed for equitable resource distribution, to make Latvia visible on the global sustainability map. They also sketched out some common fears across the groups, including conflicts caused by inequality or resource scarcity, surveillance overreach, over-centralized AI-driven services and loss of autonomy and war and forced migration.

Group discussions in Latvia. Photo credits: Marija Korobovska

The AAU team in **Denmark** also included a session dedicated to structured reflections. The purpose of the concluding session was to encourage the participants to reflect on the insights they had gained from the previous sessions, and to translate these reflections into concrete actions. The participants were asked to formulate specific action points, which should eventually be shared with the rest of the organization. The session was introduced with the overall question: What insights have the previous three sessions given you?

This was followed by several sub-questions for a deeper discussion:

- How can Repair Café Denmark use these reflections to strengthen the movement - locally, nationally and internationally?

- How can these reflections be used to promote repair practices and increase awareness of product lifetime and durability in society?

- How will I use these discussions to strengthen the work with extension of product lifetime?

- What do you think about this method of discussing the future?

In practice, four A3 sheets were placed on the wall with the following headings: *Local Initiatives, National Initiatives, International Initiativ*es and *Feedback* on the workshop. The

participants were invited to contribute points under each heading, based on the introductory questions asked above.

Most reflections in this session focused on action-oriented outcomes and how to develop the Repair Café Denmark movement. For example, participants highlighted the importance of municipalities staying informed about local repair initiatives and that Repair Cafés could assist with local recycling efforts by actively participating at recycling stations. Further, municipalities could provide permanent premises and tools for Repair Cafés, motivate users and inspire others by sharing repair success stories. Repair could preferably be integrated into waste management systems, possibly requiring waste companies to prioritize repairing items whenever feasible. Not least did participants see the need for improving the exchange of knowledge among Repair Café volunteers, influence the climate debate to include other environmental impacts, such as the conservation of resources like rare metals and water savings resulting from repair activities, and to seek international inspiration in Repair Cafés in the Netherlands, Belgium, Germany, and France.

In Denmark, the participants were led through four sessions of 2.5 hours – much shorter than recommended in the guidelines. This affected the depth of discussions and limited opportunities for reflection, causing some aspects of the dialogue to be omitted. AAU also conducted the FLL in connection with the General Assembly of Repair Café Denmark and probably had the most "homogeneous" group in terms of interests and age. All participants had a lot of practical experience with product lifetime, as they were affiliated with the Repair Café Denmark movement, and worked with the repair of various products on a voluntary basis. While this group composition possibly fostered more targeted discussions, it also potentially constrained the diversity of perspectives and insights.

Participants who are very close to the topic of the FLL come with some challenges: discussions tend to be technically oriented as participants lean towards finding specific solutions and often aiming for more direct output (Koch et al., 2026). This can make it more challenging to explore the broader lines of the topic at hand. The participants had a strong interest in maintaining and further developing Repair Café Denmark, and this was also an explicit goal of the laboratory ("To inspire the establishment of a future Alliance for Product Lifetime in Denmark"). Also, participants were encouraged to explore in line with some pre-chosen stakeholder groups' perspective in all sessions: lawmakers, manufacturers, repairers, manufacturers, citizens/users, and Repair Cafés. This approach aimed to enable quick, effective idea generation without requiring extensive deliberation. However, this approach

might have limited creativity and resulted in overlapping or less original contributions, as the framework was somewhat restrictive.

Moreover, the AAU team had very limited facilitator resources, where the manager of Repair Café Denmark took on the role of main facilitator, and the participants managed their own group discussions. The facilitators, only two in number, faced challenges managing both facilitation and observation for 15 participants across three groups. Consequently, parts of the conversations were difficult to follow, raising the possibility that some points from discussions may have been overlooked or misunderstood.

6.2 Participants' reflections on FLLs

To actively take part in FLLs, and especially the hope session and reframing session, requires an openness to play-based and personal learning experiences. As with other types of learning and competence-developing activities, there will be some finding such activities enriching while others experience this to a lesser extent (Koch et al., 2026).

The laboratory in **Latvia** created a psychologically safe space where participants could imagine agency in both positive and negative contexts. Emotional reactions (hope, fear, resistance) were legitimized as part of the learning journey. Discussions surfaced with normative questions: *What kind of society do we want? Who benefits or loses in each future?* Participants were repeatedly encouraged to challenge their habitual ways of thinking, and to connect economic, social, technological, and environmental dimensions of circular and sharing economies. For example, dystopian scenarios prompted deep questioning of techno-solutionism and assumptions about neutrality of AI governance. Trust and solidarity were frequently cited as foundational for sustainable sharing and circular economies. Overreliance on digital and AI systems was seen as a significant risk to democratic processes, local agency, and societal cohesion. Participants grappled with tensions between freedom vs. control, equity vs. efficiency, and growth vs. well-being. Collective well-being, not just economic growth or productivity, was emphasized as a guiding principle for innovation and policy. In continuation of this, participants stressed the need to prioritize health and mental well-being, not merely longevity or biomedical solutions.

The laboratory contributed to building a shared language for discussing complex sustainability challenges in a Latvian context and created a safe and creative space for exploring personal and systemic transformation. Participants imagined new ways to structure the economy and

work beyond traditional systems. They expressed a dynamic mix of curiosity, unease, and imaginative engagement. The juxtaposition of optimistic and dystopian scenarios contributed to rich debate, with both personal introspection and critical questioning of current societal trajectories. Many valued the rare opportunity to "step outside" conventional thinking and reflect on long-term futures beyond daily professional routines. Several participants reported a shift in perspective, from technical problem-solving to envisioning value-driven and participatory futures.

Still, participants reported some weaknesses with this type of workshop. For example, some participants struggled with the hypothetical framing, especially in the reframing scenario, which felt "too far removed" or exaggerated for some. There was insufficient time for individual reflection (e.g., journaling, sensemaking), which also limited deeper emotional unpacking. Due to the fast pace, not all discussions and sticky note content could be fully transcribed or explored in depth. Some pre-lab preparation could have enhanced engagement, providing participants with background materials or orientation on transformative learning and futures literacy. This type of pre co-design is recommended by UNESCO, but as pointed out, often there is less time to engage participants in advance of the FLL.

The laboratory in Poland followed the same setup as the Norwegian one and included (as in Norway) a warm-up exercise with all participants. In Poland, the FLL revealed a rich spectrum of anticipatory assumptions surrounding the future of urban food systems. Participants jointly reflected on how their assumptions – often rooted in current social conditions – shape what they believe is possible. The plenary discussion emphasised the need to recognise both the fragility of current systems and the latent potential for reimagining urban food futures. As in other laboratories of this type, the three sessions on hope, realism, and reframing served as structured provocations, encouraging participants to move from aspirational images to more sober assessments, and finally to radically unfamiliar futures.

In Latvia and Poland, the feedback and reflections were predominantly positive towards this type of exercise. In Norway and Denmark, on the other hand, there was somewhat more mixed feedback. In the concluding discussion in the laboratory in Norway, it was also pointed out that there was a fairly homogeneous group with relatively similar values towards reuse, asking for more resistance in the discussions. The participants in **Denmark** questioned what concrete results or practical value to be derived from the workshop to support ongoing work on repair and extending product lifetimes, especially regarding the reframing scenario. In this session,

participants appeared to enter discussions about the direct effect of the policy instrument introduced in the reframing (tax on waste).

It is possible that this type of reframing in a like-minded group with strong interests in product lifetime was perceived as a little too close and practically oriented to spark exploration of broader new possible societies. This is a well-known issue, and in many of the FLLs previously carried out by NIFU, one of the greatest challenges has been to make participants accept the premise of the reframing – not because it is realistic or immediately practically usable, but because these kinds of "push" into the unknown may help them imagine and consider radically different societies (Koch et al., 2026).

Some participants in Norway pointed to similar challenges, including the fact that the laboratory did not build on existing expertise on material reuse. These types of responses may come from different expectations about results and added values of FLLs and point to the importance of clearly communicating the purpose of this type of exercise. It also points back to the overall recruitment issue: how to engage participants who are very close to the topic and match their expectations, especially concerning the resource-intensive format of FLLs? How to balance the FLLs to become both arenas for development of participants' skills, sites for data collection on learning experiences, and arenas for developing the field/topic in discussion?

As stated, the purpose of FLLs is not to predict the future or to make a "to-do-list" on the given topic. Rather, the aim is for participants to become more aware of the ideals and values, prejudices and lock-ins of themselves and others, and to explore possibilities they otherwise would not have considered. To develop and enhance this type of literacy requires much training beyond one simple laboratory. Thus, there is need for some modesty by means of expected outcomes.

7. Concluding remarks – what can we learn from FLLs?

Futures Literacy Laboratories (FLLs) are designed to create a kind of "everything could have been otherwise" mentality. An overall goal is to make the participants more aware of what they actually want and hope for the future, and what they think will happen – and at the same time take in other people's expectations and dreams. The laboratories are designed to make participants aware of how we are all in a way "captured" by the traditional stories of the future: all sessions conducted in our four laboratories demonstrated how hard it actually is to imagine something unique, and there were quite similar types of stories and ideas across

groups and countries. The reframing sessions also open the possibility to imagine and explore various types of "shocks" or "landscape changes" and the influence of these on everyday life in the "regime", as in line with sustainability transition literature (e.g., Geels, 2002; 2024). For future FLLs, the reframing could preferably be given more weight and time to explore the possible effects of such shocks more in detail.

FLLs are both time-consuming and mentally demanding. Participants may come with different types of expectations for what will be learned and produced during the day. Those who participate will take various lessons from such a laboratory with them. This is related to the participants' expectations of the FLL, previous experiences with exploratory workshop formats, how close they are to the main topic itself - whether they work with this on a daily basis, have a looser connection to the field, financial and/or personal interest - and not least group composition, dynamics, daily mood, etc.

The four FLLs in our project created a meeting place between researchers and different urban actors. As we see it, they give some insight into state-of-the-art for reuse and repair in the four countries, and stakeholders' reasoning on the topic (e.g., if they put weight on mostly technical aspects or broader socio-technical changes). Also, group discussions may serve as focus groups providing insight into what various urban stakeholders see as barriers to realize societies with more reuse and repair activities.

Nevertheless, the feedback raised by some participants question how well such a laboratory exercise works as part of ongoing research projects. Doing so creates expectations of tangible results, and both participants and organizers (we, the researchers) may have an interest in "moving forward" with the topic being explored. This is also related to choice of overall topic for FLLs, and its connection to the goals and activities of the research project in question. In such cases, it is perhaps even more important for facilitators to challenge participants to reflect on more than just purely technical and solvable aspects of the overall theme of the laboratory, and not least – clearly communicate in advance what the participants can expect from this type of laboratory. Still, though the broader goal with FLLs is to move discussions beyond concrete problem-solving and stimulate discussions about deeper societal transformations, there is room for making interesting ideas to be used in debates on reuse and repair societies.

In the introduction, we framed the FLLs as experiments, where the "data" retrieved consist of participants hopes, fears, beliefs and values. This way of working may seem foreign to some. Nor can we document the extent to which the laboratory will have any type of effect

afterwards, for example if the participants bring some of the mindset – a "what if" and "everything could be otherwise" type of mentality into their work and/or private lives, and question the way we organise society and one's own place within this world.

Still, we should not underestimate the power of imagination. With Sheila Jasanoff's words, technological innovation often follows on the heels of fabulations of social worlds, for example in science fiction, both utopic and dystopic (Jasanoff, 2015:1). Imagination, "unites members of a social community in shared perceptions of futures that should or should not be realized" (Jasanoff, 2015:6). Thus, imagination, especially on a collective level, is not an "innocent" activity; it builds nations (e.g., Anderson, (1991/1983), science and technology, and societies at large. FLLs may be one way of redistributing agency by broadly offering tools for imagination.

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Appendix A: Ideas from sticky notes from three sessions across the four countries (translated to English from original languages)

Hope sessions

Norway

- Social credits gave Liv the old age she dreamt of
- It is safe to be a child (AI, war, etc.)
- Holidays in Gaza/Ukraine in the land of utopia
- No war
- Social media is illegal
- Ultra-processed food is illegal
- The robot dog Linka is the favorite in the kindergarten
- Kindergarten is the oasis where all public learning begins
- Everything/most things are self-driving
- AI creates workplaces
- AI has created many new jobs and employment opportunities
- AI has not taken over the world
- AI builds entire buildings. Only two people were behind this building
- The 5-hour workday is now for everyone
- 10-year anniversary of the end of all poverty
- 20-year anniversary of the end of capitalism
- All resources are kept in circulation, and we take care of what we have
- Reusing materials that have already been produced
- The construction industry reports that it can for the first time be called regenerative
- Everyone now has a good place to live
- The home pharmacy
- Norway has cleaned up and restored 20% of its landfill sites
- Global climate cooperation continues
- No new oil platforms
- The Earth's temperature has not increased for 20 years!
- Always safe to swim in the Oslo Fjord!

- We have met the climate goals for 2050

- Biodiversity has tripled since 2020!

- There are no waste companies/demolition contractors

- Water is used locally through "circular water plants"

- Waste does not exist

- No more "out of sight, out of mind" mentality

- Transformation, upgrading, and extensions of existing buildings is the norm

- No demolition

- Planning is built around resource access and resource location

- A shift in attitudes toward reuse and resource use is a fact. Everyone thinks about it at school/work/home

- Used/repaired goods are now as common on the shelves as new goods

- All existing buildings have been mapped with respect to materials

- Everything is traceable, and resources are constantly in motion

- Blockchain is used as the connecting link for all resources

- When new/changed needs arise in buildings, they are scanned and AI suggests how materials can be moved/modified + supplemented from a national reuse database

- In 2060, we no longer produce anything with non-renewable materials

- Extraction of new raw materials has been reduced by 80%

- All (100%) scarce resources are reused or recycled

- Almost no materials based on virgin resources are purchased. Everything is recycled/recertified/reused

- We have producer and supplier responsibility. When dismantling buildings, the process is reversed and everyone retrieves their materials

- Ownership shifts from owning products to co-owning resources

- Reuse is the first choice in the construction industry

- In 2060, reuse is the natural choice and new things are the exception

- Building suppliers primarily sell reused building materials

- Buildings are reusable without demolition

- Architects can finally live out their Lego dream (buildings are building blocks)

- Adaptable homes can be adjusted to family size and needs

- We build more modular, with elements and adaptable buildings. DfD (Design for Deassembly) is an absolute requirement followed by all

- Stores sell used before new

- All resources are accounted for in a closed system

- New construction is "out" and old-fashioned

- Reuse is no longer a political agenda, but a fact

- Norway makes decisions based on all resources being scarce and being more self-sufficient

- Norway has reached the goal of reducing its material footprint to 7 tons per inhabitant (sustainable level)

- The "exploded view" became a success story

- Plant and animal life are considered local resources

- Easier to return things you don't want

- Food production has become more technological to protect against a wilder climate

- Biological materials

- We have a greater understanding of how materials affect humans

- Good, stable winter in Krødsherad (Eastern Norway)

- We are better at using — and distinguishing between — real and artificial intelligence

- Drones buzz around us and have many tasks — especially delivery of consumer goods

- Everything we use and consume will be returned to a closed loop and not simply burned

- Reuse and circularity have led to increased focus on cooperation and holistic value chains

- Reuse is the natural first choice

- Easier to obtain new than used

- We dismantle and reuse all materials

- It is much cheaper to repair than to buy new, and repair shops are as common as grocery stores

- Extraction of non-renewable resources is reduced by 50%

- Clothes and things are reused, shared, repaired, and swapped — free shops and companies

- Recycling materials uses less and cleaner energy

- Loose reuse for all materials we want to keep in the loop

- New building materials are produced from organisms, e.g. fungi, and can be reused or recycled
- Buildings are renovated with reused and bio-based materials
- The view from here (NIFU's offices) is roughly the same as in 2025
- We adapt to a different form of aesthetics, similar to old façades in Rome
- Material exchanges — reuse platforms are increasing
- New methods and techniques to preserve and renew materials, e.g. flooring
- New buildings have become smaller and technically simpler
- Logging of all materials (e.g. in buildings) gives oversight and allows for much more reuse
- Personal consumption reduced by 70% — decoupling consumption and prosperity
- We measure prosperity in gross national happiness instead of GDP
- New goods: low-quality items are gone
- You can get used goods at the same place you buy new
- We are led by forward-looking and wise politicians
- Democracy is more active for individuals than today
- It teems with insects and birdlife; the number of individuals and species has increased massively
- Oslo now has large populations of golden orioles, kingfishers, nightingales, and goldfinches
- You can commute between districts in a roller-coaster
- Oslo has a fun fair located centrally in one of the city's green lungs
- Oslo has many year-round outdoor swimming facilities
- More music and singing
- We live closer together without increased challenges
- More large workplaces are integrated into the city, such as furniture stores, hospitals, prisons
- We share jobs, and everyone works 50% (and still has enough to get by)
- Everyone works 6 hours a day or 4 days a week
- We are better at time use — the 8–16 workday is gone
- The reuse industry is larger than the industry based on virgin raw materials

Poland

- Reduced food miles
- Biodegradable packaging
- Vertical farms
- Strict bans on pesticides and industrial livestock transport
- Mycoprotein or local plant proteins as mainstream choices
- Basic income
- Universal access to healthcare
- Stronger social security
- More time for cooking and eating
- Education for children on food preservation and healthy diets
- In neighbourhoods there are community gardens where residents grow food.
- There are community kitchens where people in need can receive meals or prepare them themselves.
- Food co-operatives operate vigorously, e.g., in every district.
- People share their surplus and their own home-made preserves.
- People buy only as much as they can eat, not "for stock."
- Hypermarkets distribute food they cannot sell to community food-sharing hubs.
- People are able to use up what they have to the fullest.
- No unnecessary packaging.
- Schools and preschools teach children and young people how to use food so it does not go to waste (in hands-on classes!).
- There is time for eating.
- People eat less meat (with healthy substitutes available).
- Food is produced locally (there are ways to grow plants that do not naturally occur in our climate).
- There is less processed food.
- Strict restrictions on processed food (food is healthier and its production is monitored at every step).
- Small markets with local products function instead of big supermarkets.
- Sugar content in products is minimised.
- Everyone has access to good-quality food (no hunger).

- People respect food and buy exactly what they need.

- Surplus food is given to those who need it.

- People choose meat products sourced only in a humane way.

- Plastic is banned in food packaging.

- Mycoprotein (fungal) protein is the norm.

- Industrial livestock farming and the transport of live animals are banned.

- Food is a right, not a commodity.

- Shops, restaurants, and wholesalers must share surplus food.

- Throwing food away is prohibited and punishable.

- There are workplace community canteens.

- Pesticides may not be used in food production.

- Producing overpriced food is not allowed.

- Food is produced and distributed locally.

- Healthy eating is mandated.

- More sustainable food production

- Stronger regulations on what can be thrown "into the bin"

- Maintenance and development of community gardens and local food production

- Women's circles and initiatives delivering food to those in need

- Strengthening skills for food preservation (e.g., canning, jarred food)

- Better distribution of grocery stores, especially those offering high-quality food

- Lower prices of local food

- Introduction of a basic income

- Growth in the number of cooperatives

- Greater sustainability in food transport and production (reducing food miles between countries and continents)

- Universal and free access to drinking water

- Free canteens in workplaces, institutions, and schools

- Finding solutions to reduce social inequalities — such as poverty, hunger, and unemployment

- Easier shopping for people with disabilities and for socially isolated individuals

- Continued advancement of medicine

- Good access to healthcare

- Communication skills that support community building

- Greater social awareness of mental health

- Social security — trust not only in institutions like the police but also among citizens

- Stronger local communities enabling exchange and food sharing

- Tolerance towards all forms of difference

- Food education

- Self-determination

- People have the courage to take responsibility for themselves

- Values / engagement / action

- People are aware of how their actions affect others and the planet — and have enough empathy and strength to strive to be better

- The "doomsday clock" hands move backward

- Introduction of measures to reduce environmental pollution

- Ecological transport = local crops = less urban pollution

- Renewable energy sources

- Development of vertical farms and other cultivation methods allowing food production on small areas

- Bioplastic replaces conventional plastic

- Legalized food processing and reintegration of surplus food into circulation

- Food production within cities; urban areas dedicated to cultivation

- More biodegradable solutions, e.g. in industry

Latvia

- Latvia is the greenest country in the world, exporting clean air and peaceful natural experiences (e.g. starwatching, quietude).
- AI-enabled rural development: Smart assistants helping citizens in remote locations live sustainably.
- Distributed living: urban-rural balance through modern village models, enabling telework and self-sufficiency.
- Sharing economy as default: extensive resource sharing in housing, transport, and food (Airbnb-style housing rotation, car and clothing sharing).
- Lifelong learning and health: people living healthily to 110–120 years, thanks to holistic education and proactive well-being.

- Decentralised communities: small, autonomous settlements with high-tech support and social cohesion.
- Everyone is an entrepreneur: formal employment models have been replaced by flexible, initiative-driven livelihoods.
- Deep social trust and community resilience; social norms favouring collaboration and generosity.
- Green education begins in early childhood and is rooted in nature and empathy.
- Citizens participate in circular design processes through local innovation labs.
- Latvia exports fresh air, silence, and stargazing.
- Zero-emission mobility.
- Harmonious coexistence with nature.
- Latvia's natural resources are our global strength.
- Circularity and sharing are default behaviors.
- Latvia's economy is based on reuse and long product life.
- All materials are traceable and biodegradable.
- Zero waste is achieved through citizen innovation.
- Nature-based lifestyles are supported by infrastructure
- We all are entrepreneurs like in Africa – local self-reliance.
- The system supports lifelong learning.
- Citizens live up to 110 years due to healthy lifestyles.
- Mental health and well-being are national goals.
- Every person shares not only goods but also values.
- People act responsibly without control.
- Society values are shaped around collaboration.
- The population is healthier and more active.
- Intergenerational learning is embedded in education
- There is no state in the traditional sense.
- No ministries – new institutions.
- People work project-based, not by contract.
- Communities self-organize using digital tools.
- Latvia trades in emotions – silence, air, and stars.
- AI helps optimize transport, energy, and space use.
- Robots handle routine tasks.
- Data-based platforms reduce overconsumption.
- Product passports are introduced (reuse transparency).
- Personalized sustainability incentives are common.

Denmark
- "The producers are so heavily pressured by legislation and lack of raw materials that they are forced to produce more responsibly."

- "All imported goods must comply with the legislation (also from Temu)."
- "The more the products emit, the more the products must live up to the repair criteria."
- "Legislation: Requirement for 100% recycling."
- "Consumer regulations have been introduced to address global resource overuse (e.g., aligned with Earth Overshoot Day)."
- "Clear, sensible rules that can be enforced - and become it!"
- "That repair indexes and complex evaluation systems become irrelevant because legislation has made all products repairable."
- "Planned obsolescence (of software) is illegal and punishable!
- "Repair hindrance is prohibited"
- "Products are collectively owned and universally accessible, rather than individually possessed."
- "People should be permitted to retrieve usable items from all recycling sites."
- "Product lifetime and repair possibilities become a sales parameter in line with energy labeling."
- "Producers compete on sustainability."
- "New products must remain repairable at reasonable costs for many years—for example, ensuring a 10-year TV can be serviced after seven years."
- "Product prices should reflect their true environmental costs, making sustainability a core consideration."
- "Raw materials are extracted from waste."
- "Bio-materials are approx. 90% of the products."
- "Produced locally (110 km radius)"
- "Clothes must be able to be repaired with "spare parts""
- "We borrow much more. Buy into community"
- "Sharing economy"
- "We rent various machines instead of owning them."
- "COMMUNITIES"
- "Buys almost no clothes. Need to have/nice to have."
- "Consumers have all the information to decide what to buy or what to avoid buying."
- "We live smaller so you need fewer products, therefore buy products of better quality."
- "The dealers will ONLY sell quality due to customer demand."
- "Climate changes force us to think recycling + durability + repair and access to spare parts."
- "Tools and materials are free for society. Knowledge is almost free when it is shared. The purpose is to promote learning."
- "Repairer: In high demand - more privatization."
- "You can make a living as a company by repairing. For example: tailors, people who fix kitchen machines etc."

- "A repairer on every street corner where there used to be beauty salons and telephone shops. They are VAT-free, and in a form of union."
- "AI - Camera that can generate electronics diagram + documentation + diagnostic."
- "AI - repair + spare parts."
- "High economic support for repair of hard white goods etc."
- "That repair cafés become more well-known and come more on the map, as well as that they attract more volunteers."
- "That consumers become more dependent on RCD."
- "That Repair Café becomes part of the finance law!"
- "That RCD maintains authoritative repair- and sustainability indexes."
- "Repair cafés are superfluous."
- "Repair cafés are not busy because goods last better – only old things are repaired."
- "Consumers have learned to always try to repair."
- "Universities and technical schools have reintroduced teaching in repair."
- "Repair cafés must be integrated into primary school education, including together with teaching in personal finance."
- "Repair must become an optional subject in primary school – preferably compulsory!"
- "The employees at recycling sites are trained to assess whether items should be discarded as waste or whether they can be repaired."
- "The hope is that we assess our progress based on people's well-being rather than GDP (money/turnover)."
- "The hope is that the UN will achieve a worldwide agreement to equalize CO_2 costs for products across nations."

Realism sessions

Poland

- Rubbish is everywhere.
- People are starting to understand that food should be respected.
- Food is not packed in plastic; it can be bought loose.
- Regulations for food producers are more stringent.
- We prioritise short supply chains and a return to seasonality.
- Food education is carried out in schools.
- Greater public awareness is possible.
- People share surplus food within families, among friends, and in organisations.
- A lot of food is wasted.
- People fall ill en masse from unhealthy food.
- There is an obesity epidemic.
- Meat is produced on a mass scale and animals are transported.

- Food is a commodity, nothing more.
- There are no major or visible changes—things are even worse.
- Long shelf-life foods, mass products, an excess of products.
- Social inequalities deepen due to unequal access to food.
- The food industry is powerful—you cannot fight it; it's too late.
- Food is a resource over which conflict is waged.
- Disaster—environmental exploitation by "big" producers.
- Little has changed; there are more hungry people in the world, and food is more expensive and more contaminated.
- Food is completely overpriced and unhealthy.
- Ultra-processed food.
- Continued dominance of the world's richest 1% and corporate power blocking social progress and reform
- Ongoing social polarization hindering development
- Deepening social disparities
- Social isolation
- Society remains divided
- Some return to community life
- More community gardens appear, but mainly in wealthier urban areas
- Intensified intercultural tensions
- People with lower economic status face limited access to high-quality food
- Lack of access to healthy food
- Increase in diseases (e.g., cancers)
- Canteens exist but are paid and serve processed food
- Food remains under corporate control
- Health, well-being, and food subordinated to efficiency and productivity
- Community understood as self-labeling rather than genuine change
- Low engagement in ecology, food, and production issues
- Conflicts become focal points of social life
- Participation in production circles, etc., brings "discounts" or freebies for future purchases
- Celebrity-driven health promotion
- Media promotion of anti-intellectualism delaying progress and change
- Intensified climate migrations
- Migration from cities to less populated areas
- Climate migrations in the Global South disrupt food production and fuel food-related conflicts
- Wars over access to drinking water
- Capitalism continues to profit from arms production — now more so in Europe
- Ecological disasters
- Loss of natural farming and grazing areas, disrupting food supply chains
- GMO seeds restricted

- The right to water still not recognized as a human right
- Continued overconsumption beyond actual needs
- Systemic limitations on technological development
- Reduction of working hours
- Increased self-production of food; home gardens
- Trend toward eateries using food that would otherwise go to waste (often employing people at risk of exclusion)
- Grassroots initiatives emerging and functioning
- Greater public awareness and pressure for systemic change

Denmark

- "Corporate lobbyists have repeatedly weakened repair directives and regulations, so even as legislation increases, its impact remains minimal"
- "Obligation to have spare parts for 10 years."
- "5-year warranty."
- "Requirement that things can be easily disassembled and repaired."
- "Software obsolescence is prohibited."
- "The dealers still don't care, as long as they can make money."
- "Repair of clothes and recycled clothes was a fad that disappeared after 5 years. Partly because the quality of clothing has become so low that recycled clothing has no value."
- "More automated manufacturing, which means more cheap products that are difficult to repair."
- "Manufacturers want to introduce new products and are actively working to develop new features to extend the product's lifetime and increase its competitiveness."
- "More products with simple repair solutions are developed."
- "All electronic gadgets must be able to be opened."
- "Consumption is increasing globally at the same rate as the last 30 years."
- "BUY-BUY-BUY. Without growth, there is no room for welfare."
- "Citizens are becoming more anxious and afraid for their economy in old age, which leads to less consumption."
- "Political parties will (still) want to curb consumption."
- "Repair Cafés become in! And everyone knows them."
- "Larger activities and more fixers in Repair Cafés. There will be an economic reward à la craftsman deduction for repairs."
- "RCs are busy because new things have become expensive."
- "RC - Is an organized part of retailers, shops, housing associations, department stores, etc."
- "RC - More component and spare part replacement."
- "RC - Becomes more workshops that lend tools so you can come and repair."

- "Repair Cafés lack volunteers as repair requests surge, requiring people to stay longer in the workforce."
- "Electronics are ubiquitous, and manufacturers—facing resource constraints—design ever-smaller products, raising the repair barrier."
- "The government's focus is now on the increasing pressure from extreme weather phenomena and groundwater pollution. Repair gets very little attention."
- "Repairers become VAT-free."
- "Repair-deposit."
- "Danish insurance companies support owners' repairs economically."
- "Recycling shops with repaired products take over part of the market."
- "New life in smaller companies that repair (tailors, shoemakers, etc.)."
- "Transport of goods is becoming more expensive, so we can't afford southern fruits galore."
- "Labor is expensive, especially in the EU, so it will not be easy to spread repair."
- "Perhaps cheap labour can be used from Asia. Problem with transport?"

Norway

Reuse / Circular Construction
- Reuse is common practice for a range of building components
- There is strong focus on product durability and ease of disassembly
- Many manufacturers are shifting operations to circular models, e.g., leasing and maintenance agreements
- Reuse receives more public attention and is increasingly normalized
- Reuse is the natural first choice
- Stone and loose masses are used 100% circularly
- The reuse industry is larger than the industry based on "virgin" raw materials
- Significantly reduced consumption
- Circularity has helped avoid the expected rise in consumption due to a growing global middle class
- From 20,000 to 2,000 buildings demolished each year
- Demolition does not exist
- Clear standards for circular buildings
- Recycling and producing new from old is standard for many more material types than in 2025

Work Life and Competence
- Everyone works more with their hands

- Significant increase in specialist firms dedicated to extending the lifespan of products and systems, e.g., ventilation systems and floor coverings
- AI has freed up a lot of work time; we work slightly less than in 2025 (7 hours per day)
- Reuse is a natural part of both vocational and academic education
- Sharing of equipment and expertise

Climate and Energy
- Greenhouse gas emissions 90% down from 1990
- Only a few days of winter with snow in Eastern Norway
- Local energy production, solar panels on private rooftops become standard; roofing produces energy

Geopolitics
- The geopolitical situation forces increased focus on reuse and reduced consumption
- Reuse - both knowledge and materials - is an export industry
- Water is a scarce resource to an even greater extent: refugee flows, and surface-water management become crucial

A Good Society

- Everyone lives by the "Cardamom Law"
- We are better at helping each other
- Generation A has brought new solutions – and we 5 will have a good old age
- We feel challenges more directly — food, economy, leisure — increased everyday stress
- Norway has managed to maintain its high-tech industries
- There is full understanding between preservation and new use — the Directorate for Cultural Heritage is larger and more collaborative
- Based on mandatory reuse mapping, all mapped reusable materials can be published in a database and made available internally and externally
- Materials in buildings are logged digitally for future reuse
- Materials change owners more easily due to open information flow — a well-functioning market
- More building components are produced closer to markets using 3D printing
- The Oslo trams from the 2020s are still in operation, well-maintained, and will remain for 30 more years
- TEK58 is fully circular — world-leading

- We have better understanding of ecosystems and how we use them; food production and biobased building materials
- There is a predominance of emission-free and toxin-free natural materials in buildings — health-promoting architecture
- Worldwide climate revolution
- New mental maps and concepts
- Not value chains, but value circles
- Reuse is the first choice
- Extensive reuse of existing building stock, upgrading and extensions
- New business sectors have emerged, where repair and material recycling are the new value chains
- Choosing reuse is the first choice
- Buildings are widely disassembled. Sales of used materials between countries is common
- Design for disassembly is an established building practice
- There are limits on how much non-renewable material may be used for construction/import
- Increased use of renewable resources. No use of non-renewable resources
- No demolition. Limited disassembly, 80% reuse
- Homo sapiens → homo dopaminus
- In school, everyone learns to repair, fix, and preserve everything they own — from wool socks to refrigerators
- Reuse is necessary due to resource scarcity and has become a political requirement
- Resources are mapped and systematically assessed in the UN resource framework
- War/crisis led to restructuring of the ownership model. We now have a rental system based on family size
- Everything planned for demolition/rehabilitation/alteration is mapped in a digital national database for reusable materials with standardized assessment
- Access to raw materials is scarce, and our resource base relies on keeping things as long as possible and repairing
- Increased flooding has led to improved local stormwater management; water reuse remains minimal
- Maxbo (material shop) becomes "Vintagebo." Reuse becomes cool/status among the general population
- 2025 – 6 planetary boundaries exceeded.
  2030 – all planetary boundaries exceeded.
  2045 – a new "Montreal moment."
  2060 – Hope returns.

- Norway has reduced its material footprint to a sustainable level due to economic downturns and limited resource access
- Established supplier responsibility. Specialists for different components
- We realize we should have spent more money and effort on prevention rather than repairing the damage we face now
- Blockchain used at scale for resource planning
- Clean air and water are the new gold
- Changed work life
- Strongly regulated AI contributes to good systems
- AI did not solve the aging population challenge
- AI has revolutionized learning - interactive
- Mobile phones no longer exist
- More additives are illegal
- AO (the Architecture Rebellion) has won - we use what we have, new aesthetics
- Focus on quality over quantity. The throwaway culture is over
- Clearer standards for reuse make it easy to preserve building resources
- Circular value chains are the norm in construction and infrastructure
- Norway reaches 80% circularity
- CO_2 capture compensates for emissions
- The Earth's temperature has remained stable for 10 years
- New record in climate tourists coming to Norway
- Shark attack in Farsund
- Global climate cooperation not fully achieved — but almost!
- Biodiversity back to 1990 levels
- Generation Alpha takes best care of nature and chooses reuse first
- Massage bed, Tai Chi on the pier, homegrown food, kind teenagers — Anja loves her old age
- Around 150 of us show up for morning exercise in Tøyen Park every Saturday
- The tunnel at Frognerkilen creates an enormous green area and Norway's finest park!

Reframing

Poland

- Food production is local and dependent on climatic possibilities; food tourism is a major problem.
- Food is shared and local because transporting it over long distances is not even possible.
- Food is approached in a multi-sector and cross-sector way.

- There is no food trade based on money and mark-ups.
- Family allotment gardens return to favour (not as summer cottages, but as arable plots).
- Using nature's resources is treated as a gift, not as something we are entitled to.
- Food is not wasted; local communities are responsible for its stewardship.
- Food is consumed together; there is a culture of eating.
- Food is rationed (e.g., ration cards).
- Small communities - everyone plays a role, but there are no divisions.
- Allotments and small farms.
- Food is important because it is limited; people respect it and do not throw it away.
- People are compelled to produce locally.
- Transport does not go beyond the city scale.
- Food has become a currency (barter).
- Animals are full members of society, so they are not eaten.
- There are local federations for food production and distribution.
- There is no money; exchange exists, but the "object" of exchange is not monetised or ranked by value.
- We return to very small communities which nonetheless cooperate and exchange with one another.
- Return to nomadic lifestyles - moving in search of resources
- "Natural" food replaced by technologically modified, lab-grown food
- Development of new forms of community (possibly inspired by democratic confederalism)
- Creation of communes
- Fully grassroots food production, leading to a lack of oversight
- Revival of local craftsmanship, creators, and small service providers
- Life in small communities or settlements
- Rebirth of communal life through small-scale living
- Rise in various forms of crime
- Threat or actual use of nuclear weapons
- People crossing moral boundaries in search of food
- Collapse of state structures leading to worsening living conditions
- Gang wars and local mafias
- Ubiquitous food mafias
- Improved living conditions in the Global South as the Global North's influence declines
- Poor or home-based education; children forced to work
- Educational inequalities depending on location and prevailing "doctrine"

- Visible effects of malnutrition (somatic and psychological)
- Higher mortality due to deficiencies
- Greatly reduced birth rates and increased mortality
- Space colonization by the richest
- Food treated with due respect
- Return to meat consumption out of necessity
- Extinction of many animal and plant species
- People highly oriented toward spiritual development
- Dominance of genuine needs over pseudo-needs
- Respect for nature = reduced species chauvinism = veganism as the norm
- Focus on values rather than value-judgment
- Slow life - people stop self-exploitation
- Decline in consumerism = more time for "being" (vita contemplativa)
- Enclaves of the wealthy; bunkers stocked with resources
- Electricity as a luxury good
- Food production and water controlled by the richest
- Huge social inequalities between "city-states" - producers vs. owners
- Deepening social divides
- Food banks reserved for the most privileged
- Corporations taking over cities ("company towns"), restricting human rights
- Strong limitations on technology access
- Rejection or retreat from technology

Latvia

Environment / Circular Economy

- Resource quotas controlled by AI.
- Circularity required by regulation.
- Waste management centralized – access limited.
- Scarcity of energy and materials.
- Food supply instability due to climate stress.
- Growing dependence on controlled food systems (e.g. hydroponics).

Social / Cultural

- Migration waves and identity concerns.
- Universal values embedded in systems.
- Emotional responses to perceived "climate apartheid."
- Fragmented societies based on score/ranking.

- Distrust and mental health deterioration.
- Social class determined by digital behaviors.
- In-group/out-group dynamics based on tech compliance.
- Marginalization of rural and low-tech groups.

Technology / Economy

- AI algorithms dictate what can be accessed or consumed.
- Digital inequality leads to rebellion and underground markets.
- Digital rating systems affect access to services.
- AI overreach: from resource management to moral governance.
- Surveillance tools embedded in everyday life.
- Data economy replaces traditional currencies.

Institutional / Governance

- Local autonomy diminished.
- Governance transferred to global tech actors.
- Overreliance on predictive AI models.
- Civil protests against unaccountable tech rule.
- Democratic processes bypassed by platforms.
- Tech corporations become de facto governments.

Norway
- Global production stop – no new products (except edible ones)
- Manufacturers have handed responsibility over to waste management companies – they must take in products, repair them, and sell them
- Half the population works with redesign
- We return to a barter economy
- 10% of our time is spent handling/redesigning/fixing things at home that previously became waste (the state counts this as paid work time)
- The insurance industry takes care of producers that have gone bankrupt
- We have a digital register of all raw materials used in the world, with updated product form
- We have a national "resource manager" – a database, a population registry for materials
- At work lunches: no takeaway – everyone must go to restaurants. All meals are eaten in restaurants. Packaging used by restaurants is picked up by suppliers
- We live as we did in 1825 - approximately
- Deposit system – you get something back for raw materials

- Ownership of raw materials contained in a product does not necessarily follow ownership of the product
- Products-as-a-service is widespread
- Building components and buildings are designed to be: repaired, disassembled, and/or reused
- Solar energy (and storage) provides all the energy we need
- We have clever storage solutions
- Nearly 100% bio-based
- The "out of sight, out of mind" mentality is gone
- We use only bio-based materials
- No oil industry
- Food waste must go through a bokashi process before being collected/delivered for soil production
- Food is sold in biodegradable bio-based packaging
- Reward system: payment scheme for delivering raw materials (from waste). It must be profitable to collect waste
- 3D printing and other technologies make it possible to quickly turn one product into another
- Producers are responsible for their products: they repair, collect, replace
- On construction sites: all wood is collected by sawmills, all metal by Norwegian steel companies, etc.
- IKEA collects your cardboard boxes and discarded furniture
- Life becomes more harmonious – less guilt
- People consume very little
- Tracking technology prevents resources from going astray
- We live more simply: eat more plant-based, need less space, need fewer tools
- Competence: everyone knows how resources are transformed into new raw materials
- A new subject is in high demand at NTNU: "Re-purpose" dismantling engineering
- Composite packaging is no longer allowed – all packaging must be collected and sorted where it arises
- Life extension of everything is the top priority: products, buildings, biological systems
- All resources have their natural place in their value chain (value network)
- We travel less and more qualitatively
- Shopping is done with reusable bags you can borrow and return if you forget
- We manage biological processes organically (not chemically)
- Medical equipment like syringes and needles is collected and sorted by robots that sterilize/recycle the materials

- Everyone must have their own compost systems, including for hygienic products designed to be decomposed by fungi or bacteria
- Designing for redesign and reuse
- Supplier responsibility throughout the entire lifecycle
- Producers/suppliers themselves handle collection/return, repairs, recycling, and offer products back to the market, or provide maintenance/repairs on site
- All packaging is reusable, e.g., milk bottles
- "Consumption statement" (similar to a tax return)
- Extensive deposit schemes for different inputs/products
- No more plastic in clothes or unnecessary gadgets
- Local, circular growing, food production, and composting
- Simple living, minimalism. We are not owned by our things. Human values are in focus
- Pure, homogeneous products and materials
- Sharing economy
- All product sales require the possibility of return and repair
- Neighborhoods/communities are (more) self-sufficient and produce and handle (most) resources locally (energy, food, grey/black water, water, etc.). The rest is traded between communities, and everything is a resource
- Sharing culture and more cooperation across sectors – less divide between private and public
- Consumption reduction within the planet's boundaries. Assigned quotas
- Christmas Eve is now about food and family; presents have been replaced with games, songs, and book-exchange evenings
- A European material-exchange organization ensures European cooperation. Scandinavia becomes the timber hub
- Challenge: those who have always had little get fewer chances to get more – both countries and individuals
- Buildings become state-owned/owned by large companies because individuals/small actors cannot acquire materials through exchange
- Norwegian Championships in not-throwing-things-away
- Norwegian Championships in reuse (households, housing associations, neighborhoods, companies)
- If things = infinitely reusable, money loses value. Less time at work, more time at home
- Local incineration and heat-production facilities
- Better quality and greatly increased lifespan of all products (everything can be fixed)
- We share more, instead of everyone owning their own
- Flea markets replace shopping centers

- Raw material prices (for new raw materials) are so high that all existing materials are profitable to keep, repair/maintain, recycle
- The King's new role is the King of Fairness — he decides sharing and justice
- Repair industry, upgrading industry
- Research on reuse for materials that often get down-cycled becomes the new environmental technology
- Because all waste has value, we take care of things. Repair centers become the new weekend activity
- All goods are sold in bulk – minimal packaging
- All (potential) surplus from transformation and rebuilding goes to reuse
- Need for a joint resource manager ("UN-resource") for the various fractions — the large, more complex materials/buildings
- Waste facilities are now logistics and storage hubs for reuse
- There are stations where resources are collected to gain new life
- Drop-off points for very specific segments
- Recycling companies still exist, BUT strictly for materials that must be delivered
- We must always think: "Do I need this for the rest of my life?"
- Biodiversity – with less in circulation, less can be taken out?
- Food is produced and distributed locally. Less car traffic
- IKEA finally makes money on rental and repair
- More tolerance
- Dating apps with family trees
- Large social community
- Back to the milkman model – no packaging
- Compost in every garden
- All food must be bought/sold in brought-along containers
- The end of consumerism. Focus on durability and quality
- Urban mining is normalized
- Attitude shift in the world/the West. Creativity for new solutions – awareness of what we have everywhere, clothes, food
- 5-hour workday
- A society where generations help each other more
- The repair and maintenance reform in schools celebrates 10 years
- A market for worn/damaged items
- Material passports
- Demand for oil (plastic) is reduced
- All protective packaging is regenerative or biodegradable
- Everything is circular, everything is regenerative

- 100% reuse of building materials
- All resources and products are mapped. Their potential new uses are mapped. AI-supported matching between needs and supply
- Waste designed out of all products and buildings
- New materials come into focus → biodegradable
- Much less stress in society than before
- Greater calm due to inherent respect for what is created
- Individual ownership is abolished; all resources belong to society
- Time freed by AI is used for circularity activities (maintenance, fixing, etc.)
- Materially minimalist society; focus on humanity, nature, well-being
- Sharing culture comes naturally
- Community-based living arrangements

Appendix B: Example of FLL set-up (Norway)

Time	Activity
09:30–09:50	introduction
10:00–10:50	session 1: hope (group work)
11:00–12:00	session 2: realism (group work)
12:00–12:45	lunch
12:50–13:20	short report from the groups (session 1 and 2)
13:20–13:30	session 3: reframing scenario
13:30–14:15	reframing scenario in groups
14:15–15:00	closing session (plenary)