Nordic Innovation

Building within the Safe Operating Space – Nordic Insights on Sustainable Construction

Contents

This publication is also available online in a web-accessible version at:
https://pub.norden.org/us2024-440/

Preface

This project is part of the Nordic Sustainable Construction program initiated by the Nordic ministers for construction and housing and funded by Nordic Innovation. The program contributes to the Nordic Council of Ministers' Vision 2030 by supporting the Nordic region in becoming a leader in sustainable and competitive construction and housing with minimal impact on the environment and climate.

The program supports the green transition of the Nordic construction sector by creating and sharing new knowledge, initiating debates within the sector, establishing networks, workshops, and best practice cases, and helping to harmonize Nordic regulations on the climate impact of buildings.

The programme runs from 2021-2024 and consists of the following focus areas:

Work Package 1 – Nordic Harmonisation of Life Cycle Assessment

Work Package 2 – Circular Business Models and Procurement

Work Package 3 – Sustainable Construction Materials and Architecture

Work Package 4 – Emission-free Construction Sites

Work Package 5 – Programme Secretariat and Capacity-Building Activities for Increased Reuse of Construction Materials

This report is connected to the Work Package 3 SUSTAINORDIC work.

The work has been conducted by Form/Design Center and Climate-KIC in collaboration with 24 experts and practitioners connected to the value chains related to construction and housing in the Nordics.

All views, interpretations, and recommendations represent the views of the stakeholders interviewed and the writers in SUSTAINORDIC.

Nordic Sustainable Construction

For more information on Nordic Sustainable Construction, visit our website here: www.Nordicsustainableconstruction.com

Perspectives on Nordic Sustainable Construction

One of the big global GHG emitters is the construction sector. Our built environment is responsible for around 40% of all carbon emissions and 50% of all raw materials extracted on a global level. If we, as society are serious about transitioning the sector to operate safely within planetary boundaries, the industry needs to radically reduce the amount of carbon emitted from new construction, infrastructure and buildings while at the same time being at the forefront of an increased need for homes. On this account, the sector is expected to grow 42% by 2030. This puts an extra level of urgency on the need to transition the way we imagine, plan, construct and use buildings.

And we have to start now! The good news is that we know many of the solutions already, and if we get started, something can be done about it.

Since 2018, the Nordic countries have collaborated on lowering the climate and environmental impact of construction. The goal is to make the Nordic countries the most sustainable region in the world. As part of pursuing this goal, the Nordic building authorities are working towards harmonized building regulations in the region with an aim to arrive at a construction sector which is compatible with the planetary boundaries. Some of these efforts revolve around implementing standardized LCA measures and setting limit values for emissions for new buildings.

But the efforts on LCA and limit values cannot stand alone, the transformation towards a carbon neutral and planetary boundaries- safe construction sector requires a full systems transformation. This involves a fundamental and integrated transformation of structures, processes, and practices to create a more environmentally, socially, and economically sustainable built environment.

All of these components and the interdependencies between them must be considered and reflected in holistic policies and regulation that reflect real life experience from the users and clear the path towards long-term positive impacts on both human well-being and the planet.

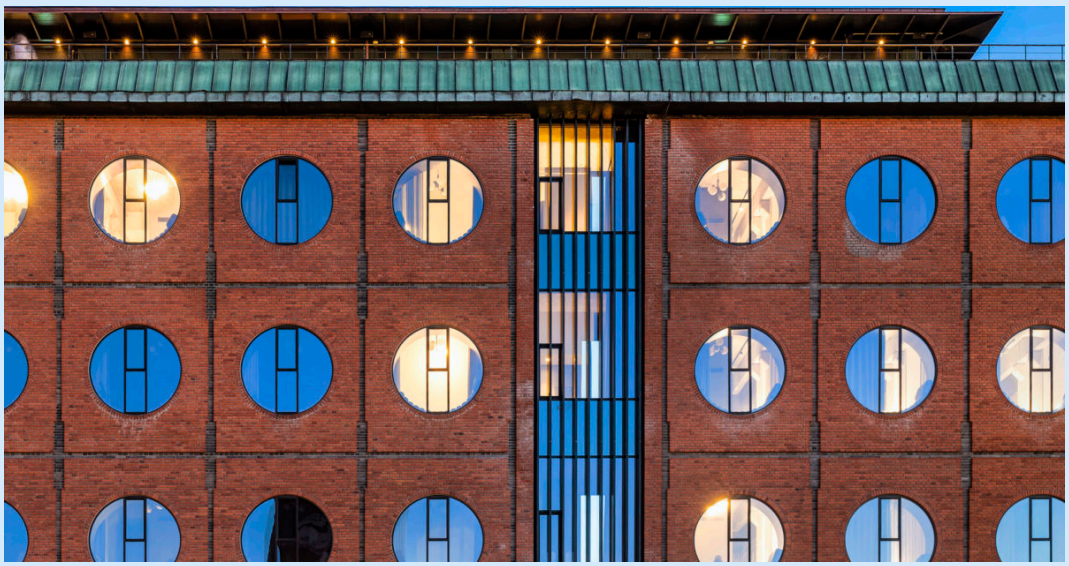
Through 24 interviews, this publication invites you into the minds and ideas of experts, developers, architects, policymakers, researchers, opinion shapers, and builders offering their perspective on what the future of construction and architecture will look like and how it should develop to be compatible with the planetary boundaries.

The following sections will address critical questions, such as how we can maximize the use of existing building stock, prioritize retrofitting and renovation over new construction, and embrace biogenic materials to reduce the carbon footprint of embedded energy. We will explore the role of architecture in shaping communities and promoting sustainable behavior, as well as the importance of contextualizing construction within local material availability, cultural norms, and legislative frameworks.

Finally, we will examine the role of legislation and policy in guiding the construction industry toward sustainability. As we face the realities of the climate crisis and other environmental challenges, it is imperative that regulations evolve to protect not only individual safety but also the health of our planet. Through this exploration, we aim to illuminate the path forward, offering a comprehensive vision for a sustainable, resilient, and thriving built environment.

This publication is part of the Nordic Council of Ministers initiated programme Nordic Sustainable Construction programme and the work package SUSTAINORDIC with the aim to identify the cultural change and legislative reforms that would steer the construction sector towards alignment with the Paris Agreement and other sustainability benchmarks such as social sustainability and biodiversity.

Pernille Martiny Modvig



Hotel Ottilia, Carlsberg City, Copenhagen, Denmark. Two of Carlsberg City's most distinctive buildings, Maltmagasinet, originally designed by Vilhelm Dahlerup in the 1880s, and Lagerkælder 3, designed by Svenn Eske Kristensen in the 1960s, form the framework of Hotel Ottilia today after an extensive transformation. These distinctive historic buildings have been meticulously transformed into a modern luxury hotel with respect for their distinctive features and history. Arkitekt: Arkitema.

Central learnings

This section presents a brief summary of the key learnings based on the content of the 24 interviews of this publication. This summary section is organized in five categories of key learnings. The first category reflects the need for, and the emergence of, general mindset changes observed among the experts interviewed in the four sections of this publication. The second category brings together the arguments for legal and regulatory development, as expressed in this material. The third category is a summary of the identified responsibilities and challenges, as well as knowledge and experience of the construction industry, including the use of material and the design task. The fourth category assembles learnings on the importance on the level of community, where place-based knowledge and collaboration are key factors in politics and practices. The fifth category summarizes the key learnings on the ecosystem level, the green and blue systems that know no boundaries set by legal or national borders.

Mindset and attitude changes

Cultural and paradigmatic shift

The traditional mindset of constant building and consumption, rooted in the 20th-century economic growth paradigm, needs to be challenged. There's a growing culture that values doing more with existing resources rather than continually adding new constructions.

Importance of political will: Strong political leadership and commitment to sufficiency-based policies are crucial for enacting meaningful, science-backed changes in the building industry.

Effective and informed mobilization: Engaging politicians and industry stakeholders with clear, well-researched data is key to inspiring action and ensuring the construction sector contributes positively to national emission targets.

Agility in policy and practice: Institutions must become more agile to keep pace with rapid changes and evolving scientific knowledge. This agility is necessary to address the urgent climate crisis effectively.

Valuing ecosystem services: Ecosystem services are often undervalued in economic systems and local land use planning, leading to decisions that neglect long-term environmental benefits. Economic decisions often favor immediate financial returns, overlooking the long-term opportunity costs and ecosystem services, such as flood protection.

Need for mature economic understanding: A more mature political and economic perspective is needed, where ecosystem services are properly valued and prioritized over visible financial gains.

Evolving sustainability: The concept of sustainability is shifting to include social dimensions and must adapt to account for "unknown unknowns" in future definitions and practices. Sustainable concepts are merging into a cohesive narrative, driving positive change.

Historical perspective on resource scarcity: Post-World War II resource scarcity required careful use and reuse of materials. Today's resource shortages, driven by unsustainable consumption, necessitate a similar approach to preserve resources for future generations.

Challenges of adopting new methods: Overcoming mental and process-based barriers is crucial for shifting towards sustainable practices, requiring education and a reevaluation of decisions on all levels, across all businesses and borders.

A new enlightenment: Akin to the 18th-century European Enlightenment, where shifting societal values were driving sustainable change, we might be in a similar mindset transformation. Observations suggest that younger generations might already be embodying these transformative values.

Legal and regulatory development

Sustainable Legal Foundation: Planning and building laws should prioritize sustainable development, requiring legal reforms where necessary.

Urgent Legislative Alignment: The building industry's impact on biodiversity demands immediate legislative alignment with climate science to mitigate its environmental footprint effectively.

Setting and Revising CO_2 Targets: Establishing quantifiable CO_2 emission limits, even if imperfect, provides a baseline for ongoing improvements, fostering innovation and competition.

Incentivizing and Regulating Sustainability: Advocate for policy changes and adjusting contractor incentives to prioritize reuse over new construction, reducing community disruption and fostering sustainable practices.

Legislation and Regulation: Strong political and legislative support is essential for prioritizing the reuse of building materials, setting mandates for recycled content in construction, and overcoming market entry barriers.

Comprehensive System Integration: Developing national or EU-level frameworks and digital platforms is crucial to coordinate material availability, support logistics, and foster a circular economy in construction.

Need for legislative models for preservation: There is a conflict between preserving place-based values and the pressure from new EU directives and climate calculations. There is a need for updated models and tools that reflect the long-term sustainability and historical value of buildings, and a need for ensuring that preservation evaluations are mandatory before demolitions.

The need for legislative action: There is a need for legislation that ensures equal conditions for all actors in the construction sector, laws and clear guidelines to avoid leaving decisions to individual discretion.

Sustainable land use and policy coherence: Nordic countries need uniform land use strategies, with policies encouraging both restrictions on harmful practices and incentives for sustainable actions.

Overcoming legislative conflicts: Conflicting regulations hinder sustainable practices. The industry must adopt a more integrated approach, with flexible and innovative regulations that support sustainable choices and methods on all scales.

Building industry in transformation

Circularity and sustainable use of existing buildings: The most sustainable buildings are those that already exist. Before constructing new buildings, it's crucial to evaluate whether it's necessary. Circularity is intensified through shared housing, by better utilizing existing buildings, reducing the need for new construction.

Role of the construction industry: Rapid development of efficient solutions is needed to address the climate crisis within the construction industry. The construction industry plays a significant role in resource use and greenhouse gas emissions, presenting substantial opportunities for impactful change. Rapid development of efficient solutions is needed to meet climate goals.

Cultural shift in the construction industry: The construction sector is crucial in reducing resource use and emissions, with a strong push towards circular systems and holistic legislation to support sustainable practices. Challenge the assumption that building is always necessary; consider alternatives to demolition and new construction.

Paradigm shift in architecture: There is a significant shift from prioritizing new monumental buildings to transforming existing building stock with high-quality sustainable architecture. A growing "construction shame" in architecture reflects a broader societal move towards valuing building reuse over new construction, signaling a shift in how progress is perceived.

Establishing infrastructure for reuse:

Creating a connection between supply and demand emphasizes the need for a comprehensive market platform that connects those who have reusable materials with those who need them. A functional infrastructure for reusing building materials requires a) a market platform, b) storage, c) sustainable transportation, d) quality assurance and insurance clearance, and e) digitalization to track materials.

Comprehensive impact assessment: Prioritize the reduction of virgin material use due to its significant impact on biodiversity and incorporate environmental considerations across the entire material lifecycle.

Balancing sustainability and affordability: A key challenge is to achieve sustainability without sacrificing affordability or architectural quality, particularly in housing, while aligning regulations across different regions.

Bridging research and practice: It is essential to close the gap between academic research and practical application by developing tools and knowledge that support environmental sustainability in the construction sector. Architects and educators should approach their work as learners, not masters, constantly seeking to understand and respect the places they are working in.

Contextual design approach: Place-based architecture involves understanding and integrating cultural, historical, and environmental contexts. Sustainable practices include using local materials and building in a resource-efficient way that aligns with social and economic conditions. Local and indigenous architecture benefits from experience, earned by time and interactive development in a specific location.

Embrace continuous innovation: Overcome the resistance to reuse in the construction industry by proving its viability as a business strategy and creating local job opportunities through refurbishment and repair practices. The industry must focus on the future by embracing new tools, contracts, and methods, recognizing that adaptability and flexibility are key to meeting evolving sustainability challenges.

Community concerns

Proactive Local Governance: Encourage local authorities to actively use land ownership and long-term strategies to drive sustainable development, ensuring that growth aligns with local context and values. Active community governance and a strong negotiating position are essential for adapting to urban changes and preventing gentrification.

Community willpower: The motivation and drive of the local community are the greatest assets in place-based development. Place-based development projects emphasize local identity and the power of local initiatives and organizations, ensuring high local engagement and ownership.

Municipal leadership and knowledge sharing: Municipalities need concrete guidelines and in-house expertise to make informed decisions on new construction versus renovation, setting ambitious climate requirements and sharing knowledge across regions.

Holistic Integration: Sustainable planning must incorporate ecosystems, non-human life, and circularity, using dynamic data models to address complex "wicked problems" and future uncertainties.

Harnessing local potential: Prioritize leveraging existing local assets and knowledge for innovation, focusing on holistic community development rather than solely attracting external businesses. Advocate for better resource allocation and avoid one-size-fits-all solutions, emphasizing tailored designs that reflect local conditions and needs.

Prioritize place and community: Emphasize "place before space before buildings," focusing on creating cities for people, reconnecting with local assets, and considering long-term, holistic planning.

Learn from international examples: Draw inspiration from other cities to address gaps in local heritage discussions and showcase the benefits of place-based planning through innovative development strategies.

Democratic participation and collaborative planning: Effective solutions demand active citizen involvement in planning, beyond superficial engagement, particularly in response to the climate crisis. Overcome fragmented project responsibilities by fostering collaboration among architects, communities, and various stakeholders.

Collaborative networks and visualization: Build networks among stakeholders and use powerful visualizations to create shared visions, fostering collective responsibility and effective environmental restoration.

Interdisciplinary approach: Engaging diverse disciplines and local communities to reconnect society with nature, transforming challenges into opportunities for innovative and sustainable development.

Protect and support ecosystems

Short-Term vs. Long-Term Thinking: Economic decisions often favor immediate financial returns, overlooking the long-term opportunity costs and ecosystem services, such as flood protection.

Coexistence of culture and nature: Integrating nature-based solutions in urban development restores the balance between culture and nature, focusing on enhancing ecosystems like water and forests.

Changing the soil use narrative: A shift from viewing soil as a resource to recognizing its value in ecosystem services is essential, with EU policies playing a key role in promoting sustainable land use.

Rewetting peatlands for climate mitigation: Rewetting peat soils reduces greenhouse gas emissions and supports biomass production, aiding climate neutrality.

Challenges in land use: Nordic countries often misuse fertile land due to abundant availability, while a lack of comprehensive land use management leads to suboptimal resource utilization.

Holistic water planning: Plan beyond the immediate site to account for upstream and downstream effects and the relationship between inland and coastal water bodies to support proactive climate adaptation.

Nature-based solutions: Utilize blue-green infrastructure to provide water buffering, ecosystem support, and enhance urban resilience.

Valuing soil and regenerative agriculture: The future value of arable land hinges on global protection efforts and soil health, making regenerative agriculture essential for maintaining soil fertility and ecosystem services.

Holistic and interdisciplinary approach: Engaging diverse disciplines and local communities to reconnect society with nature, transforming challenges into opportunities for innovative and sustainable development.

Sustainable land use and policy coherence: Nordic countries often misuse fertile land due to abundant availability, while a lack of comprehensive land use management leads to suboptimal resource utilization. Nordic countries need uniform land use strategies, with policies encouraging both restrictions on harmful practices and incentives for sustainable actions.

In order to close the performance gap in reducing CO_2 emissions and mitigating the effects of climate change and damage to biodiversity and ecosystems - as identified by all interviewees - there is a need for increased knowledge, engagement,

and ambitious requirements to promote circular business models and adopt new ecosystem-oriented structures. While knowledge and willingness to act according to the Paris Agreement are high, the speed of action to handle high initial costs are insufficient. A paradigm shift towards sustainable practices is needed, fostering a respectful relationship between people and their built and natural environments.

Based on the key learnings from the 24 interviews, SUSTAINORDIC can identify a set of responsibilities and suggestions for regional, national and EU policy and legislations. We can also extract suggestions for changes in practice and mindset in the building material and construction industry, the architecture profession, finance, researchers, politics and local communities. The overarching task is achieving a harmonization of building regulations across Europe while respecting regional differences. Thus, we may contribute to a culture of collaboration, emphasizing ethics and responsibility to manage increased risks associated with climate change, and develop methods to articulate and exchange knowledge derived from phenomenological data across disciplines and borders.

Photo: Rasmus Hjortshøj

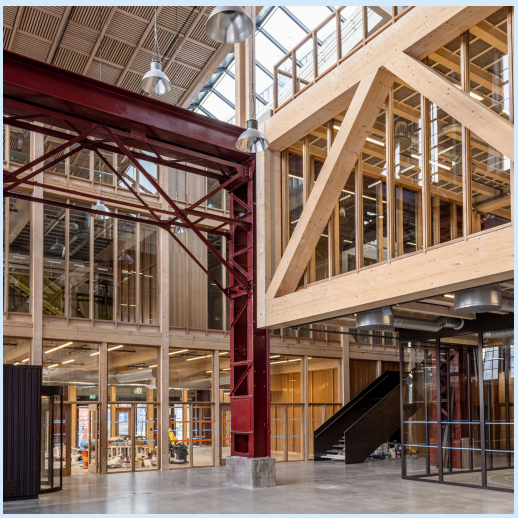


Photo: Rasmus Hjortshøj

The transformation of Gjuteriet in Malmö, designed by Kjellander Sjöberg for Varvsstaden, focuses on the intensive re-use of repurposed materials, the project demonstrates how existing buildings can be reimagined based on circular principles.

Formerly a ruin, the distinctive building has been given a vibrant new life as an innovative and open new meeting place, a vibrant creative node in the city, and a new inspiring and experiential company headquarters for Oatly.

Throughout its radical transformation the building still tells a multifaceted story about the port's rich maritime heritage. This is achieved through a composition

wherein the new and old elements integrate into a cohesive whole, while still retaining their distinct and separate layers.

Four pathways to transformation

The work of SUSTAINORDIC[1] has focused on knowledge gathering around the question of what it takes to implement a truly sustainable construction sector in the Nordics. Based on input from Nordic urban planners, policy makers, architects, engineers, developers, building owners, grassroot movements and activists collected through 28 panel debates and events as well as numerous conversations with experts connected to the SUSTAINORDIC project. The findings from the first phase of knowledge gathering have pointed towards four focus areas or levers for change. In this publication, we have asked 24 experts to offer their perspectives on these four pathways.

The hierarchy of material use in construction

We should intensify the utilization of the existing building stock and design spaces for multifunctional and flexible purposes. Prioritizing energy renovation, renovation, and transformation over new construction is crucial. Introduction of new materials should only occur when absolutely necessary, and in such cases, the use of biogenic building materials is recommended for both new construction and renovation to mitigate the negative impact of embedded energy.

Place-based development and architecture as a community builder

Construction and architecture should be defined by the context in terms of local material and resource availability, cultural, social, and aesthetic context as well as legislative context working actively with architecture as a community shaper and a nudger of sustainable behaviour as a lever for change. This focus area explores a holistic and place-based approach to community building and urban development in the Nordic region to reduce the environmental impact of buildings and infrastructure, promote more sustainable lifestyle choices, build stronger and more resilient communities, and preserve local cultural and aesthetic traditions and values.

1. SUSTAINORDIC

The underrepresented stakeholders in construction policy

There is a significant need to include voices that lack the economic or political leverage required to influence the current construction system. These voices or stakeholders include future generations and the planet and its nine planetary boundaries. New leadership structures and decision models are needed to ensure the representation of these stakeholders, who lack a voice in traditional democratic systems and current economic models.

Regulation for sustainable construction and architecture

Governance and regulation have been repeatedly cited as both an obstacle and a potential lever for change. The aim and need are for legislation and regulation to be directed towards a consistent alignment between the safe operating space within planetary boundaries and our construction practices.

This publication is divided into four parts with interviews related to these four focus areas. It is important to note, however, that all elements are interconnected and therefore, the same recommendations may respond to several focus areas at once.

Material hierarchies

Shifting towards sustainable practices and material in construction

Photo: Rasmus Hjortshøj

Fabers Fabrikker, Rysinge, Denmark. A former factory in the small town of Ryslinge now contains four affordable dwellings built using an all-wood modular system. The house-in-house method is a new housing typology that makes it economically viable to reuse the cultural heritage in rural areas. The Faber's Factories project was done for Faaborg-Midtfyn Municipality by Arcgency in collaboration with Ekolab (engineer) and Aarhus School of Architecture.

Introduction

Architecture is, in essence, an artful pile of material. Throughout history, this material has been a very valuable asset. So valuable that no building would be standing unused for long. Stones for walls, entire columns, roof tiles, floor tiles, windows and doors of course – everything can be dismantled and placed in new contexts. The term for building parts, removed and inserted in new buildings, is spolia, left-overs. We might have put some distance between our fossil-era-fuelled building industry and this building tradition, but in fact, building material is as valuable today as it was in ancient times. We just don't respect it as much, and we find it easier to replace it with newly sourced material, even though we are surrounded by possibilities.

Something in our minds has shifted during the last century. From the turn of the 19th century, we have witnessed two world wars with immense destruction of urban areas, and the subsequent need for rebuilding. Combined with social engineering and standard improvements of housing, we have provided ever growing urban populations with new housing, and a growing state and municipality with public services in new buildings, then adding infrastructure for growth, social, industrial and economical mobility. In the last century we have come to accept, even celebrate, the immense act of entropy that is the demolition of a building. What took years to build takes days to tear down. In a cloud of dust, the material is painstakingly removed, truckload after truckload, to become landfill.

Maybe we lost respect of the work involved in building, operating diesel-powered machines and cranes to do the hard work, instead of men lifting half their body weight in bricks, walking ten floors up, as when the Stockholm City Hall was constructed in the 1920's. The demand for new buildings has spiraled under the influence of global markets seeking investments, while rules and legislation systems are lagging. Under dire climate circumstances, we need to remember that the model of the building industry during the last century is an exception in history. Buildings are in our time either overvalued or undervalued. If they were assessed right where they are – standing, functional, maybe in need of an update, but far from ready for landfill – we would not fail to see the structural value that they represent, being artfully layered material.

Photo: Ditte Isager

Signe Wenneberg, Climate activist, speaker, author and journalist, Denmark

No change without reach – the voice of the activist and opinion shaper

Signe Wenneberg is well known to the Danish audience, often featured in public debates, giving lectures around the country and serving a wide audience of Instagram followers. Wenneberg is keeping a close eye on national heritage, architecture and climate policy, summoning fellow climate ambassadors as well as people who just feel sad to see old beautiful houses being demolished and replaced by uninspired constructions. Covering climate issues, cultural heritage and democracy in planning, she communicates by examples and with an educational and straightforward approach. Signe Wenneberg also walks the talk as a construction pioneer:

– During the last three years I have rebuilt two national heritage houses, the last one is where I have my office and home called @studiehuset in Instagram. I have taken the opportunity to show my readers how they can renew an old house in a sustainable manner so we will prolong the buildings' life with a century or more. Everyone can do their bit – and I think people sense that, when they read my stories, as I am not a trained builder nor an architect. Before that I built the world's first FSC-certified wooden house on pillars: A project that was presented on prime-time TV. In terms of construction, the summer house was as sustainable as it could possibly be, with locally sourced material, recycled windows and doors and only FSC certified wood and biobased insulation. That house for sure got a lot of attention! Please search #signessustainablehouse if you would like to see it.

”

I have an exposure of 3.6 million on Instagram, which some commentators have suggested might actually be Denmark's largest climate media channel.

Advocating sustainability for almost three decades

Wenneberg defines sustainability in construction as resource consciousness that is in reasonable proportion to our commitment to the Paris Agreement and the 17 UN goals for sustainable development.

– The definition of sustainability in the Brundtland Report is still viable: "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." That's the definition I always use, since I first read the report in 1987, encouraged by my social studies teacher when I was a third-year student at Haslev Gymnasium. I was already socially and politically engaged, but my engagement towards a greener future started right there, reading that report. It was a natural progress for me as a child who had already engaged in things such as the Panda Club of the World Wildlife Fund and Greenpeace. I lived in the countryside and was concerned about our water well in the courtyard being contaminated with the pesticide Roundup from our neighbors in the surrounding fields. I was so angry; I could not help but take action. It's been my whole life.

Denmark's largest climate media

Signe Wenneberg – who has a degree in Rhetoric and Journalism – has pursued a journalistic career covering culture and climate since 1991. Her format is investigative and critical journalism, but her most influential platform is social media.

– I used to write for newspapers and magazines, but I decided to move my activities to Instagram because I don't want to be behind a paywall. Readers of all ages from all over the country follow my posts. I have an exposure of 3.6 million on Instagram, which some commentators have suggested might actually be Denmark's largest climate media channel. I have no assistants, designers, photographers or any editorial staff. It is like running a little green newspaper – I work twelve hours a day to keep this running. I get the energy from a desire to change things. And there is no time to waste, so I just have to get these stories out in a format that is easily accessible and understandable to the widest possible audience.

”

I get the energy from a desire to change things. And there is no time to waste, so I just have to get these stories out

Awareness about overconsumption for ordinary citizens

Wenneberg focuses on the problems with demolition and replacing original building parts that do not need to be replaced. One of the cases she has brought attention to is Hotel Kolding Fjord, where she stayed and fell in love with the wonderful windows, presented in her Instagram feed.

– Later I learned from a reader that the hotel was in the process of replacing these windows. I thought this was a devastating thing to do, especially since the hotel has an articulated sustainable profile and is listed as National Heritage. A beautiful place, once a hospital in a pre-historic pandemic, now a high-end hotel where President Obama has slept. Anyway. You just cannot replace hundreds and hundreds of old quality windows, still in fantastic condition! This turned out to be the beginning of a long story. This unsustainable decision was the verdict of an external advisor, who did not grasp the quality of original heartwood windows – nor the impact of the Paris agreement and the SDGs. I had to dig into the back story: Who benefits from the purchase of a hundred new windows? The building is owned by the Danish Nurses' Organization. Is this how the nurses' money should be spent? The story kept unfolding and showcased how some companies defines themselves as green – and keep making black decisions.

Wenneberg is creating a wide awareness about the overuse of materials, stretching from senseless demolitions to the intense consumption of food and textiles.

– We use way too many new materials. The demolition of a heritage-listed house is an unbelievable loss of value. I have raised awareness of houses threatened of being demolished, and it might be worth it just saving one house by that opinion. We need to use less, and we need to share housing, but the Danish Minister of Social affairs and Housing seems to be unconcerned by these questions. What situation does that put the population in, when the responsible ministry doesn't act according to the climate crisis? It seems like they are unaware that construction and housing accounts for 40 percent of the total carbon footprint.[2]

2. Global CO2 emissions from buildings, including embodied emissions from new construction, 2022 – Charts – Data & Statistics - IEA

It seems like they are unaware that construction and housing accounts for 40 percent of the total carbon footprint

Equal conditions for all stakeholders

In her contact with readers and followers, Signe Wenneberg has observed an increased sense of disillusion with the way that politicians deal with the most severe crisis of our times.

– I don't think politicians understand that the situation has built up to a point not far from revolution. I don't think they have a clue how dissatisfied and frustrated people are. People do not sense that politicians pay any attention to them, and the fact that 89 percent of the population are willing to make sacrifices if it helps the climate crisis.[3] What we need is legislation that ensures equal conditions for all actors in the sector!

– If all actors in the sector were bound by the Paris compliant legislation, they would not have to compete with the ones willing to offer the cheap and unsustainable solution to their clients. They could just tell their customers; you may wish to tear this building down not reusing as much as a brick or build with prefabricated concrete components, but that is not legal, so instead I can offer you this ethical solution. There needs to be legislation saying everything must be reused on-site and setting clear guidelines for what is allowed, so that it would not be left to the knowledge or abilities to convince of the individual advisor, architect, craftsman as we see now.

I don't think politicians understand that the situation has built up to a point not far from revolution.

3. Opløftende og overraskende«: Vores globale medborgere er mere villige til klimahandling, end vi tror | Information

Political inaction

With the Reduction Roadmap Charter, the majority of the Danish construction industry is demanding to be regulated with ambitious emission requirements that meet the Paris Agreement. Nevertheless, politicians are ignoring their call and set a target with a significant overshot. The question is why political ambition keeps aiming much lower than what is needed to reach the Paris agreement, Signe Wenneberg says.

– Local and national politicians are more concerned with being re-elected than dealing with the biggest questions of our time. This is eating away at their trust capital. It is not a small thing, having signed the Paris Agreement to reach the 2030 goals – it is a commitment, and it is your job as a politician to attend to the work that extends into the future, ensuring the lives of coming generations.

– There is a sense that people are losing faith in representative democracy as reliable a form of governance to solve the climate crisis – either because it is not indeed representative enough for people to feel that their future interests are being taken seriously or because it is too inflicted by undue market interests.

Signe Wenneberg thinks of democracy as a mirror of the human desire to accumulate and gather.

– It has proven efficient in securing monetary growth resulting in increasing wealth and access to more benefits for the masses but in this process, market forces have taken a central role in responding to human needs or desires with an ever-growing array of products and services. And we have allowed these interests too far into the control room. The climate crisis requires the opposite of our immediate desires. It requires self-moderation, degrowth, an economy of sufficiency and a limited approach to resource consumption. The question is if the human brain is capable of separating the notion of freedom and wellbeing from access to material commodities?

Cultural identity over market mechanisms

Signe Wenneberg makes communication of sustainable values look easy, but the clarity and consistency of her messages is the result of staying with the focus, using real examples from everyday life. In fact, any building in Denmark could be an example.

We need to get to a point where we say that the built environment is a resource in itself. We should focus on creating legislation to enforce the preservation of all houses throughout Denmark. If something is preserved, then you have to apply and give really good arguments to take a building down. The built environment is a reflection of our lives, and how they were lived. We can't take that away just to put

up a generic concrete construction, where each square meter exceeds planetary boundaries.

– How can we sacrifice all of our cultural identity because someone want to sell products? Of course, the windowmakers' calculations will show that your old windows need to be replaced. I don't understand how consumption has been allowed to run so wild. It's overconsumption gone wild.

> **How can we sacrifice all of our cultural identity because someone want to sell products?**

A growing movement

Signe Wenneberg has been frustrated for a long time, having worked with these issues for decades, with an increasing sense that politicians are not listening. In her early days of engagement, it was firmly established that if consumption continued in the same manner, it would have a negative effect on the lives of future generations. Then consumption just became even more rampant. Moving towards a point of no return, Wenneberg reads the signs of the times.

– Something is starting to happen underground. The young are seeking knowledge, and they want to take action. What's making this movement grow now is that the state of things is dawning on ordinary citizens. For every post I write, these people get a clearer picture of what is going on. That's what's keeping me fuelled.

Photo: Zuhal Kocan

Louise Heebøll, architect MAA, founder and owner of Louise Heebøll ApS, founder of the association Del Hus and V!GØR

Shared house – double gain

Louise Heebøll is an architect and urban strategist and the initiator of a movement to transform single family homes into two or more family homes. Her main work is to act upon the insight that circularity in construction and architecture can be intensified by a more adequate use. The associations founded by Heebøll show that circularity is intensified by dwellers themselves, as they gain mobility within the housing market and get access to a more fitted living space within existing residential buildings.

Using what we already have

– The most sustainable building is the one that already exists in the fabric of urban space. So, the question to be asked before every new building is – should it be built at all? By retrofitting and transforming, we can build with a very low impact. Today, more people are talking about regenerative architecture, but in all honesty, architecture can never be fully regenerative. So, we need to ask ourselves: How can we use what we actually already have? There are a lot more opportunities in that, and I am in the process of discovering this, together with others who want to challenge the only idea of growth as adding new stuff and new buildings. This mindset still lingers from the last century, when the general perception was that there was nothing wrong with consumption, and all new stuff was good for the economy. The whole paradigm of the building industry is still in the last century mindset, to build and keep on building, but parallel to this there is a growing a culture of doing something with what we already have.

The whole paradigm of the building industry is still in the last century mindset, to build and keep on building, but parallel to this there is a growing culture of doing something with what we already have.

Housing for a new demographic landscape

Del Hus presents a solution both to increased reuse of the built environment, but also to the need of appropriate housing for a growing group of people. It was based on this need that Del Hus was started.

– I was a single parent and I was looking for a house, something close to the city, the kind of ideal situation you dream of, near my daughter's school. But I couldn't find anything that was small enough for me and her, there was nothing on the housing market in the detached house segment that was a fit for our size of household. When talking about this with a friend, they suggested we would share a house, and this is where it all started from. It had never occurred to me that I could have access to this type of housing, and that sharing a house would be possible. This started my research and experimentation with how a house could be shared between more households, in a way that creates quality of life.

The movement to share houses is slowly growing, as more people discover the advantages of having just enough space. As a founder of the association Del Hus, Louise Heebøll has gone through the entire process, from first thoughts to the legal details.

– Del Hus supports the process of dividing a house in two or more households. The process is complex, which is why people still hesitate. But hesitation mainly concerns the question of how less space could be better. Asking yourself 'can I have a good life in a smaller living space' expands the question into your life balance. Paying for less space means having more time with your loved ones, more contact with your surroundings. More quality instead of quantity.

Asking yourself 'can I have a good life in a smaller living space' expands the question into your life balance. Paying for less space means having more time with your loved ones, more contact with your surroundings. More quality instead of quantity.

Connectedness and quality of life

In Del Hus, Louise Heebøll is both an architect, a pedagogue and a bit of a life coach too.

– The people who are interested in Del Hus, are often unhappy with their situation, and they have a feeling that something has to change and could be changed. They have typically worked full-time jobs to make money to buy a full house, but even with the right job they find that the kind of living they search for is out of reach. They come to Del Hus with that frustration, and with feelings of loneliness. I get quite a lot of emails from people who are unhappy about their situation, not being able to get loans, for instance.

But in Del Hus, this frustration is transformed into energy to change. We have a lot of discussions together, learning that you are not alone in the desire to make positive changes. Along the process you will also learn a lot, as in get more understanding of the history of a building.

Del Hus presents a solution in a societal situation where the number of households is increasing in Denmark, while the number of people per household is going down. This is due to people getting older, an increasing number of single parent households, and other demographic and social structures. The total population of Denmark is meanwhile not increasing by much, but many new houses are being built as a response to the need of many new households. Louise Heebøll was soon involved with all the aspects of house sharing, as it is a complex process.

As an architect, Louise Heebøll accepts the challenge that the reuse movement introduces into the profession.

– Well, we must change the design process anyway so why not focus on creating new business models. In V!GØR the business model is to look at the creative process, looking at what is there and what do we want, then how do we make that. For every step of the process, you need to find recycled building material, as locally as possible, and this could be a challenge, so the design process has to be flexible. In a way the creative process is turned upside down. At first, this process is received with some confusion – why not build a new sustainable house? But no matter what we consume, it's still consumption and it's still taking something away from the planet.

– We have worked our way on all the questions of what is required in turning a house into more households. Being single does not have to mean being alone. Apart from the technical requirements and the building processes, legislation is a part of what needs to work when dividing existing houses in smaller entities and how building permits work.

As an architect, Louise Heebøll assessed the possibilities of adding bathrooms and kitchens and the general transformation ideas. Del Hus then hires architects to draw the solutions.

– We have found that big companies in architecture as well as builders and craftspeople generally do not work with smaller residential transformation projects like these, so we are mainly working with SMEs – small and medium-sized enterprises. In the building process, the role of developer is often the owner, but it could also be an architect, and we also have a few architects as owners. The actual division is different for each house, it could be one floor per household or a vertical division with two smaller floors each, even one-floor houses can be split into two households. It is quite simple to find the dividing solution, but we also want to make the construction process as smooth and efficient as possible. The buildings we work with would often have needed a thorough restoration anyway, so the transformation is often a part of an upgrading process and optimization of energy systems and replacement of hazardous material and other necessary measures.

The total population of Denmark is meanwhile not increasing by much, but many new houses are being built as a response to the need of many new households.

More than just marriage

The biggest challenge in the process is to get a financial forecast based on knowledge of the process. Banks are not used to the process and struggle with the risk assessment. Another barrier is how to define the ownership and the relationship between the parties who share the house.

– The construction process, surprisingly, is a minor part of the process. Installations are more complicated, as they need to be separated, subdivided, and doubled – again, considering that the installations would have had to be renovated anyhow. We need to collect a body of knowledge of this type of transformation process. Some private home builders might have done this on their own, but this knowledge stays with them since it is usually a 'once in a lifetime' kind of project. Del Hus works towards predictability, to facilitate loan-giving by having proper calculations and know-how behind the decisions. The financing system is not prepared for this type of projects. If you go to the bank and tell them you are buying an old house, and plan to demolish it and build a new one, they are right along with you. The banks do not have any products ready on the shelf for these new approaches to property. The forms of sharing need to be discussed too, what type of contract is established between the house owners, their responsibilities and so on. It could be in the form of a company, a fund or other regulating forms – but it is obvious that there is a need to develop alternative legal forms of living under one roof other than the institution of marriage.

The economy should be sustainable to begin with, and our calculation in Del Hus is quite healthy. Two small houses cost more on the market than one big house, so that the expenses of subdividing are returned in most cases. The key is getting a bridging loan to finance the expenses in the transformation phase. This can be repaid when the other half of the house is sold. I have identified this as the biggest financing barrier in this kind of project, this needs to be addressed by financial institutions somehow.

We need to collect a body of knowledge of this type of transformation process.

A cultural shift

Despite all the challenges mentioned here, Louise Heebøll claims that the biggest barrier is cultural.

– Our main struggle is to overcome the cultural barriers, both in the building industry and in the social structures. We have to get finance and regulations into place, but the cultural shift is harder to overcome. Many people do not feel entitled to follow ideas like this, if you are a single parent for instance – do you have the feeling that you can change your life in this way? The typology of co-housing is growing, even if it "does not exist" in the perspective of finance and real estate legislation. It is an alternative for all types of single households, for seniors it opens a lot of possibilities. Take for instance a retired person who would like to stay in the same area but their house is too big for them. What are their options? By selling off half of the house, gaining a more secure financial situation, even a more social life, provides quality of life right where you live, in an appropriately sized home.

Many people do not feel entitled to follow ideas like this, if you are a single parent for instance – do you have the feeling that you can change your life in this way?

A classic start-up story

Louise Heebøll has identified a hole in the market, answering the needs of a growing group of people.

– It's a classical startup story, but still, this size of projects is a small potato in the building industry. Building companies and funders are not really interested in developments less than 5000 square meters.

– The way ahead may be hard to see if you just keep on building, then you miss all the possibilities of existing buildings. From the political side, we should adapt to a new approach like "Bevar eller forklar" – a catchphrase that could be translated as "spare or declare" – that is you can only demolish something having made a proper account for the reasons. This is why this is also a democratic movement, where more people and new groups of people are getting access to existing qualities of housing. We have enough houses, and we have enough square meters to share.

The way ahead may be hard to see if you just keep on building, then you miss all the possibilities of existing buildings.

Photo: Codesign

Peter Ullstad, architect, founder of Codesign, Sweden

Architecture in the long run

Peter Ullstad has been running the office Codesign along sustainable principles for 15 years, with a broad definition of a sustainable practice: from circular practice and social responsibility to governance. Codesign is part of the research consortium Återhus, where actors collaborate to change business performance in reuse of buildings and building material. Ullstad takes us back to the basics of the infrastructure for reuse.

Distribution and overview of resources

– In order to reuse things, there must be a connection between someone who *has* the thing and someone who *needs* the thing. So, we need a market platform, storage, sustainable transportation, security in terms of quality assurance and insurance clearance of the material, and digitalization to carry the data of all the material. When you look at all these factors together, you see that it is impossible for small actors to handle this, I would say, not even the biggest actors in the building industry would be able to encompass all these processes. So, there is a need to design overarching systems and solutions to facilitate a smooth redistribution of used materials. For this to function, we must look to the national and maybe EU level, which makes this a quite steep slope to climb, but it is a challenge we are facing.

In order to reuse things, there must be a connection between someone who *has* the thing and someone who *needs* the thing. So, we need a market platform, storage, sustainable transportation, security in terms of quality assurance and insurance clearance of the material, and digitalization to carry the data of all the material.

Comprehensive system integration

The task list of getting everything in place for a reuse platform might seem overwhelming, but Peter Ullstad claims that there is quite a clear idea of what it takes.

– We need legislation. This must come from a political decision-making level. The market has had its time to solve it, and now we realize it will not be able to pull the transition off because the threshold is too high for the market. We already know empirically that it is possible and safe to reuse building materials – we have examples at various scales in all Nordic countries. We know how to digitalize objects and put them on an online market, in this case tagging the reused material with an individual code with quality and storage location. We know all these things, but we need to combine them into a system. Storage is a key issue. When you take down a very large office building of 30,000 square meters. You need about 50,000 square meters just to store the material of one floor of the original building, which corresponds to 6 football fields.[4]

Research on circular flows of building material is carried out by the research institute RISE in Sweden, looking into the questions of quality of recycled materials, among other issues aiming at reducing the waste of construction and demolition materials.[5] But we comparable need data from all the Nordic Countries, Peter Ullstad emphasizes.

Research and proof of concept is crucial for circular development. We have pilot studies showing the resource savings and reduced CO_2 emission in numbers. We can ensure quality, in numbers ensured by testing. All these tests have proved that it is possible to recycle materials in testing. Currently, recycled material is expensive, but that's because the system still supports the flow of new material instead of reused building material this is of course a question of regulation ahead. Regarding quality this is complicated of course. The CE label has been in use in the EU since 1996.

4. Calculation: store slabs of 3000 sqm, five on top of each other = 6 000 times 2 since the houses are approx. 10 stories high. Windows 500 sqm. Doors 500 sqm. WC's 1000 sqm. Roof 300 sqm. Inner walls 1000 sqm. Floors 1000 sqm. Ceiling 800 sqm. Installations 2000 sqm. Façade 2000 sqm. Steel 2000 sqm. Stairs 400 sqm. Insulation 500 sqm. The rest 2500 sqm. Storage transportation +70%. Staff space 400 sqm. All together it is approx. 46,000 sqm storage space needed to store 1 office building of 30,000, which equals to 6 football fields (7300 sqm each). And that is only one office building.
5. https://www.ri.se/en/what-we-do/expertises/atervinning-av-bygg-och-rivningsavfall#:~:text=RISE%20works%20to%20increase%20the,products%20and%20areas%20of%20use.

Before that, there were no equivalent labels. The regulation of quality labeling needs to account for materials used before the standard of 1996, when most of today´s recyclable material was produced.

This must come from the political decision-making level. The market has had its time to solve it, and now we realize it will not be able to pull the transition off because the threshold is too high for the market.

Political leverage

– The EU is looking out for where CO_2 emissions are highest. And the building industry is always looking to reduce costs. It is easy to identify the built environment as the easiest way to reduce CO_2 equivalents in terms of return on regulations. So, it's much cheaper to regulate the reuse of material in the building industry than most other things that we do to save the planet. In a building, the "invisible" walls and floors are the most efficient and important to deal with – rather than the very visible recycle waste bins in the entrance. The public will not know if the structure they walk on is built with recycled beams – and frankly they won't care whether it is a 1-year or a 30-year-old beam. For politicians, this system change – promoting reused rather than new material in the building industry – should be an interesting thing to look at. There is a big lever for change in the field of circular flows of building material, but it has yet to become a question for the electorate.

The recycling strategy might start on a national level, that then influences the EU and in essence has a global effect in the end, as the result of scaling.

Peter Ullstad explains the difficulty of scaling circularity in the built environment.

– It is a bit of an intellectual dilemma that the human impulse is to scale up, as if that was the only way to increase something or make it a daily business. Between 20 and 40 percent of CO_2 emissions come from the building industry, depending on what country you are in. Sweden is currently on 21 percent. We have to understand that right now we're building the equivalent mass of the city of Paris every five days on the globe (UN plan promises massive emission cuts in the construction sector – the most polluting and toughest to decarbonise (unep.org) And right now, we don't reuse anything, not even one percent. But what we recycle today is such a small percentage that it's impossible to scale from the current less than one percent to ideally ninety two percent. We're going to scale up several hundred or thousand percent, and that is not possible for the industry to take care of on its own. Political pressure and incentivization is crucial here.

Proof of concept

The idea to go from pilots proving both the business model and the infrastructure to achieving enough circular volumes to pave the way for legislation is a high-stake approach. Peter Ullstad points out that the cost of bringing a circular strategy from a national to the EU level requires financing from the EU.

– In a number of European countries, Germany, Benelux, France and Scandinavia, we have now proof of concept that the recycle market is viable, as shown in a number of KPI: s (key performance indicators). So, if we can show that we are building a logistical and financial system that works. Once we can show that the system works, we could approach for example municipal level of regulations, like the cities in Sweden, to implement a system where they can demand from builders and developers that reuse must be a substantial part of their building projects. The regulation could for example state that unless you have 20 percent reused material, you will not get a building permit or get a land allocation agreement. They could also decide that you cannot take a building down unless you recycle 100 percent of the material on the demolition site. However, you can't demand this from the market yet, because there is no possibility of getting hold of reused material on the desired scale.

The regulation could for example state that unless you have 20 percent re-used material, you will not get a building permit or get a land allocation agreement. They could also decide that you cannot take a building down unless you recycle 100 percent of the material on the demolition site. However, you can't demand this from the market yet, because there is no possibility of getting hold of reused material on the desired scale.

The design process turned upside-down

Throughout history, construction parts of all kinds and sizes have been inserted in new buildings, such as spolia. Bringing this tradition forward, Peter Ullstad is confident that circular materials will have a positive effect on design thinking and architectural aesthetics.

As architects, we never start with a blank sheet of paper the architect responds to the program, the site, the budget, standards and regulations, and so on. In the same way, it is indeed possible to start with the structural parts and see what can be achieved. But we need to do this on a scale and magnitude that we haven't dealt with before. We are, as architects, used to having guiding frames, and we design within this. The idea of "new material is the best material" has had a deep impact

on our design so far, but the acceptance for second hand is growing, for the sake of quality and aesthetics, sometimes at a higher price than something new.

The idea of "new material is the best material" has had a deep impact on our design so far, but the acceptance for second hand is growing, for the sake of quality and aesthetics, sometimes at a higher price than something new.

A system in time and space

Returning to the question of a logistical system, there is the need to find material, not just fitted to size and style, but allocate the material in time as well as space. If an architect wins a competition where the design depends on a certain lot of windows, doors, and structural elements, will there be any possibility of putting in a "reservation" for the desired material? Peter Ullstad has thought a bit about this.

– If we have a national digital platform. The reserved material should be labelled for the site it is intended for, so if there are more contestants on the same building site, the system can identify this. Then there is the question of whether you should pay a booking fee for the desired material, and whose budget that would be on.

Eternal life

In a system where availability of resources and components will define aesthetics and processes, the design task will be different, that is for sure, while achieving a better carbon footprint, we will learn what we could expect from reused material in terms of measures and quality. We will be putting all things together in a new way. We have all the ingredients; the recipes will be developed along the way. But the scale we are at now, it is like trying to bake a loaf of bread using the flour dust that lies around the bakery. The *industry* is not even close to a percentage of reused building material, but on some *project* levels, the percentage of reuse has begun to look quite decent in some cases. We need to look at a building and instead of identifying what can be reused, ask ourselves – what do we have to throw away, and at what cost? With this mindset, we will be able treat every building as having eternal life.

We need to look at a building and instead of identifying what can be reused, ask ourselves – what do we have to throw away, and at what cost? With this mindset, we will be able treat every building as having eternal life.

Photo: Norwegian University of Science and Technology

Pasi Aalto, Centre Director NTNU Wood, Department of Architecture and Technology, Norwegian University of Science and Technology

Preparing for the known and anticipating the unknown

As the Centre Director of the Department of Architecture and Technology at the Norwegian University of Science and Technology (NTNU), Pasi Aalto's work joins planning practices with circularity and ecosystems. They are taking non-human life forms into account in the making of data models that combine ecosystems, existing buildings, demographic development and health factors. Pasi Aalto describes the research model at NTNU as working very actively towards a positive future, rather than documenting and writing long reports on what is negative today. Aalto claims that just pinpointing problems is not enough, you must take action and make an effort to make things better.

– We constantly ask ourselves – what are future needs and how far ahead can we predict these. In education, we are dealing with what is called "wicked problems" – something that is highly complex and interconnected or is considered too difficult or impossible to solve because of its complex and interconnected nature. Every day we practise how to handle wicked problems and "unknowns" – these are not well behaved and detailed models; they are pathways and approaches that we can use to move forward.

Sustainability – an evolving term

Pasi Aalto recalls a variety of definitions of sustainability in relation to construction.

–Sustainability is a woolly word, and it could be problematic because it makes greenwashing easier. In Norway as well as in the EU, sustainability was for a long time equal to energy savings. Gradually, a more holistic approach began to emerge, in the early days still very technology-driven, later associated with calculation instruments like LCA, embodied emissions in materials and so on. Over the last decade, sustainability in construction has become a more complex paradigm which includes social sustainability.

Ultimately, we will probably encounter "unknown unknowns" in the future, that will influence how we live and define sustainability in the future.

Over the last decade, sustainability in construction has become a more complex paradigm which includes social sustainability.

Stuck in the growth paradigm

In relation to the social side of the holistic approach, the Norwegian regulation system has a particular bias, as Aalto explains:

– In Norway, being sustainable is connected to ownership, by the way that our policies are formulated. As an owner of a Tesla, for instance, you get the benefits of having an electric car. If you own your house, you get the governmental benefits. If you haven't consumed something "sustainable", you cannot be sustainable, in the government definition. There are a lot of people who live sustainable lives, who are omitted from the system of benefits, based on the way rules and regulations are formulated. Now, we see an increased understanding of energy citizenship, and an awareness of the agency of nature and ecosystems. This is putting a pressure on all the ways we think of sustainability. We have signed The Kunming-Montreal Global Biodiversity Framework (GBF), but all of our rules and regulations are based on spatial scales other than ecosystems. The big issue is that we are planning one building one municipality at a time, but ecosystems do not follow municipal borders. At the end of this road towards sustainability we will probably arrive at de-growth and significantly reduced consumption by individuals, organisations and governments. Currently, this is not on the agenda. If you pick up the strategy plan for Innovation Norway, it is all about growth.

At the end of this road towards sustainability we will probably arrive at de-growth and significantly reduced consumption by individuals, organisations and governments.

Home is a product

The Norwegian system of ownership is a particular trait of the housing sector, as Pasi Aalto point out:

– Norway is the only Nordic country that does not have what is called a "third housing sector "There is a strong cultural goal for everyone to own their own home and this is also the government strategy.

The consequence of this is of course that a home is not just a home but a product, and so it is designed to make a profit. If we are to change this, we need to make sure that our professional culture as architects allows for us to be more conscious about the efficiency of resources. If we hold on to the way we did things yesterday, and repeat the boxticking from the last project, there will be no transformation, and more importantly, we will continue to overuse resources the way we did yesterday too.

Handover of responsibility from politics to market

Pasi Aalto describes the role of politics as something that has changed over the years. Into a political situation where a lot of activists and organizations want to open for a post-oil narrative in Norway.

One of the problems we are facing in Norway is that politicians are not prepared for the narrative that will be created if they open up for a significant societal change. We turn to politics for answers, but all they have is tons of reports, dating thirty years back. You can spend a lifetime reading those. What has happened in politics is that they are not operative enough, they do not make decisions like they used to. There is a lot of trust in the market to sort things out, but of course the market will behave as a market and not as politicians. Placing the problem-solving in the market is a form of disclaimer from political responsibility. We need to achieve system change by working *with* the system, not against it. But for many people and companies, change will be all but comfortable. What about those who are employed in the oil industry? In Norway we have 120,000 people working in the building industry what are they going to do? We will have to start by accepting the conditions and understanding that some jobs may not make it through to the

climate compliant reality. Still of course, losing a company in a location where there are very few employers could be a disaster.

Placing the problem-solving in the market is a form of disclaimer from political responsibility. We need to achieve system change by working *with* the system, not against it.

Sustainability under oath

Despite all the challenges that follow in the change of narrative, Pasi Aalto senses that a change is happening, where an awareness of responsibility is finding its way back into profession as well as politics, and that legislation could consolidate this approach.

– There is a paradigm shift in the air. Now, we know that we are not circulating enough. We keep demolishing things and destroying huge values. We fail to see the consequences of this. But a zeitgeist is forming right now. There, architecture has become something we have to do with the knowledge and perspective of an entire ecosystem, taking an entirely holistic approach, which is a huge undertaking. But the reality is that you have a client, and you get paid to do what that client needs. A fundamental professional change would be if your professional integrity was protected by an oath "not to do damage", in the way that a doctor's loyalty is with the patient and the ethical code, and not for the hospital they currently work for. If the profession was protected by some legislative instrument, that would place responsibility inside the profession, this would be a fundamental change. Nobody is above the law. Having a profession is not to have a job, but to have knowledge that contributes to a better society. Right now, we see lots of ideas like this being introduced on the market side, where companies are founded on the principles of being for instance, 100 percent circular, and of course they attract competent people.

A fundamental professional change would be if your professional integrity was protected by an oath "not to do damage", in the way that a doctor's loyalty is with the patient and the ethical code, and not for the hospital they currently work for. If the profession was protected by some legislative instrument, that would place responsibility inside the profession, this would be a fundamental change.

Need for market regulation

In addition to the ethical responsibility to create sustainable architecture with enduring values, Pasi Aalto describes the conditions for a system change to achieve quality.

– If you want a systems change, there cannot be too big a quality difference between the bottom and the top. Rules and regulations are used for raising the quality from the bottom level and up. Certifications like BREEAM and LEED have the effect of raising the quality of the top. It is in the area between these where competition happens. At the bottom there are the cheapest offers, achieving the bare minimum. But what happens above the top level? There is no movement at the top because they cannot compete and have nowhere to apply their knowledge. So there is more competition happening at the bottom level, where you can even formulate a business idea to be maximally efficient at the minimum level, and here is where the climate is sacrificed for a dime or two. So, if you don't legislate to a certain level, the companies that do not care and are cheapest are benefiting by outbidding everyone that is trying to introduce more sustainable (and costly) approaches.

Custodians of the built environment

On the role of architecture, Pasi Aalto offers some hope for the future with regards to the unique knowledge of architects.

I think architects are and will continue to be proactive and willing to change. We can do a lot more to become like "custodians of the built environment". We are the only professional group who has active knowledge about all aspects of the built environment and can work with the fabric of existing buildings with the focus of making them work for the future. This is what we should do; design to support a future activity, and to support the environment where that activity takes place. But

if we hold on to a cultural fetish of designing new buildings that are not aesthetically relevant outside the profession, then we will become irrelevant, a museal trade like barrel makers or blacksmiths.

In line with the discussion about responsibility, Pasi Aalto describes the process at hand in the academy, in the face of things to come.

– At NTNU, we have just cancelled eight master courses and replaced them with a course called Circular Studio, which will start in the fall of 2024. With this radical change of our program, the idea is that nearly half of the architecture master students will focus, not on how to make new buildings, but work with existing buildings and material flows. The analysis behind this involved looking at how many architects we have in Norway who know how to build new buildings – finding that we have enough of this competence, while there is a deep lack of knowledge in transforming existing buildings, updated knowledge about systems design, industrial ecology, ecosystems, industrial heritage theory and history, mapping and digitalization, reuse, sciences of circularity and so on. This is knowledge that is very costly now, to a point where it needs to be hired from separate consultants and experts, so this knowledge will be out of reach both in time and money. The only way we can get this knowledge into practice is by financing it from within higher education. The building sector will soon be where architects were about half a century ago, evolving from thinking that their business is to put up buildings, into realizing what kind of knowledge they need to take the sector to the next level as a constructive part of active, healthy and prosperous ecosystems.

If we hold on to a cultural fetish of designing new buildings that are not aesthetically relevant outside the profession, then we will become irrelevant, a museal trade like barrel makers or blacksmiths.

Photo: Gustav Kaiser

Anna Denell, Chief Sustainability Officer, Vasakronan, Chairwoman of "Håll Nollan" (Zero Accidents in the Construction Industry), advisory board member of Mistra Carbon Exit, LFM30 and Fria Byggakademien

Learning from reality in development

As chief Sustainability Officer at Vasakronan, Anna Denell is leading the company's strategies and experimentation in relation to sustainability. One of the pilot sustainability projects is the Lumi project in Uppsala which is currently Vasakronans biggest reuse project. With the realization that their biggest climate challenge is the use of construction material, Vasakronan takes this insight as the outset to rethinking their entire business idea of new development.

Chasing the 100% reuse

– We just completed the office building Lumi in Uppsala, where we decided to keep the concrete structure from the 1970's, and where we aim at reusing much of the old interior material. The overall company objective in relation to circularity is to only use reused, recycled or renewable material in our construction work. We measure the result closely throughout all our projects, and we are currently at around 15 percent circular material. There is still a long way to go to fulfilling the 100 percent target, but we aim to take new steps in all projects that will be started going forward.

Anna Denell describes a new construction project in Gothenburg, where Vasakronan is working with the idea of developing the building by only using reused construction material.

We have a clear understanding that it would be possible to find a suitable reused

frame for roof, façade and windows, but we must accept that it is nearly impossible to find and install reused plumbing material, ventilation and elevators. Therefore, we need to challenge material producers of such material to at least use recycled or renewable material in their production. The hierarchy of material use is firstly to maximize the amount of reused material, next choice is using recycled material and as a last choice, renewable material. Carbon intensive virgin materials should be off the list completely. Of course, there is a step before reusing that is, not using anything at all so we consider every design choice very carefully and continually ask if we answer up to an actual need of space and functions before starting to use any material.

Analyzing systemic implications of all choices

Change happens gradually, and Anna Denell's experience of Vasakronan´s transition is that some challenges are easier to address than others. Denell explains that you must identify the climate- and environmental effects everywhere, and carefully consider the effects of your choices throughout the entire process.

Even if we never build on greenfield land and develop exclusively on brownfield ground, we must address the biodiversity problem in our value chain. For us, this is in the extraction of raw material, sourced for building material. We carefully analyze what type of material we are using and the possible loss of biodiversity where they are extracted. This is an argument to stop – or seriously reduce – the use of virgin material, because of how complicated it is to remediate the loss of biodiversity. If there is a material we cannot avoid using in the end, we should find every way of compensating for that materialuse. So, we have strong incentives in place, and we notice that this is received well both internally and by our stakeholders.

Anna Denell finds that recycling material is a question that is largely accepted, but when discussing reduction of newly built square meters and the reuse of existing buildings, she finds that there is more resistance to these ideas.

– We are not only an owner of existing buildings but also a development company and the business idea traditionally has been to develop new square meters. Reuse of the built environment is gradually becoming a viable business strategy, but many stakeholders in our industry do not want to be challenged.

We carefully analyze what type of material we are using and the possible loss of biodiversity where they are extracted. This is an argument to stop – or seriously reduce – the use of virgin material, because of how complicated it is to remediate the loss of biodiversity.

Incentivizing change at contract level

Anna Denell is looking for all possible tools to promote intensified circularity in construction and architecture in Vasakronan's development projects. By revising the constructors' contract details, Vasakronan managed to shift the value of reused material.

– We looked closely at the material bonus that is in the contract with most contractors. Normally, we pay the contractor for the working hours, the material that is used and an extra gratuity of 15 percent added to the cost of the material. We decided to remove the 15 percent and replace this with a 20 percent bonus on all reused material. We have always wanted our contractors to prioritize reused material, but when we analyzed the contracts from before this shift, we found that they ended up using 100 percent new material, claiming there was no reused material to be found. When we changed the financial incentives, the contractors were suddenly able to find reused material to a larger extent than before. Some of them organized their own warehouses for reused material, and now we see a real change of mindset and behavior. This initiative of changing the procurement process was instantly accepted, there were contractors who were willing to sign agreements based on this new way of thinking.

When we changed the financial incentives, the contractors were suddenly able to find reused material to a larger extent than before. Some of them organized their own warehouses for reused material, and now we see a real change of mindset and behavior.

Public procurement rules reinforce status quo

In the process of finding new ways forward in the development business, Anna Denell has identified ways of practice in public management, showing that they too can be stuck in old ways, contributing to the climate crisis.

– In Sweden, due to the way municipalities are selling land and are pursuing the zone planning process, municipalities are sometimes not interested in reusing existing buildings. If a developer builds a new building, there is a possibility to place the costs at the developer's side for improvement of for example the infrastructure in the area, maybe adding a park, a new school or daycare center. To get the building permits or new detail zoning to be able to develop the new building, we comply to these requests and pay for these services. But if we decide to reuse and renovate an existing building, we might not need the new permissions from the municipality, and they will not be able to force us to pay for municipal services.

We have a few examples of projects where the initial idea was to demolish and develop new buildings but where we now have another plan. In Alviks Strand, a former office area by the water, west of Stockholm city center, we found ourselves in a local planning process with the municipality, where we were supposed to demolish 65,000 square meters of office space, in order to develop approximately the same number of square meters of housing. We came to a point where we could not justify this, so we went to the Stockholm municipality, told them that we were not willing to proceed with this planning.

In Sweden, due to the way municipalities are selling land and are pursuing the zone planning process, municipalities are sometimes not interested in reusing existing buildings.

Photo: Vasakronan

Alviks strand, Stockholm. Possible future redevelopment project.

Anna Denell brings up yet another example of the unintended effects of the current development model.

– In Gäddviken, in Nacka east of Stockholm, the national theatre Dramaten and the Opera will move their workshops from the old coffee roastery, where we are currently planning a conversion to residential housing where we try to keep as much of the existing building and cut into smaller residential blocks. The municipality would probably have preferred us to demolish and build a new building, so that they could take advantage of our added value and charge us for surrounding services and infrastructure. The regulating authorities may not be aware of real-life effects of the regulations they impose. It is seen as a part of everyday business, nobody is breaking any laws, but there is an unintended side effect of the model, the way it works in practice and this needs to be revised.

”

The regulating authorities may not be aware of real-life effects of the regulations they impose. It is seen as a part of everyday business, nobody is breaking any laws, but there is an unintended side effect of the model, the way it works in practice and this needs to be revised.

Photo: Vasakronan

Gäddviken in Nacka, Stockholm. Future redevelopment project

Planning to avoid unintended consequences

In the future, Anna Denell would like to see a different planning process, based on a local plan with priority on keeping existing buildings.

If you would only get permission to change existing buildings and not demolish them, we would see a totally different system, I believe. The benefits of this change

in procedures would be many; Giving building permissions for adding a few floors or do exterior renovations, would probably be a process that is easier to accept from the neighboring stakeholders. There would be less intrusion in exterior areas, more chances to keep public parks or football fields intact, the building process would be shorter and less noisy, less transport, processes would be less disruptive to the neighborhood.

Anna Denell thinks that increasing redeveloping, renovating and reusing material in Sweden and in the Nordic countries, would also improve the local market.

– If more material is refurbished and repaired locally, that would mean more job opportunities in a market that has seen more migrant workers, sometimes not treated or paid well, just doing general assembly work on construction sites around the world, Nordic countries are no exception. With the more local market comes a higher level of design and quality construction work, making our business a more interesting place to work, more challenging, but also more innovative and interesting processes.

> **If you would only get permission to change existing buildings and not demolish them, we would see a totally different system, I believe. The benefits of this change in procedures would be many.**

Undue interests

Looking closer at the development process, Anna Denell finds other examples of hidden incentives that interfere with sustainable choices.

– We are continuously looking at how we manage this interference of undue interests in contracts and agreements. In some areas you can find hidden financial incentives between the contractor and the seller of certain material. The contractor will get paid for using a certain type of material, and to get the best bonuses, they want to use more of that material. We want all our stakeholders along the value chain to be able to be profitable, but this is an example of unsustainable incentives, encouraging an excess use of virgin material. We would like to see as much reused and repaired material in our buildings as possible. There are a few brave companies rethinking the way they deliver, at least they have a parallel business model selling new and reused material. Swegon is an example of a retailer of remanufactured material, tested and controlled cooling and ventilation products are resold with repair guarantees.

We are continuously looking at how we manage this interference of undue interests in contracts and agreements.

A window of opportunity

Among the positive outcomes of a transition to circular processes and material in development projects, is that we would get a better building sector and at the same time happier communities. When demolishing buildings, a huge area is transformed around the development, and following this, there might be a lot of protests from the community, which may in turn slow down the processes.

– Using existing buildings for redevelopment into housing, for example, will probably be a safer and quicker process, especially in urban centers. I hope that we use the current economic downturn well, to try and do things in a new way, and negotiate some of the obstacles to the transformation processes. We don't want to go back to where we were, when the economy picks up the pace. It would be terrible if an upturn will get everyone to just throw sustainable innovation to the side and go back to business as usual. The economic downturn is a window of opportunity for legislators to get to work now, so that the playing field is ready for the return of investors.

Among the positive outcomes of a transition to circular processes and material in development projects, is that we would get a better building sector and at the same time happier communities.

Perspectives on place-based architecture

Photo: Basalt Architects

Guðlaug baths rest in the rock barrier of Akranes's Langisandur Beach, facing the vast North Atlantic Ocean. They are a testament to the positive effect a single architectural intervention can have, as they enable and encourage interaction with the ocean and the elements. Guðlaug is a open to all, democratic, public space where the local community and visitors come together stripped of their day to day uniforms.

Introduction

The future will judge us by the "how" as well as by the "what" in the built environment. But most of all, the built environment will be appraised by how the built corresponds to its environment – its place.

Every person in this world is connected to a place, to which we develop an extra sense; the "sense of place". This makes every one of us experts in the place where we dwell. Place is the dimension of our identity, it forms its inhabitants, and its inhabitants forms their place. This article will investigate place-based development and architecture as a community builder in the Nordic context, with a focus on learnings from regional and local-based planning and development. The aim is to promote methods and skills that use local knowledge, skills and materials. Learning from a number of examples will contribute to the knowledge of how we can take care of existing places and buildings within a local fabric of social structures, materials, energy, infrastructure, culture, identity and relations. Through the perspectives presented in this text, we will also get an understanding of cultural, political, and legislative barriers, as well as how these can be overcome. We will also investigate how architecture and planning can be used actively as a community shaper that builds the foundation for regenerative use and more sustainable behavior. The perspectives presented in this text build the story about how to work with place-based architecture within the Nordic countries, in different situations, scales and levels.

The Nordic context

Place ties the embodied existence to the conditions of earth itself. Where industrial building has caused a disembodiment between architecture and climate, material, culture, craft, community – place-based architecture brings us back in balance with reality. The Nordic countries share common characteristics in terms of public policy, values that form a good basis for place-based planning. The Nordic countries have a tradition of political consensus. Collaborative decision-making contributes to stable and enduring public policies. While maintaining a strong central government, Nordic countries also emphasize local governance. Decentralization allows for greater flexibility in responding to regional needs and preferences. Nordic countries are known for transparent and accountable governance, and open government practices, access to information and low levels of corruption contribute to public trust in institutions. Policies supporting equal opportunities and gender equality, as well as access to quality education in publicly funded educational systems, contribute to a high quality of life for residents. The Nordic countries also share a tradition of archiving and keeping historical records, accessible to the public in open archives and museums, which facilitates staying in touch with, and caring for, the cultural heritage.

Placemaking vs Place-based

The terminology is important, though the term "place-based architecture" seems fairly unambiguous. Yet similar terminology, such as placemaking architecture, causes confusion. Placemaking architecture denotes a process where architects and planners work with residents, businesses, and other stakeholders to create or develop the identity and culture of a place, with a strong emphasis on the design of social public spaces and creative interventions. Placemaking as a strategy is troublesome because it assumes a place was not a place before the creative interventions, and also because of the questions of who benefits from the values created within the community, and sometimes the lack of long-term perspectives that stretches beyond the next stages of development. After the place is "made", the cultural activities and value-creating strategies are often no longer present on the same terms as before the full development. Strategies within placemaking can be found in processes of place-based architecture, but the essence of place-based architecture is the long perspectives, looking back as well as ahead, to ensure that the local conditions and needs are met in the most socially, economically and ecologically sustainable ways.

Critical regionalism

As a historical economic process, globalization has decreased geographic distances but increased financial inequalities. Rather than boosting humanity's sense of interconnectedness, the negative consequences of globalism are omnipresent. The era of inexorable extraction of fossil fuel energy sources coincides with an expansive, homogenizing industrialized architecture, executed in the concrete and glass of "international style". The backlash was articulated by, among others, Kenneth Frampton who coined the term "Critical Regionalism" in an essay published in 1983. Fueled by the imperative sustainable shift in architecture in the 2010's, regionalist planning was brought to light after having led a parallel off-the-beaten track since the 1980's. In 2014, Brian MacKay-Lyons published *Local Architecture: Building Place, Craft, and Community,* bringing together some of the most important and original voices advocating the regional focus in architecture and development, including Kenneth Frampton, Juhani Pallasmaa, Deborah Berke and Glenn Murcutt. This book concluded the International Ghost Lab conferences, initiated by MacKay-Lyons as a forum to discuss place, craft and community, with an underlying concern about the state of the profession of architecture in both education and practice. The ideas of an architecture that responds to site, draws on local building traditions, materials, and crafts and strives to create a sense of community is not new. At the contemporary end of what Frampton framed as critical regionalism, and after half a century of theory and practice of sustainable site-sensitive architecture, place-based architecture is a comprehensive term for all the necessary strategies to achieve ecological, economic and social sustainability in the built environment.

Photo: Vandkunsten

Tinggården is a public housing experiment near Herfølge in Denmark. Since its establishment in 1978, the development has set a precedent for dense, low-rise housing in Denmark. Tinggården is the story of a public housing experiment that, through its architecture, reinstated resident democracy in the local community and successfully achieved its mission.

Photo: Vandkunsten

Søren Nielsen, Architect and Former Partner, Tegnestuen Vandkunsten, now Professor at Aarhus School of Architecture.

Place-based architecture in the perspective of an architecture office

The Danish architecture office Tegnestuen Vandkunsten was founded in 1970 and were first renowned for Tinggården in Herfølge (1971–1978), where mainly all of their sustainable ideals and ideas were invested. Still today, their architectural attitude and analysis of place stem from this project, even though their practice involves a sizeable, internationally awarded portfolio half a century later. The office still refers to Tinggården as the "Mother project" from where the methodology they developed has informed many projects since.

Placeless contemporary architecture

Vandkunsten defines place-based architecture as planning on the basis of existing qualities in a place, be it culture, material, energy and also how they as practitioners relate to social and cultural conditions and values in a given place. Since the start, they have maintained this mindset by various names; contextual architecture, regionalism, genius loci and so on. Vandkunsten's Sören Nielsen describes contemporary generic architecture as placeless, even style-less defining these types of buildings not as architecture at all but as investment cases. In the larger financial system, there are global funds behind these buildings, whose main virtue is being liquid capital, a transitional calculation sheet in the form of a building. The building is an investment, and its generic appearance is an asset as a resellable object with a high degree of predictability in financial terms. In order to achieve this type of building, an asset on an international real estate market, it is built with rational industrial construction methods and without any architectural features that would

add identity. Against this background, Nielsen argues, there is no wonder we get the opinion groups that criticize contemporary architecture and argue for traditional styles in architecture. These groups have appeared in all Scandinavian countries and gained momentum during the last ten years.

The importance of scale and context

Vandkunsten's style has been labelled "Vernacular postmodernism" (Lise Baek), playing with traditional building elements and putting these together in new ways, with local materials and a presence of history. Vandkunsten's collective statement today is "no more flat roof concrete boxes", and transform existing building. It is the architect's expertise to recognize and see the potential in the existing structure, and that is sought after in a future where the impulse of building from scratch needs to be inhibited. In all architectural practice, the task is to situate the building in its context, with regards to local conditions. A building needs roofs and cladding in our regions, and people are in need also of a psychological shell structure in our days. There is an ideal size for a group of homes, in the experience of Vandkunsten. A group of fifteen to thirty houses with social spaces in between, is a well-functioning social size where you get to know all your neighbors, yet where you could choose your degree of social contact. It is the "hej"-size – you do greet one another but you are not obliged to stop for a chat every time you meet. Vandkunsten refers to this village-sized, sociologically based residential structure as a base unit.

The landscape offers tacit knowledge

Landscape architecture is a key competence in Vandkunsten, who ever since the start have incorporated landscape architects as part of their practice. Reading the landscape is the base for all projects. This key element provides an important analysis whether the site is a flat urban lot or a complex biosphere. Everything you can read out from the landscape informs the design process and contributes to a building process resulting in architecture that supports the place and create good experiences. The latter goal may seem a bit light-weight and not easy to measure, but the architects are simply looking for that feeling that makes you comfortable as you pass by the building, something in harmony with the senses.

There is a sense of recognition in places where this happens. Sören Nielsen talks about "tunet" a particular sized "square" that can be found in farmhouse yards all over the Nordic landscape. This enclosed place, sheltered from the wind between the surrounding buildings, maybe paved with local stones, is a regional feature. The typology of" tunet" is a part of a cultural "pool" of archetypes found all over the Nordic countries, and there are a lot more examples; the fishing village, the mills, the churches. As an architect, we need to be attentive to this typology and" literate" in our reading of the landscape and its local features. This knowledge is something we

share across the Nordic countries, because it is embedded in our response to climate, culture and history. The import of international features, such as the Renaissance square, that goes back a mere 500 years, Sören Nielsen reminds us. The landscape offers us tacit knowledge, a readable continuity.

Photo: Vandkunsten

Photo: Vandkunsten

Two other examples of placemaking by Vandkunsten Architects: On the left: Vannkunsten Nord, Fjordbyen in Oslo, and on the right: Lisbjerg Bakke near Aarhus.

Repurposing architecture

Vandkunsten now is in a stage of reinventing the vernacular, by re-use of material, timber constructions, craft and biogenic materials, they embrace the vision of an art of building that is readable from the perspective of place. For inspiration you do not need to go further than the local open air national museum to study structures where every material could be reorganized in endless re-use for generations, Nielsen points out. A very clear statement from Vandkunsten is that the more sustainable an architecture, the more it will express the local identity, and vice versa. The identity is created by a subtle use of architectural references and inspirations, details and local traditions. The local is in turn connected to living knowledge. Another take-away from Vandkunsten is the focus on re-use (genbruk), and the importance of reconnecting to the tradition of either reusing components in a new place but with the same function, or repurposing, where building components can serve in a new role as material, and finally, as often as it is possible – try to upcycle material in that they will have a more permanent function in their new use than they had before they were recycled. Repurposing puts the architect in an interesting exercise of playing with time and narrative. You pick something up that has a history, and place it in a new context, and in this process, you need to find a "sweet spot" between the familiar and the innovative: to communicate both the history and the future at the same time.

Photo: DOGA

Andøy municipality received support through DOGA's Gnist Innovation Program.

Andøy municipality is in a challenging position, balancing large national and international initiatives with a local community that is not equipped to receive newcomers in a way that ensures they become a resource and a natural part of the Andøy community.

With support from the Gnist programme the municipality explored how existing infrastructure be used in new ways to provide quality housing and exciting meeting places in Andenes.

Photo: Sverre Christian Jarild

Malin Kock Hansen, Senior Advisor, Design og Arkitektur Norge (DOGA)

Place-based architecture in the perspective of an innovation program for local authorities

As a part of Norway's DOGA (Design og Arkitektur), a program for design driven innovation processes has been developed, called Gnist. DOGA is an innovation tool under the Norwegian government, under the shared head of the ministry of local department (kommun departementet) and the business department. Local municipalities who want to work in new ways with sustainable development can get support by Gnist in the form of competence, methods, and practical tools to apply in local development processes, with regards to local needs, advantages and prerequisites. An innovation team, consisting of dedicated competence in design methodology, architecture and/or planning and other innovation competences is connected to development projects to boost the exchange of knowledge and experience, not least bridging the communication between municipalities and regions. The Gnist process is about co-creation in early phases to understand different perspectives and observe different needs in local contexts. In that way, municipalities can get more accurate, holistic, and resilient results in their planning processes.

The need to create quality of life

Malin Kock Hansen, DOGA, reflects upon the fact that in Norway, with its very strong district politics, a general idea for a good development of a district was that if only a lot of work opportunities and more businesses were brought to a region, everything would fall into place. If you would, for example, get a battery factory in a

far-off district, all the prosperity and culture would follow. Then about four years ago, there were reports revealing that people did not share this view, and that there are many other factors that matter for people in their decision to move to a certain place. To be taken care of at all ages of your life, from childcare to elderly care, and the sense of having strong social relations, a quality of life and sense of belonging. This was when we got the importance of place-based development confirmed and printed in black on white. says Kock Hansen, and there were two main reasons for founding Gnist: the first being the need to create quality of life by looking both at place-based development and business development the insight was that a local authority cannot focus only on the creation of workplaces, there need to be a sustainable designed living environment as well, in order to create attractive places where people want to live, not only work. This is where architecture and design come into place, of course, and very few local authorities have these competences they need support in their design and innovation processes. The second reason for Gnist is this in order to release the potential for local authorities to see their assets in a new light, and get the perspective back to the existing potential, the innovation processes begin to unfold from the heart. Many small municipalities had adapted the regional perspective of a future that would come "if they would only" get this factory or that industry began to roll back their focus on what is already there, in the present. Architecture and planning are crucial tools in this too, making the inventory and analysis of existing structures.

A mobilizing method to release potential

In short, the need to connect business development and place-based development, and the need to release the potential of existing assets in small communities – Gnist was the response in form of support as a complement to the local community. In order to extract the local knowledge and begin to make new connections, the Gnist process comes into play to mobilize actors that normally would not collaborate.
The interest to take part in the Gnist program has been large, both from local communities and from architects and designers to work in the Gnist processes, however the means are only enough to work with five municipalities per year. Why is this concept not just scaled up to meet the high demands? In Norway, there is the tradition of placing the responsibility of development in the local authority, not at the government level. There is development funding, but these are hard to apply for and at the small-scale local authority level, there are no resources to get access to these types of funding. The funding of Gnist is a bit of an innovation in itself, since business development comes with a lot of funding, whereas place-based development does not have much funding from the department of local authorities – together they can form a new unity to make all of Norway a livable country.

One size doesn't fit all

In the years 2020–2022, sixteen local municipalities have been part of the Gnist innovation process, among these the municipality of Lom.[6] The challenge was a stagnant local housing market, that could not meet the needs of the present and future inhabitants. Oda Ellensdatter Solberg was the project leader in the Lom Gnist team (but is also trained as an architect), and she gives examples of identification of local circumstances applied to define the local needs in Lom. A value-based strategic approach based on insights of local knowledge, local material and design approach, local existing structures in the housing market, local culture, and of course the local population in all age groups and with all different needs. Municipalities competed to be selected for Gnist. The competition is also made to create cases of municipalities as innovative and good clients during the Gnist process. The municipality was thinking in long terms, steering away from the "quick fix" or "one size fits all" thinking that may look like immediate response to local needs, but lack all connection to local condition, and will look like a loveless act of planning failing to bring long-term perspective into place. Oda Ellensdatter Solberg points out that local needs are defined locally, and not distanced from the place – and that local resources always can be found – there is never nothing in a place. She also reminds us about the power of landownership when it comes to housing – the municipalities should take full responsibility and use the ownership as leverage as well as using the full action range that comes with ownership. Local authorities need to be proactive and engage in long term perspectives.

Oda Ellensdatter Solberg points out that local needs are defined locally, and not distanced from the place – and that local resources always can be found – there is never nothing in a place.

The need for local knowledge

The Gnist process gathered local knowledge from different municipalities at an extremely close level, involving people and their engagement, attitudes, preferences, desires and needs what they are proud of, finding out that they need age bridging places and locations for exchange of neighbor services, that the locals appreciate bird life, and that the culture school needs more space. The Gnist process brings

6. https://doga.no/globalassets/dokumenter/gnist/rapporter-gnist-kommuner-2022/lom-kommune-natural-state-og-haugen-zohar.pdf

together, among many others, actors from all sectors and sizes; the local bank, local brewery and the local dance company no organization forgotten, and no need too small to include in the inventory of the local conditions and culture.

Gnist shows the need to bring local knowledge into the planning processes in places of all scales. It is a crucial piece of the puzzle, in offering expertise in processes of change, and bringing together the chain of knowledge all the way from the local community to the government and supporting innovative thinking on all scales along the way. All these processes remind us that there is not one size that fits all. Norway has many small municipalities, and when big consultants come from the outside to create for example a culture house, things could get out of scale, and the built result is a generic behemoth that looks like fifty other culture houses. This is not the way to create place-based architecture.

Gnist shows the need to bring local knowledge into the planning processes in places of all scales. It is a crucial piece of the puzzle, in offering expertise in processes of change, and bringing together the chain of knowledge all the way from the local community to the government and supporting innovative thinking on all scales along the way.

Photo: Mikael Linden

Pikku-Finlandia is a temporary event center that will be used during the refurbishment of Finlandia Hall. After this, it will be moved to another location, to be used for example as a school or kindergarten. The building was designed by a group of architecture students from Aalto University as part of their studies. The project included several innovations in wood construction, such as the use of tree trunks as load-bearing columns. Otherwise, the simple -dark volume sits quite inconspicuously next to the white marble-clad Finlandia Hall.

Borghildur Sölvey Sturludottir, City Architect, Reykjavik, Iceland

Place-based architecture in the perspective of policymaking on an urban and national level

Iceland is still forming its national basis for education of architects. As recently as this year, 2023, the first architects and planners to complete all of their education in Iceland, and not leaving the country for studies in Europe or in the Nordic neighboring countries, got their exams. The head of local plan in Reykjavik, Borghildur Sölvey Sturludottir, explains this in relation to the state of the small nation in relation to architecture and planning.

The making of an understanding of place-based architecture

The architecture culture is still under formation, and in some environments, the term architecture is connected to an idea of luxury consumption and not something that serves a community on all levels and makes good places for people. In the same spirit, even a discussion on quality can cause misunderstanding, as Sturludottir recalls a workshop with the national housing committee, where the word quality represented something, you cannot afford and this is the reality of a sector dominated by developers and builders. The architecture policy in Reykjavik was named a "city design policy", in order to be more self-explained and less intimidating. This is why our tools are just being formed and making a difference in a tradition of plans and development are carried through without the presence of the architectural profession. A typical local plan in Iceland is a mix with what the city owns and what the private sector owns. The level of control is mostly "how high" and "how much"- according to Borghildur Sölvey Sturludottir. The lifestyle

with more than one car per household as a symbol for the good life is contested now, which is good, but parallel to this we are also reminded of our vulnerability, Sturludottir points out, referring to the current development with an imminent eruption in a village that was evacuated in early November.

A hole in the discussion of heritage and value

Sturludottir points out the lack of perspective on the built environment, where it is easy to see the value of an old timber building, but not the value in more recent concrete buildings that embody a lot of material value but does not trigger a cultural response. Icelandic heritage is very old, but it seems to obscure the discussion of value of the existing built environment. It has been an eye-opener for Sturludottir who in 2020 was engaged in discussions of heritage on a planning level with representatives for Oslo, Copenhagen, Stockholm and Helsinki. It struck her that there was a "hole in the heritage discussion", where most 20th century architecture, like the brownfield areas, is thrown out and torn down without discussion. The post-war period development has been dominated by road infrastructure, with financial post-war support from the US – and with the money came the car culture – from out of place.

The need for long-term perspectives

Borghildur Sölvey Sturludottir thinks about the word "place" which in Icelandic translates to "staður", meaning to be present, to be in the place. It is much more than a geographical location or a geographical space, and it also translates as the ambiguous term "local". In her role, Sturludottir instead uses the term "city for people" as it is the most intuitive way of expressing the ambition of reconnecting with the local assets, heritage and conditions. She emphasizes that a city must be built for people, even though attemptts in the past had tried hard to plan the city for cars. All the while, Sturludottir is implementing architectural thinking and targeting areas that have potential, introducing and nurturing quality in everyday life, not just in icon buildings like the opera or the city hall. There is a need for beacons, though, but as Anne Mette Boye, who wrote the new architecture policy for Aarhus, pointed out we need to have "place before space before buildings" we need "byliv before by before bygninger". She also reminds us of the need to demonstrate solutions that come from architecture, introducing architecture and quality to finance to take up the competition with money as the main driver of the built environment. In Iceland, the long-term perspectives have shortened both in the perspective of private finance, with regards to the high interest rates. In the natural landscape, Icelanders experience the short perspective of the geologically intensive activities that is literally changing the landscape under their feet. Sturludottir is curious about the development of the Keldur district in eastern Reykjavik, the result of an international competition was to create a development strategy, where the

Swedish architecture office Fojab won. This could be one of the beacons of architecture as Sturludottir calls them that Iceland needs so well, demonstrating the power of place-based planning, the space in between, cooking with the local flavors.

Need to demonstrate solutions that come from architecture, introducing architecture and quality to finance – to take up the competition with money as the main driver of the built environment.

Photo: Sara Gust

Uddebo stands out as one of Sweden's finest examples of a hyper-local development, with a deep involvement of the village population, to turn a financial downward spiral upside down, and reversing the movement pattern from going out to going in to the community of Uddebo.

The "Yellow House" played a crucial role in the development of the village of Uddebo, serving as a gathering place where people could come together and be creative. The whole community rallied to save the house and transform it into a new meeting spot. Now, the three-story timber house built in 1892 is filled with activities. Café, concerts, film screenings, quizzes, market, flea market, free shop, woodworking shop, canoe rental, and art projects.

Caroline Bergmann, Coordinator of designed living environment, Västra Götalandsregionen, Sweden

Place-based architecture in the perspective of a regional support structure

People want something in a place – this desire is our outset. These words are spoken by Caroline Bergmann who is a coordinator in the architecture of everyday life in Västra Götalandsregionen (VGR, Sweden's the West coast region), and the region's process facilitator for local initiatives. The willpower and motivation of a local community is the biggest asset in the place-based development process. The tools and methods Bergmann uses in her practice are all aimed at harvesting this drive and ambition that emanates from the local community. Västra Götalandsregionen has over time developed a six-step model based on experience from ten years of place-based architecture and development in the region. The process facilitator tool brings a local initiative from a local process of establishment, mapping and analysis, to articulating a local development plan with various stakeholders and finding financing and meeting organizational needs. In the assisted process, the region helps both the civil society and the local authorities to navigate through the field of responsibility.

Hyper-local rural development

Before her role as process coordinator at the regional level, she learned the ropes from a local perspective of her hometown Uddebo, a village in the rural extensions of Göteborg. There were dire needs in the local community, and also big opportunities, and to this day Uddebo stands out as one of Sweden's finest examples of a hyper-local development, with a deep involvement of the village

population, to turn a financial downward spiral upside down, and reversing the movement pattern from going out to going in to the community of Uddebo. But turning the local development around from a negative to a positive development is one thing, to get to a level of resilience is the next level. Over a long time, how will the local community deal with changes to the demographic pattern, or the bus routes changing, or the loss of a local service provider?

The regional process facilitator tool

In a similar way to GNIST, the regional process facilitator tool is a method to respond to an initiative coming from a local community and assist in navigating through the development process initiated from the local perspective. This kind of local initiative is based on a resolution to maintain a long-term engagement, and to own and manage the local development. Historically, a great independence has formed the rural landscape, with great local knowledge comes great possibilities. The place-based development in the facilitated projects all have a high degree of local involvement and engagement, with a focus on the local identity and the power of the initiative and the organization behind it. Along the way there may be challenges, such as communication, in which the region can assist. With competence and expertise comes a terminology that might be excluding. The process support can bridge the gap and bring the discussion to an informative level for all stakeholders in the process.

Photo: Karen Rosetzsky

Arne Høi, Head of Institute, Institute of Architecture and Culture, Royal Danish Academy, Denmark

Place-based architecture in the perspective of tools for knowledge

The most fundamental aspect of place-based architecture is to gain a thorough understanding of a location. In the Nordic region, several analysis tools have contributed to the Nordic knowledge bank. These tools provide effective architectural and cultural historical analyses that can read spatial structures, individual characteristics, and conditions, as well as define places, environments, and buildings that should be preserved. The purpose of this deepened understanding is to generate precise data that can be used for meaningful dialogue. The results of these methods can help us define the identity and conditions of a place, providing essential groundwork for place-based architecture and planning.

An adequate tool to recognize values

In the 1980 s the SAVE analysis was developed in Denmark by the ministry for environment and planning and Arne Høi has worked with the method since then. SAVE is a method and guidance for mapping the conservation value of buildings, as well as valuable environments and places, to provide a basis for future urban development. The method was named SAVE Survey of Architectural Values in the Environment. Until 2007 the SAVE method was organized and published as "Municipality Atlas", supported and initiated by the state. This process stopped in 2007 and after that each single municipality was responsible for pointing out buildings and sites worthy of conservation on a local level. In 2011 the SAVE method was further developed by the Danish Ministry of Culture, Arne Høi was the author

to the new SAVE guidance.[7] Arne has gained an understanding that about half of Danish municipalities are working with SAVE analysis, but half do not. It is a matter of cost.[8]

Emphasizing specific qualities

The purpose of SAVE was to provide municipalities with a tool to assess not only their buildings but also environments. At the national level, the aim was to ensure that municipalities had an adequate tool to recognize values in urban and rural environments. The SAVE analysis is based on three scales: landscape, neighborhood, and building. Arne Høi points out that SAVE adds knowledge to all processes of development, as it highlights the qualities, describes them, and provides recommendations on how they can be improved. The SAVE model is built to emphasize the specific quality of a place and focus on quality instead of what to do about it. To Arne Høi, it is the best experience from the process of working with SAVE, because it provides a perspective one can carry into the world, bring it into new surroundings, and spread among colleagues.

The struggle with definitions and calculations

It is the municipality's responsibility to ensure operational implementation, analysis, and updating of the local environment. With SAVE, the data from various places in a municipality was compiled into a municipal atlas (kommunatlas) – a comprehensive SAVE analysis of several places in a municipality with common, dominant features. Today, there is no common understanding of how much we preserve and demolish, Arne Høi points out – we only know that 0.2 per cent of all buildings are protected by the state because of their national importance and that the rest is up to the municipality to safeguard. But, Høi emphasizes, everything could be cultural heritage if you look at it as a history-carrying layer in the built environment. Legislation and municipalities struggle with definitions, and new EU directives are further complicating things, stating that all buildings must comply with new standards. Arne Høi is concerned that today, despite everyone saying we can't build more, we build and demolish more than ever, and he identifies a risk that numbers will govern the built environment, meaning climate calculations and LCA will out-calculate the place-based values and qualities.

7. https://slks.dk/fileadmin/user_upload/kulturarv/fysisk_planlaegning/dokumenter/SAVE_vejledning.pdf
8. https://realdania.dk/publikationer/faglige-publikationer/tendenser-i-kommunernes-arbejde-med-de-bevaringsvaerdige-bygninger

”

He identifies a risk that numbers will govern the built environment, meaning climate calculations and LCA will out-calculate the place-based values and qualities.

Photo: Angelica Åkerman

Stokkøya is a small island on the West coast of Central Norway. The inhabitants here have decided to revive their community and founded Bygda 2.0 as a frame for developing a sustainable, modern and attractive small village that brings the virtues of the city together with the beauty and simplicity of rural life. Together, they have created a "microcity" that focusses on architecture, meeting places, food, art and culture.

Bygda 2.0 works for a social, ecological and economic development of the district, which can contribute to increasing the amount of people choosing the village as a place to live and work. The project aims to create a dynamic context for life, businesses and research activities, artists-in-projects as well as encourage economic equality economy.

The need to update models and tools

The SAVE method is used to identify buildings of conservation value based on architectural and historical assessments. Høi recalls a project where students and researchers examined a house together with the Technical University of Denmark (DTU). The Apprentices' House is a small neglected half-timbered house from 1887 located on Bornholm, Denmark. A life-cycle assessment (LCA) has been conducted to quantify the impacts of different transformation scenarios for this house and identify which of them has the lowest impacts on the environment. The investigations examine the different degrees of re-insulation and refurbishment methods that can be used and compare them to the climate footprint of brand-new buildings. The project shows that the most climate-friendly way to approach old buildings is not to tear them down, but to refurbish them and, during the refurbishment, use the same materials that were originally used to construct the building. This is done with the conventional LCA measurement method, based on a fifty-year life perspective. But everyone who works with old houses knows that they last at least 200 years – there is a need to update our models and tools, for them to be entirely truthful.

A legislation that ensures the preservation of places

SAVE covers certain important aspects in understanding a place but, as Arne Høi says, this is not sufficient. To be able to show a place's entire story and take all historic layers into consideration, other methods are needed. The work on how to understand a place is constantly evolving. The researchers at Arne Høi's department are tasked with adding layers and combinations of perspectives to increase the understanding of a place. Similar models are being developed, for example Dive, developed in Norway, which has a broader user group, involving more elements of dialogue and involvement. In contemporary architecture, Høi can trace a new attitude in the form of more historically informed projects, with a critical edge, for example bringing social patterns and power relations into question and demonstrating a critical history of a place, for example the student project that included a mapping of slave trade locations in Copenhagen. This is different from even fifteen years ago, when a museum could be placed in a field without being much more than design and concept. Another positive effect is, according to Arne Høi, that the idea of place-based development was previously often related to the scale of the landscape, whereas now it includes all types of environments.

In conclusion, Høi appreciates SAVE as a good screening tool for preservation, to gain knowledge of cultural-historical, environmental, and architectural qualities. He suggests that we need to review our building preservation law, so that we can handle larger entities of the built environment that we can protect, not just

buildings but entire areas. With the SAVE method, it is possible to quickly get an overview of a large number of buildings and urban environments, providing a solid starting point for shaping a conservation policy or developing a conservation plan or development strategy for an urban area. We need legislation that ensures a preservation evaluation before any building is demolished.

Photo: Institute for (x) and Angelica Åkerman

The Institute for (X) is a cultural and educational platform founded in 2009, as an independent and non-profit cultural association. The initiative emerged from citizen initiatives in a central area in Aarhus, where designers, musicians, artists, entrepreneurs, and craftsmen work side by side. The area houses workshops and office spaces created by about 90 projects, 50 companies, and 35 associations, engaging around 400 members.

Mads Peter Laursen, CEO, Institut for (X), Aarhus, Denmark

Place-based architecture in the perspective of a grass-root initiative

The "x" in Institute for (X) may be read as something undefined, but perhaps the understanding of "x" as in "x marks the spot" is more appropriate.

A growing cultural grassroots platform

The Institute for (X) is a cultural and educational platform founded in 2009, as an independent and non-profit cultural association. The initiative emerged from citizen initiatives in a central area in Aarhus, where designers, musicians, artists, entrepreneurs, and craftsmen work side by side. The area houses workshops and office spaces created by about 90 projects, 50 companies, and 35 associations, engaging around 400 members. As a platform, the Institute for (X)'s purpose is to facilitate cultural and creative grassroots initiatives in Aarhus and contribute to creating a more inclusive city, with a particular focus on social environments. (X) also actively collaborates with the Aarhus municipality to promote the city's overall development, and the city's Architecture School moved there as neighbors a few years ago, fostering significant exchange.

Photo: Institut for (X)

Institute for (X)'s purpose is to facilitate cultural and creative grassroots initiatives in Aarhus and contribute to creating a more inclusive city, with a particular focus on social environments. (X) also actively collaborates with the Aarhus municipality to promote the city's overall development, and the city's Architecture School moved there as neighbors a few years ago, fostering significant exchange.

How to make a long-lasting place

Mads Peter Laursen is one of the initiators, who along with his founding friends have a long history of creating various types of spaces and places for culture in Denmark. When they moved from Aarhus to Copenhagen in the early 2000s, the capital city was abundant with abandoned harbor and industrial structures, in which they saw a significant potential for self-organized cultural activities. Over time, they created several platforms where they had the opportunity to test various forms of organization from collaboration with the municipality to a completely anarchist approach. After their third attempt was shut down by the police, the group realized that what they wanted to create was, for economic and bureaucratic reasons, not compatible in Copenhagen. They moved back to Aarhus, which is a city with a strong tradition of grassroots' activity. Wise from experience, they set up

three criteria in their search for a new more long-lasting location. Firstly, the land should be owned by the municipality, secondly there should be no plan for the area, and thirdly, there should be a building they could take care of and accommodate with activities. The place they found was an old railway yard that had been vacant for several years, with an old tollhouse among several surrounding buildings, which became the starting point for their dreams and ideas of an expanded cultural platform.

The importance of timing and trust

The timing and moment for the start of (X) were crucial, Mads Peter Laursen explains. He refers to the early 2000s as "The golden age of possibilities" – this was before all municipal land was sold, privatized, or planned in Denmark and when a young group of people could get the ears, and finally handshakes, of municipality officers. Another contributing factor 25 years ago was the global economy. Many urban development projects were interrupted or stalled in the wake of the financial crisis in 2009. Aarhus, like many places and municipalities, chose to focus urban development on one area – the Docklands. Because of this focus, the municipality left other areas and properties untouched for regular urban development for some time. After negotiations with the municipality, the (X) initiative obtained a running lease on the site. Initially, it was short contracts, but over time, as they gained trust, they now have a ten-year rent-free agreement with the municipality. With a smile, Mads Peter shares his experience of using the right terminology – we refer to it as a cost-neutral agreement – as soon as you say free, everyone shuts their ears.

Today, (X) actively plays on the synergies between politics, business, and culture in Aarhus. The 400 members are organized with a board of nine people sitting in an annexed house in the middle of the area. Their quarterly meetings ensure the power of the members, in (X) nothing happens that is not based upon the will of the community. All tenants pay rent per square meter. Mads Peters advice is to set the rent low enough to be reasonable, but high enough to be responsible and caring for the space.

The multidimensional values of (X)

As the municipality's economy has recovered over time, the (X) site area has changed. When the municipality developed new plans, several of (X)'s buildings were demolished to make way for the city's project. Over time, the new architecture school, more housing, and a garage has been added to the original site. When asked about the dangers of gentrification, Mads Peter is fully aware of the creation of value that (X) contributes with, as he puts it their activities have generated much more multidimensional values for the municipality. Because of this, (X) still has a strong negotiating position with the municipality, and it seems that the plans being

made by the municipality in many ways take the (X) perspective into account. For example, the area planned around the (X) site has a border of day activity building as sound barrier to the residential areas beyond, that way the lively activities on the (X) area can be compatible with its future surroundings, while offering culture, music, and food to the coming residents.

To make place for grass-root perspectives

Nowadays, Institute for (X) is well-known among cultural practitioners and real estate business, and people attempt to achieve similar places. However, Mads Peter Laursen points out that a place like (X) cannot be copied, not only because of the lucky coincidence of timing or because of the number of stamina it takes to carry through the ideas – but for the attitude in general in contemporary society. Everyone wants "cultural glitter and values to new construction projects", as Mads puts it, "but the real key is nurturing the grass-root perspective, in order to harvest strong communities who make place for new unestablished creativity."

As a way of supporting (X), Mads Peter and his colleagues continuously work on further developing (X) through several applications and collaborations. The same day I was there, they had just received money from Realdania for the further management of the properties and the site's history. In short, culturally vibrant places like (X) does not grow out of thin air.

Photo: Ugo Carmeni

Huussi outside the Finnish Pavilion at the Venice Architecture Biennale.

Arja Renell, Dry Collective, Finland

Place-based architecture in the perspective of a universal local resource

At the Venice Architecture Biennale, just outside the Finnish Pavilion, a shallow grave is unearthed, revealing its contents. It is a severed water closet, its porcelain parts white as bare bones, resting in peace. This is the subtle opening act of the exhibition "Huussi – Imagining the Future History of Sanitation", curated by Arja Renell and the Dry Collective for the 2023 Finnish Pavilion. The exhibition critically reassesses the infrastructure of sanitation, in response to freshwater shortages which have long been a global situation, but more recently a reality in Europe. Creating the future sanitation infrastructure naturally includes the possibility of restoring the nutrient cycle in food production. Visitors to the exhibition can experience the huussi, a traditional dry toilet, with all their senses. Properly maintained, it does not emit any unagreeable smell while it produces a local resource of highly nutritious soil. Vegetables and plants thrive in cultivation beds in and around the pavilion, demonstrating the result of the full cycle. The huussi itself comes with its own vernacular architecture – a small scale tribute to a resource that is as universal as it is local.

Tools to make place-based decisions

In her work, Renell works with clients and users in early stage, where a lot of important decisions needs to be made. Using a special model, all important data goes in to cost evaluation and program planning, a lot of repetitions can be avoided in the design and building process, where work involves a lot of people and becomes very expensive. The challenges are mental- and process based. A lot of great

examples exist and are very inspirational we need to increase the level of education, starting with even beginning to talk about the issues of sanitation. In our contemporary societies, Arja Renell reminds us that we need to question where we are building, whenever we are building, or we will immediately waste the chances - presented by the place itself of reevaluating the decisions, instead often architectural decisions and building processes are copy-pasted from one place to the next.

we need to question where we are building, whenever we are building, or we will immediately waste the chances - presented by the place itself – of reevaluating the decisions, instead often architectural decisions and building processes are copy-pasted from one place to the next.

Photo: Miina-Jutila

huussi - imagining the future history of sanitation

This piece was shown at the Pavilion of Finland at the 18th International Architecture Exhibition – La Biennale di Venezia, 20.5. - 26.11.2023

With the exhibition, curator Arja Renell, wanted to critically reassess sanitation infrastructure in the context of global freshwater shortages which have become a reality in Europe. Sanitation infrastructure is also connected with the possibility of restoring the nutrient cycle in food production.

By questioning the so far indisputable position of the current water-based sanitation system, the exhibition aims to inspire architects to start looking for alternative solutions, also at the urban scale, to better serve the world we inhabit today.

Making profits, copy-pasting is a money-saving method, and it is difficult to compete with the efficiency of copying something that is repeatedly built, and thoroughly calculated. Building with local materials and local knowledge is something that is not built in bulk, so it has become more expensive even if that does not make sense. We have to make it possible and financially attractive, whatever the tools may be to make place-based decisions in creating architecture and infrastructure. We have to realize that it may not be cheaper than what is globally repeated as architecture around the world. If we want to do something different – what are the methods, structures and tools we need? If we have successful models, these can be cheaper in the long run, but in the short run, we need to invest in pilot projects and models to challenge the old system. The huussi makes sense as an example of this, in itself a small structure, but the creation of a new system, beginning with place-based decisions.

If we have successful models, these can be cheaper in the long run, but in the short run, we need to invest in pilot projects and models to challenge the old system.

The value of the local

Making sense, to Arja Renell, sums up the efforts. Having grown up in a generation that experienced a positive outlook on the world, the contemporary crisis in both humanitarian and climate sense reminds us of the value of local resources. If something good is coming out of a global conflict, it may be that it shows us the value of local – the flow of materials becomes visible. The sewage is a good example of a complex structure that is draining resources, with a solution that presents itself in the form of the most obvious place-based resource. Arja Renell shows the Huussi as a game-changer in a system that needs to change, where the mental shift is necessary to see our waste as a valuable resource and transition to treating it as such. At the moment, this most invisible part of buildings and of entire societies holds the secret to not only re-evaluate waste, but also re-evaluate our built environment.

Photo: Marwa Dabaieh

Examples of nordic, nature based materials for construction.

Photo: Nille Leander

Marwa Dabaieh, Adjunct professor at Aalborg university and docent and associate professor at Malmö University, Sweden

Place-based architecture in the perspective of the educator

Working with place-based architecture, Marwa Dabaieh employs a number of components. A contextual design approach, cultural and historical considerations, working with community engagement, sustainability, esthetic harmony, relation to the surrounding landscape, adaptation to climate, but most importantly; respect the indigenous knowledge in the local community, the residents of the site. Dabaieh emphasizes the connection between humans and site. The reason for this is that the residents have shaped the place, but the place has also shaped them.

An iterative process – learning by doing

For more than twenty years, Dabaieh has worked with indigenous architecture, what is commonly called vernacular architecture, where complex structures for cohesive and harmonious settlements, meticulously built from knowledge and experience accumulated by and passed down from generation to generation. In this architecture, all needs are met, and it is built with local material in a respectful and resource efficient way, built according to their social needs, within the economical means available, and in all this, also built to not only accommodate the community but to make people comfortable and happy. The proper education and training come from learning by doing, by ancestral knowledge. It is an iterative process, over long periods of time where the results you get are achieved by going from try and fail, to try and succeed and finally try and excel. This iterative process, Dabaieh reminds us, means that indigenous architecture has drawn from another asset; the luxury of time. By building with respect to the place, using what is under your feet, you are not only serving but becoming part of the landscape.

Planetary assets

In her teachings, Marwa Dabaieh uses the metaphor of literacy in relation to place. In many ways, the industrial era has turned us into analphabets in relation to place, we do not read well. In essence, we should look at planetary assets on the largest scale – if we went to Mars, we would have to ask what our needs are and how they could be sourced locally. The principle of the habitat – not just for humans but for all living beings – is the key to success. In order to succeed with cultivation, you see already what grows there naturally – placing a palm tree in Malmö takes a lot of resources to maintain, if it is to survive at all.

Place-based architecture emphasizes the strong sense of identity and belonging. Often it serves not the end of the project but the not only values specific characters in a site. Sometimes it is a site, and you choose a project, and sometimes you have a project, and you choose a site. As Dabaieh puts it - as architects and educators we should act as learners, not behave like masters.

The principle of the habitat – not just for humans but for all living beings – is the key to success.

Down to Earth

Photo: Peter van der Meulen

Forests are under a lot of pressure to deliver material, while pests and storms are an increasing risk. The base narrative in society is that the soil is there for us to utilize it, says Kristiina Lång, Research Professor, Natural Resources Institute Finland (Luke).

Introduction

The ground we stand on is all we have. Throughout history, it has provided us with everything, as the foundation of civilization. In this article, we try to lay an ear to the ground, listening to the knowledge that grows from the soil that feeds us. Cultivable soil is a scarce resource, at the intersecting point of many interests. This article will focus on the underrepresented voice of our land use in architecture and planning in the Nordic context.

We find ourselves in a constantly changing landscape of politics and policy. The current state of Europe against a background of international conflicts, ongoing crisis and wars, affects our collective ability of addressing crucial questions of sustainable development and mitigation of climate change and global warming. Changes in land use are the main reason for loss of biodiversity and the biggest driver of climate change. Meanwhile, territorial conflicts show how much land is valued on a national level. The paradoxical relationship to land is due to how it relates to power. The loss of land is the loss of power, although we need to reassess this logic and go much deeper into the ground, beneath the surface condition of land assets.

In order to understand the complexity of ecosystems and how they nurture us as humans, we need new models of knowledge. The ability to visualize is a key competence in relation to research and practices of change, as exemplified in these interviews. It is not just a matter of visualizing complex systems in the forms of diagrams or infographics, but also to visually manifest change itself. "Before- and after" images are powerful drivers of understanding of potential change, affirmed by the architects interviewed here. Demonstrating alternative use by creating a vision as a method established in the practice of planners and architects, is as potent in the fields of research and policymaking.

Visualization is the key to understanding the scale of human interventions. As this text is written, Norway is roaring with debate in the wake of a documentary produced by the Norwegian journalist Mads Nyborg Stöstad.[9] The film shows how the use of land escalates, contrary to the ambition to preserve the natural environment. The scale of action is stunning, but even more astounding is that the exploitation is carried out in the name of sustainable development. In collaboration with Zander Venter from the Norwegian Institute for Natural Research, 40,000 satellite images were analyzed using artificial intelligence, to find natural areas that had been expropriated between 2017 and 2022. This eye-opener is powerful in and of itself, but the added dimension of deceit is that the development is made as a part of a "green transition" of society. We are facing huge challenges in restoring natural environments. While waiting for policy and regulations to be installed, we cannot underestimate the need to make the right decisions. In order to make wise decisions, we need to trust the research and knowledge that help us understand nature and its systems and values.

We cannot afford to lose ground.

9. https://www.nrk.no/dokumentar/xl/nrk-avslorer_-44.000-inngrep-i-norsk-natur-pa-fem-ar-1.16573560

The four partners of Gaia arkitektur: from the left: Pi Ekblom, Ania Öst, Ulrika Stenkula and Marta Bohlmark. Photo: Gaia arkitektur

Marta Bohlmark and Ulrika Stenkula, Gaia arkitektur

The perspective of a nature-based architecture and urbanism

Nature-based urbanism is about integrating urbanism with nature-based solutions. Gaia arkitektur starts off from the perspective of coexistence between culture and nature. Land use becomes the starting point in an aim to restore the balance in this coexistence. Marta Bohlmark and Ulrika Stenkula are architects and founders of Gaia, where they, together with two additional partners and collaborators, Ania Öst and Pi Ekblom, work with urban/rural development within the framework of water, forests, and the life conditions of humans and other living beings. They bring with them extensive experience from large-scale architectural firms and academia.

Their professional experiences have evolved into a desire to shift the perspective from the simplification that humans alone are at the center whilst nature is the resource at hand, as Ulrika Stenkula describes it:

– It became increasingly clear that we as actors within the built environment sometimes did not work *with* nature. Our projects focus on the green-blue structures as the foundation for life. When we start a project, we begin with the understanding of the prerequisites of the land. We map out the systematic flows and relations, both through GIS, history, site observations and interacting with the local community. We identify the points where there is lack as well as high values. We aim for a synergetic approach.

”

Our projects focus on the green-blue structures as the foundation for life.

Procurements and requirements

Gaia's practice involves mapping the existing stakeholders systematically. Understanding incentives and needs connected to the site and the development is essential. Ulrika Stenkula emphasizes that procurements and requirements create incentives and must be based on prioritizing regenerative development and resource efficiency.

– We must listen closely to the inherent conditions of the land, the earth. Today we see how the official documents present plenty of regulatory statements with various conflicts of interest. The economic policy must align with the environment. Historically many human concepts have contributed to the division between humans and nature. Modernism is one expression that has influenced the field of architecture heavily. This divide is a way of thinking that has prevailed, where the landscape is a place from which we extract resources like energy and food. We now collectively see the consequences of this dualism. For the first time in history, we are globally intertwined, and the effects are global, thus massive.

Photo: Gaia arkitektur

Render of Skeppsholmen, Stockholm

Long-lasting architectural practices

Gaia believes only regenerative practices will prevail in the long run. Their work requires both new methods and processes, and they also see the need for new roles within the field.

– Working as architects in our day and time has resulted in projects that involve recreating nature, says Marta Bohlmark. The methods and processes that we develop work as a general framework and the parameters are always site specific; thus, the result manifest as diversity, just as nature works. We use the experience of beauty as an indication of a viable project. We are interested in exploring how these – often conceptualized terms – such as beauty, in essence could very well be a phenomenon interlinked with sustainability.

In their practice as architects, Gaia seeks to recreate structural conditions for natural processes, using the function and grammar of nature itself. An example of this is the creation of a lagoon in Stockholm inner archipelago where the predatory fish are supported through created reeves. This action is part of supporting the endangered eco system in the Baltic Sea. Marta Bohlmark explains the methodology:

– This is not the same as remediation or direct solutions to increase the land's capacity. It requires time and careful research to find the right solution. Instead of, as architects, providing an answer to a question from an industrial perspective, we base our methodology on finding a question that will address an opportunity (financial investment is one) based on finding synergies, addressing long term needs and thus long-term values.

Practice-based research as a method

Gaia's projects often start with practice-based research. Posing the right question is essential to finding the relevant answer in times of transformation. The research projects then act as a base for prototypes and projects that implement the findings.

Photo: Gaia arkitektur

Picture from the research project Living Forest Living Society – our relationship with the forest; past, present and future.

Gaia has built platforms around three research areas: the forest, the water and the rural living environment. Among these, Gaia's research-based project MASSA has gained interest and has become somewhat of a growing movement. The methodology involves managing enormous amounts of stone from infrastructure projects, such as the ongoing subway construction in Stockholm where 25 million tons of stone will be handled. That corresponds to convoys of trucks transporting the stone residue out of the city, putting pressure on the city in many different ways. Marta Bohlmark explains the strategic vision.

– Transporting residue accounts for 40 percent of heavy traffic today. At the same time several of the excavation sites for the construction of the subway are located near water. We propose a strategic design vision for six sites with a high recreational value in the inner archipelago of Stockholm. With water transport and assigned water restoration projects these challenges can be turned into opportunities.

– Life cycle calculations need to account for every aspect of a project's consequences to be valid, emphasizes Marta Bohlmark. Legal agreements that sublet responsibility to another actor, are only a theoretical construction. Maybe the responsibility needs to go even further; if you gain from an action, you inherit responsibility. If there is a lack of that perspective, economic gains will appear from the very slack and inefficiency that the society aim to prevent. Creating business models that rely on upholding slack can be more than wasteful, sometimes destructive. As an example, we should maybe not pay to get rid of stone residue and then pay to get it back when building? At the same time trucking the stone forth and back on our roads across the country.

Reasonability for long-term restorations

Great efforts are also being made along the line. The city of Stockholm has created a logistic center for stone residues, and some of the excavated stone is transported on water, to be used in the city's own projects.

Photo: Gaia arkitektur

Vision of a new lagoon in Stockholm inner archipelago

– We propose quite small measures compared to the enormous logistics and cost of removing masses between sites, says Marta Bohlmark. One issue in these initiatives is the mandate; who is responsible for these long-term restorations? When the gain is for everyone, maybe everyone is responsible. But more often the conclusion maybe is that no one is responsible. We see this as one way of taking the responsibility, by contributing with prototypical examples. It needs also to be said that there are many occasions on these pilot projects where the initiatives can be put to a halt; it only takes a little uncertainty and doubt during a meeting, and everything is at risk of being struck down. The lagoon has prevailed as a valid proposal with great ecological potential and will be submitted for building permits together with the landowner Royal Djurgården.

Examples that manifest healing

We see how we can contribute by showing examples of how these initiatives can actually be manifested in reality. To scale up these prototypes' organizational structures. We drive the issue in our projects by creating actor networks, which allows us to work with more complex and larger areas – this is important because we need to heal entire environments. Not everyone wants to engage in actor collaboration; it is quite a demanding process. It's exciting times for architects, where we can act in new roles, not least by using our expertise in creating shared visions.

Gaia produces the vision images needed to show alternatives, such as illustrating how a shoreline can be designed in the city where there has been a quay for hundreds of years. Especially in research, images are needed, as visualizations are powerful communication tools.

– As an architect, it's natural to observe an environment and at the same time see the possibilities; it's a trained gaze – not everyone has this ability, even if architects tend to forget that it is an acquired competence to see spatial opportunities with the eye of your mind. With powerful images, we can help create a shared vision, says Marta Bohlmark. We facilitate the actor network sharing the vision through various methods. We believe that all actors need to connect to the actual place.

– A place that you have experienced and created a relationship with you naturally care for as an empathetic being. We are the water, and we are the forest and the land, says Ulrika Stenkula as a summary.

– We believe that these new processes that reconnect us to the landscape are essential, asserts Marta Bohlmark. In these projects, a broad range of disciplines are involved and extensive work with local communities. There is an impressive amount of knowledge in our society. However, this knowledge needs to be connected in efficient and seamless ways. It is not easy, but it's amazing when it works. A few people can make a tremendous difference, and especially when they become connected.

It's exciting times for architects, where we can act in new roles, not least by using our expertise in creating shared visions.

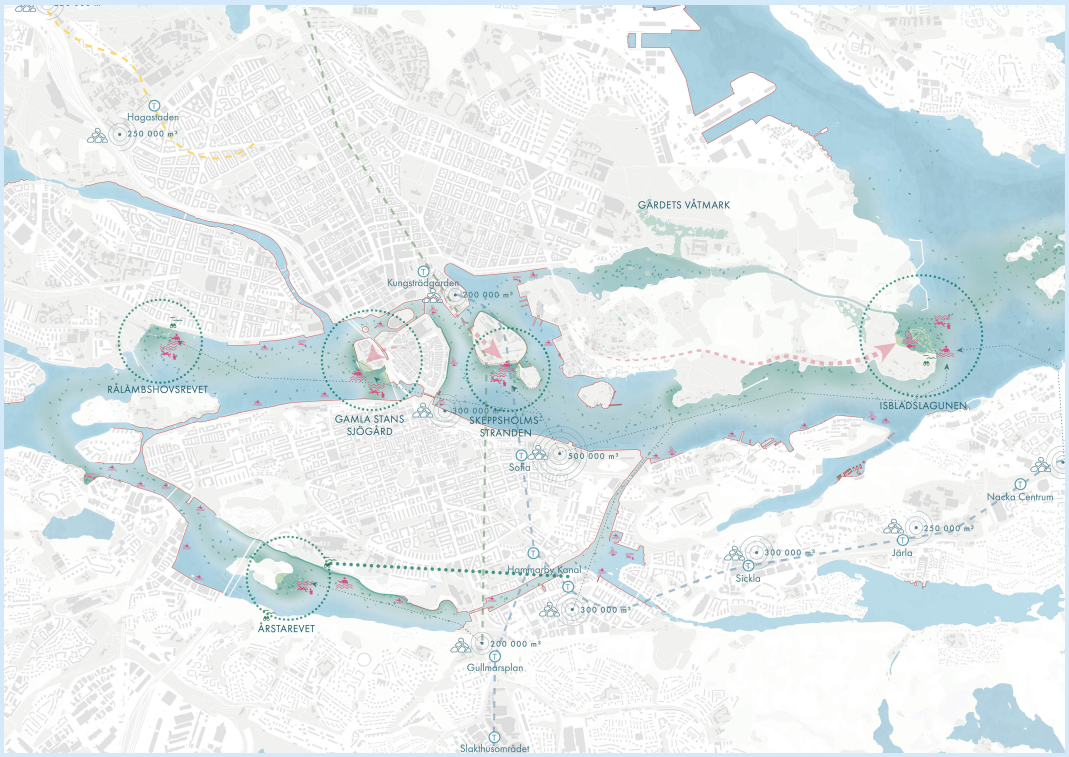


Photo: Gaia arkitektur

Strategic map

Join forces with nature and reconnect

Gaia sees challenges as engaging opportunities. As architects they can construct platforms that connect broad and inspired knowledge we have an important possibility.

– With inspiration we can develop our landscape and create new awe-inspiring experiences. To us it is a simple truth; join forces with nature and reconnect to the earth under your feet, says Marta Bohlmark. The MASSA project gathers participants from the administration of Stockholm dealing with infrastructure, logistics, water quality and fish, as well as academia and expertise in marine ecology, construction, heritage, architecture and art and extensive community interaction. These actors have an individual ability to both understand their specific contribution and the holistic living environment we are aiming to create.

On March 7, the Bifrost bridge was inaugurated in Uddebo outside Gothenburg, made of 96 percent wood. The bridge is the result of a research project carried out by Gaia in collaboration with Timber bridge specialists, Funkia landscape architecture, KTH and the City of Stockholm. Photo: Timber bridge specialists

Photo: SLU Alnarp

Anders Larsson, Researcher and teacher at the Department of Landscape Architecture, Planning and Management, SLU Alnarp

Ground Values

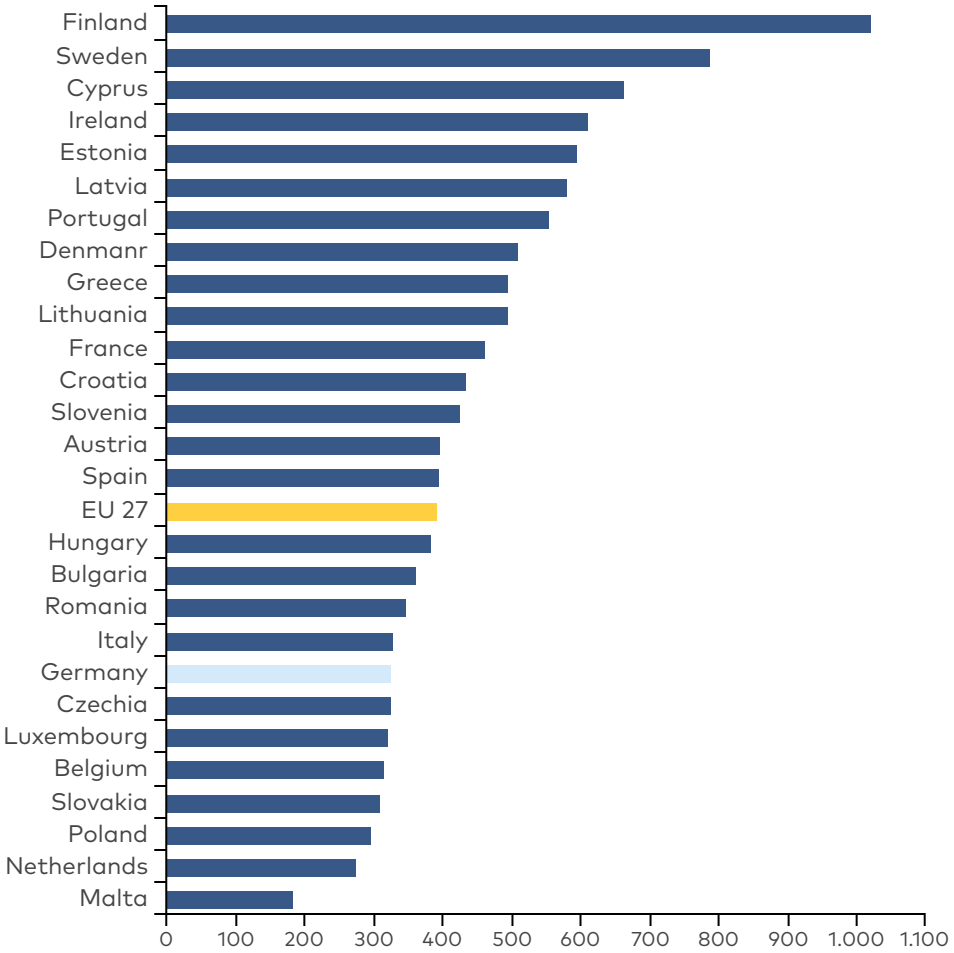
Anders Larsson (Dr) is a researcher and teacher at the Department of Landscape Architecture, Planning and Management, SLU Alnarp. Anders is a member of a number of Swedish and international organizations, among others the Royal Swedish Academy of Agriculture and Forestry (KSLA) and ECLAS (European Council of Landscape Architect Schools, Executive Committee).

– As a young architect, I thought I would follow the path to become the great "Designer", but by way of amazing supervisors and teachers, I set off on the path to landscape planning in relation to agriculture. It is not a huge academic field, but now we see an increase in interest from our Master students in the subject area.

– I have a feeling that our self-image in Sweden is that we are doing just fine in our national green transition work. This is interesting, because we seem to have a constant dead angle in our perception of Sweden as a very moderate nation, when in fact we are extreme. In comparison with other nations, we are almost off the chart in some questions. Our relation to natural resources is one of these extremes. If the state would compensate for placement of windmills, as the practice is in Denmark to offer 20 percent partnership to the local community – in Sweden this is an option, not at all mandatory. In Piteå, a foreign energy company could reap full profit without any compensation to the local community. This has been practiced to a point where few or no locals will say yes to windmills in their territories. Still, with all the exploitation going on, uncritically, I cannot see a demand for analysis, research, and calculations to back up our regional layout plans. The thinking at municipal level seems to be "just keep on keeping on in the name of growth and we will be successful". And if a global actor comes along and wants to set up a warehouse for servers, a battery factory or a logistical center, municipalities accept them gladly and offer all kinds of discounts on local resources, even if there are very few work opportunities in the offer.

Land use: Artificial land cover 2018, square metres per capita

Source: Office of Germany (Destatis), 2024.2 Graph: Federal Statistical Office of Germany (Destatis), 2024. Source: Eurostat.



EU as a driving force for land protection

What can we do in the face of this lack of foresight?

There are plenty of examples internationally that could readily be applied in Sweden, if we would be interested in protecting future resources. Compared to the German system, where there is a regional policy that any industrial establishing should be made in existing industrial areas, anywhere outside of existing industrial grounds will be subject to large costs on the entrepreneurial side, called “Eco-accounts” and in rural areas there is a protective “belt” around villages where no industrial establishment is accepted, says Anders Larsson and continues to describe the particular conditions and attitudes towards land use in the Swedish context. What

can we do to mitigate the conflicts of goals?

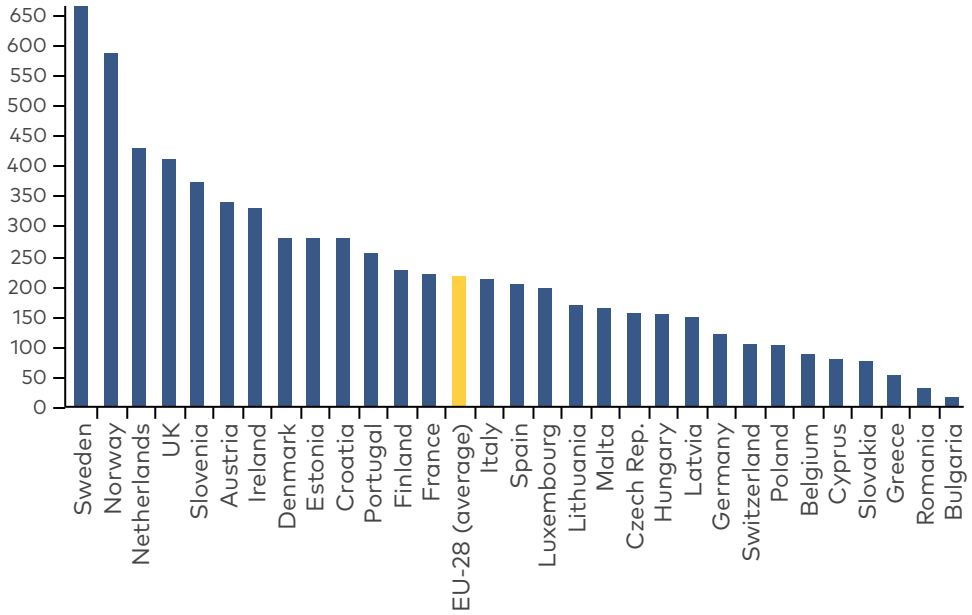
– In Sweden, everyone refers to PBL (The Swedish Planning and Building Act), yet land as a resource is in effect rather unprotected in our country. We have a whole variety of terms that make us believe that we have a solid protection of the land; we have areas declared as "national interest", "federal interest", "particular civil interest" and more – nobody really understands the difference. And it seems that whatever term of protection that is put on a piece of land – it can readily be overruled by some compensatory action somewhere else. Our legal foundation is based on exploitation and extraction, and the Environmental Code is a bit like a sticker on the surface. I think we should turn the legal protection to its other end and build from the ground up with a sustainable approach.

– When I worked for the Swedish Road Administration, I became aware that EU is a driving force in protection, while Sweden as a nation has a regressive attitude in favor of exploitation. The EU is a lot tougher, simply because they have a large-scale overview of the land use of the EU. If we do not act now, I think we will have a much harder time to transform. We need to get our politicians to understand that either we engage in incremental adaptation, or we will have to deal with a transitional chock in the future.

Our legal foundation is based on exploitation and extraction, and the Environmental Code is a bit like a sticker on the surface.

The illustration shows the amount of shopping centers per 1000 capita

Source: ICSC 2014 and Eurostat 2014



The dissociation between self-image and dominating practice is bad enough for the transitive ability. Does Sweden have any examples of municipalities who adopt a more futureproof strategy?

– The municipality of Jönköping is the first in Sweden to sign a protective law for agricultural soil. Behind this decision lies many years of political discussion to reach a political agreement between all political parties. Jönköping has thus shown what can be done on a municipal level right now, within the framework of the present legislation.

Measuring the values?

The most common question that Anders Larsson gets is "what is the soil worth":

What is the future value of cultivable soils? How do we calculate the value of arable land fifty years from now? My boring answer is that it depends. There are no calculation models. It depends on how much soil is protected around the globe. The value depends on how the condition of the soil is kept if it has been subject to compactation, flooding, droughts, pests there are a number of factors. What we do know is that we need to engage in regenerative agriculture and return more organic material to the soil or they will become infertile. The UN report on land use lifts the questions to a higher level, not just asking how much produce could be harvested from a patch of land, but regarding every level of use, including water retention and flood delay and other large scale ecosystem services. A fatal mistake is that land is

not included in the life cycle analysis model for the built environment.

With the EU as the stronger driver of regenerative strategies, what does Anders Larsson think of the potential for more collaboration in the Nordic region?

– Our natural environments differ greatly in scale and constitution, from the rural Denmark to forestry in Sweden, Norway and Finland, but of course we can learn from our neighbors. But if we are serious in studying the protection of agricultural soils, then we should look at for example Germany or the Netherlands, densely populated nations with a high percentage of agricultural land. Scandinavians have placed investments in Baltic land. I learned that 10–15 percent of the Baltic region is owned by Nordic companies – perhaps as a future bond, since the current production value of the soil is lower than in our countries. This, if anything, tells us that we are planning for an insecure future. And when facing insecurity, the best thing to do is act with great caution.

What we do know is that we need to engage in regenerative agriculture and return more organic material to the soil

Kristiina Lång, Research Professor, Natural Resources Institute Finland (Luke)

The perspective of a soil scientist

Kristiina Lång is a research professor of agricultural greenhouse gas mitigation at the Natural Resources Institute Finland, where she studies ways of improving the sustainability of land use in agriculture. Her studies focus on mitigating greenhouse gas emissions of cultivated peat soils by developing value chains involving biomass production in rewetted peat soils.

– I am an environmental scientist concentrating on soil issues. My research career started with greenhouse gas emission measurements. I have also worked on policy advice on climate mitigation in land use. Then I realized that these are very slow routes to changing the world, so I turned my focus to climate change mitigation in the land-use sector by biomass production on rewetted peat soils. Peat is originally a thick layer of organic matter that has not decomposed since it has been preserved under water. Peatlands are ecosystems that support biodiversity and serve as carbon sinks as long as they are wet. Drainage starts the process of peat decomposition that leads to high greenhouse gas emissions. Peat releases huge amounts of stored carbon dioxide and nitrous oxide when it is cultivated, about 30 carbon dioxide equivalent-tons per hectare if we use them in agriculture. Peatlands used in agriculture emit annually as much greenhouse gases as passenger cars in Finland. When rewetting drained peat, the water table is raised to retain the peat. It can be left to revegetate with wild vegetation or used for biomass production of a moisture-tolerant crop. Biomass production on rewetted peatlands (paludiculture) provides double benefit: emission reduction from soil and substitution of unsustainable materials.

Photo: Kristiina Lång

Peatlands are ecosystems that support biodiversity and serve as carbon sinks as long as they are wet. Drainage starts the process of peat decomposition that leads to high greenhouse gas emissions. Peat releases huge amounts of stored carbon dioxide and nitrous oxide when it is cultivated, about 30 carbon dioxide equivalent-tons per hectare if we use them in agriculture. Biomass production on rewetted peatlands (paludiculture) provides double benefit: emission reduction from soil and substitution of unsustainable materials.

Replace fossil materials with novel biomass types

Kristiina Lång studies what kind of plants can serve as biomass, not *if* but *when* we have to replace fossil materials:

– Cattail, reed and grasses are high yielding crops that can be used for many kinds of industrial purposes. If we want to be climate neutral, we need both reduced emissions and a strong carbon sink by maintaining the forests and peat lands. Forests are under a lot of pressure to deliver material, while pests and storms are an increasing risk. We need to keep the options open, and for example the FIBSUN project studies how to use novel biomass types in construction, automotive and textile industries.

The Nordic perquisites and self-image

Kristiina Lång points at the Nordic self-image is quite elated in the field of sustainable development. We are making a lot of mistakes along the way, it seems. What is the situation of urban sprawl across fertile land?

– I think we are a bit careless in the Nordic countries because we have a lot of land area per person. In other countries like France, they have been wise enough to regulate for instance, where to place solar power panels – first choice is on roofs and parking lots, whereas here we often use agricultural or forest land. Regarding the issue of rewetting, we all face the same problems in the Nordics, where we have about the same amount of drained peat soil. Denmark has incentives in place to rewet half of their agricultural peat soils, a good enough strategy. Norway has also initiated a rewetting program. In Finland we are concerned because we have peatland that are neither used for food production, nor rewetted. We found 17 000 hectares of drained peatland fields in farms that do not produce food at all. In addition, there are tens of thousands of hectares in "middle grounds", land that is not in active use, producing a lot of emissions but not producing food. In Sweden you have a better legal system to deal at least with estates of the deceased: according to the law they cannot own farmland for more than four years. Without a law like this, the government has no tools to guard the land use because agricultural policies reward landowners for owning the land; food production is not required.

> **If we want to be climate neutral, we need both reduced emissions and a strong carbon sink by maintaining the forests and peat lands.**

The whole picture

Although the values are immense, there seems to be no one who has the whole picture of land use, nationally or indeed in the EU. Meanwhile, we in the Nordics continue to apply our consumer perspective on land, and the potential to strengthen the carbon sink of soils is not fully utilized. Kristiina Lång proposes communication strategies across stake holders, that could be applied on a national level:

Our ministries should talk more to each other. Agricultural and forestry ministries are responsible for most of the regulation of land use. Ministries for Building and infrastructure, the Ministry of Environment, and the Ministries for Energy systems all of these are related to land use. Then we need to consider the division of responsibility between the local municipality who decide on land use and planning,

and provincial authorities giving other permissions also they have tools to improve land use. Policy coherence should be improved not only guiding us to the don't but to the do's in reducing emissions. Industrial policies could support land use policies by favoring companies who want to develop new methods of production and ways of using materials. We should have more uniform guidance from the government regarding how land use should be prioritized, for example when placing solar panels in the landscape. So, in order to use land in a smarter way there should be guidelines for priorities of use in different land use situations: use natural soil only as a last resort.

Kristiina Lång adds an example on a successful communication strategy:

– In Finland, the authority implementing land consolidation started to inform landowners about the high greenhouse gas emissions of peat soils, in order to recommend the owner to restore such land parcels to mitigate the emissions. Taking action is optional, but a tool is now available to help the authorities to calculate effects of alternative soil management.

Our ministries should talk more to each other. Agricultural and forestry ministries are responsible for most of the regulation of land use.

Healing the ground

Finally, there is the cultivation of soil for the purpose of healing the ground:

– In the FIBSUN project we measure the ecosystem services soils perform. Soil remediation can be achieved by crop production as a way of taking pollutants out of the soil. Organisms learn how to take up pollutants, and how to degrade them. In extremely dry soils, in the Mediterranean for example, they can be too dry to use for cultivation – but if we get a draught-resistant crop to grow there the vegetation is able to restore the ability of the soil to retain moisture. For example, hemp is a versatile fiber plant with a high potential of remediating soil, and it does not require much water.

The more you study soil issues, it becomes clear that the situation is quite alarming. Do you think that we need to change the general narrative about soil and the use of the soil?

The base narrative in society is that the soil is there for us to utilize it. Then we become surprised, in the image of the tragedy of the commons, that soils are over-used. We should be much more considerate *before* we start any intensive use

activities. We have a pretty good knowledge about what destroys soil, and also how to avoid damage. Ecosystem services should have a prize, a monetary value, that society and consumers could pay more for sustainable options. Consumers should know more about the effect of soil use on the climate impact of products which is currently not fully included in life cycle analyses. This spring, we were close to a new EU law of land restoration that would have made a great difference. We might get that chance to vote for protection of ecosystems again. Either way, we need to keep faith in the democratic processes, and appreciate that EU is a strong driver in land-use questions.

The more you study soil issues, it becomes clear that the situation is quite alarming.

Photo: Ewa Malmsten Nordell

Thomas Hahn, Associate professor, principal researcher, PHD, Stockholm Resilience Centre, Stockholm University

Governed by money instead of economy

Thomas Hahn is an Associate Professor and principal researcher, leading a collaborative research program for climate action and transformation with civil society organizations (FAIRTRANS).

Hahn's work on ecosystem services has resulted in an overview of the different approaches that we humans have towards nature. The outset for his research is that most people are largely unaware of the great value of the contribution to health and wellbeing that nature provides. Planning for and with ecosystem services is smart from the point of view of national economy, but this strategy is not included in the calculations and budgets in local land use decisions and politics on a municipal level.

Nature as a reservoir of raw materials

Thomas Hahn summarizes the overview that was developed for the study IPBES – Intergovernmental Platform for Biodiversity and Ecosystem Services:

The first approach we can call Living from nature. From this perspective, we see nature as a reservoir of raw materials. It is not inherently wrong everyone lives off of nature, but it is an extremely dominant view in our Western culture. We also see ourselves as Living in nature here, nature is our living room where we feel at home, reinforcing our sense of belonging, which nature type we "come from" as individuals, something that gives us a sense of place and that we value for the recreational and social spaces that nature provides to those who visit, such as sailors, bathers, hikers, etc. We humans can also see ourselves as Living with nature, where we are a species

among many others in an intricate ecosystem of which we are a part. This is an ecological understanding that requires a bit more understanding and interpretation from our side. Nature works very well as long as we don't become too greedy, then the balance disappears. If we live with nature, we need to understand the connections between human activities and biodiversity; agriculture, forestry, fishing. An approach that takes this connection to another level can be expressed as Living as nature, where we have developed a deep relationship, a spiritual dimension in the relationship with nature.

The outset for his research is that most people are largely unaware of the great value of the contribution to health and wellbeing that nature provides. Planning for and with ecosystem services is smart from the point of view of national economy, but this strategy is not included in the calculations and budgets in local land use decisions and politics on a municipal level.

Biodiversity and ecosystem services in the green transition

Thomas Hahn has been working on land use issues in relation to the green transition for the past eight years. He has looked at ecosystem services and how to protect them, and calculated so-called biodiversity offsets, where lost values are replaced by a land-exploiting company, such as in the construction of a mine.

– It should be known that compensation and replacement are not entirely accurate terms. Every ecosystem that is destroyed is unique. The order still becomes that 1) the mine is prioritized, and 2) it is decided that lost values on-site should be compensated for, for example, by preserving a forest area as a land conservation area, at the expense of 3) the industry, such as the forestry industry, which loses what cannot now be harvested in the protected area. Every project corresponds to their having to be less in another project. Those most affected are usually indigenous peoples and low-income earners in rural areas – those affected by mines, construction of wind farms without compensation, or tax technical solutions as they have in Norway.

The UN has launched the concept of *No net loss of biodiversity and ecosystem services.* The world's ecosystem services are to be restored, but how will this be done? Thomas Hahn sees clearly on the matter:

There is no government that disagrees with this preservation, but in a society that is fully focused on growth more mines, more land exploitation the compensatory measure is shifted around the entire chain. For every zone that is to be preserved,

there is an actor whose room for maneuver is reduced, but the total burden continues to increase because it is assumed that exploitation and extraction should still be allowed to occur.

> **For every zone that is to be preserved, there is an actor whose room for maneuver is reduced, but the total burden continues to increase because it is assumed that exploitation and extraction should still be allowed to occur.**

Goal conflicts

To address goal conflicts and these layers of justice issues, are there solutions within our democratic processes or in increased knowledge?

– We have knowledge, but one must be interested in absorbing it. People want the municipalities to be able to govern more through the comprehensive plan, where certain areas should be marked as "occupied" by performing ecosystem services. If you seek help from experts such as limnologists who can show exactly which land areas are crucial for absorbing large amounts of water and preventing floods, then you can mark out that area in the comprehensive plan and let that ecosystem service serve as insurance for the future. Other experts can show where important pollination overwintering occurs, so that you do not accidentally remove bushes strategically located for the insects. Those who consider these protected areas to be a "green dead hand" for development have almost certainly not understood what development is. Then you have to plan for flooding and crop failure instead.

To implement global decisions on a national level

Do we have the right knowledge in the right places to be able to change society with just principles?

– In today's state of knowledge, we can demand that our politicians take expertise seriously and let it support decisions. The major decisions made in the UN and at the national level are ultimately to be implemented by the municipalities through their planning monopoly. But it is easy to forget the important knowledge when Google knocks on the door in Gävle and you are so flattered that the global tech company gets a great piece of agricultural land and almost free renewable energy, without requirements to even utilize waste heat. But in addition to being lured into short-term thinking, it may happen that one loses perspective in one's efforts. Perhaps one focuses all attention on a few beehives on a downtown rooftop, while allowing a huge logistics park to emerge on the outskirts of the city.

Thomas Hahn particularly warns that the short-term comes with great temptations.

– If it's not about a lack of knowledge, then we can still observe the difficulty of resisting the short-term decision, which on paper looks almost profitable. You sell something and get a pile of money to look at – a concrete cash flow, visible money. This particular asset traditionally provides power and weapons, on both an individual and a national level, and a reform space for politicians if they have visible money. But what does that money buy really? As an economist, you learn to think about opportunity cost. What have we lost in the long run when this short-term decision was irresistible? What benefit have we given up when we chose to do something else?

The ecosystem assessment and value

In a commission for the forestry industry, I talked about ecosystem assessment. The forest has a lot of values, on different levels. Each individual tree has its value, as timber and lumber. But it also has value as an uncut tree. If you remove the tree to realize its material value, you miss out on the tree's ecosystem value. In some cases, forests strategically located in relation to a locality, for example upstream from Karlstad, are far more valuable as flood protection than as timber. This is a major challenge, to resist the impulse to sell the timber and get money in hand when invaluable services stand there and are performed quietly, without anyone cashing in, but also not paying dearly for that silent service.

Is there a good way to show the land value perspective in your research, with demand for calculations where these values are apparent, making it possible to calculate a value without aiming to realize it?

– Yes, both economists and environmental economists have developed methods to visualize values like these. If you are interested in this, there are plenty of experts to mobilize; ecologists who measure water flow, landscape architects, biologists. The pressure is high on "visible money" – the municipality wants the investment, the union wants the jobs, the employer wants the profit. There are plenty of values in ecosystem services, but no one accounts for them, they are invisible money that is difficult to argue for as politicians. We still have a very immature political culture, which in turn is due to the fact that we do not have such a well-developed understanding of economics, and here is the most common fallacy: it is the money that governs, not the economy.

If you remove the tree to realize its material value, you miss out on the tree's ecosystem value.

Photo: Aarhus School of Architecture

Katrina Wiberg, Landscape architect, Associate Prof, Aarhus School of Architecture, Arkitektskolen Aarhus

Waterscapes of value

Katrina Wiberg is a landscape architect with focus on climate adaptation in relation to water. Wiberg works with waterscapes (precipitation, groundwater, sea level rise) with a departure in landscape-based readings and strategies for climate adaptation in urban landscapes, and her PhD project was about rainwater and multiple benefits via climate adaptation. Wiberg is one of the researchers behind the 2023 Venice Biennale exhibit *Coastal Imaginaries* in the Danish Pavilion, addressing global challenges in the form of how to plan and protect coasts from rising seas and storm surges. Wibergs work goes beyond the protection strategies, addressing accommodation, retreat, land-use, and other strategies to face future water situations.

We were building our problems faster than we could solve them.

The connection between the built environment and the landscape

Early in her architecture career, Wiberg realized that, as a practitioner, one is most often not allowed to go beyond the designated site. So, it wasn't a matter of not

considering water issues, but that it was not possible in the design process limited to the scale of the plot, to plan with a holistic approach to the landscape character was an accumulating challenge:

– Even if you adapted a place locally, something could change upstream, resulting in a flooding downstream. We were building our problems faster than we could solve them. This changed my focus. How can we show the connection between the built environment and the landscape? The fastest urban development globally is taking place in coastlands.

Katrina Wiberg observed that most coastal cities have been looking to protect themselves from storm surges, while failing to address sea level rises. In her work, visualization of landscape based- and future coastal conditions is an important aspect of addressing the actual situation. Together with colleagues at Danish Technical University DTU, Aarhus School of Architecture, and in collaboration with University of Copenhagen KU collaborated on the research project *Cities and the rising seas* – new solutions spaces, that was a part of the Venice Biennale exhibition. The publication *The Little Blue Atlas by AAA*, visualized conditions in the form of maps show the result of investigations on the future relation between sea, coastal city and inland in the context of sea-level rise.

Photo: Rasmus Hjortshøj

From the exhibition Coastal Imaginaries in The Danish Pavilion

– The notion of the coast as a "fixed line" may be misleading. It is a zone, and it has always been moving, but with climate change, change happens faster. We are looking at coastal cities of the future and what is happening at different sea level scenarios. Coastal cities might be aware of their relationship with water, but in Denmark, as in many other countries, public knowledge is not very high about how the watershed and inland water bodies influence the coastal areas and how cities are interdependent on the dynamics between backlands water and the sea. In the book, we explore how to visualize and map interdependencies between inland and coastal cities, coastal habitats, human and non-human, exemplified via Natura2000 protected areas.

The need to increase knowledge of coastal cities

There is a lot of work to be done in increasing the knowledge base about the intermediary phases of the landscapes and cities in relation to the uncertainty provided by sea level rise and changing waterscapes, and plenty more to do as actual adaptation, Wiberg points out:

– From a national, to regional, to municipal to city scale and down to the individual level, we are transforming everything around us, now change from natural forces is increasing speed. We have added so much to the land – buildings, car parking, infrastructure. A lot is being built in harbor sites of Danish coastal cities, but what do we build on this edge to the future? We have studied 54 cases around Denmark, and the tendency is that buildings are constructed in flood risk zones, also since the EU Flood Risk Directive was enforced in 2011 and the first municipal climate adaptation plans of 2013.

– We found that in 37 of 54 cases, there are new buildings or plans for urban development in the form of residential housing and public buildings in flood risk zones of coastal cities. Some of our cases are very small towns of about 6 000 inhabitants, but they seem to be built in the image of Copenhagen or Aarhus or other large cities. However, the capacities to handle the risks are much smaller than in the bigger cities.

Throughout the case study, Wiberg and the research team have observed that most communities would benefit from developing in a more contextualized way.

– A number of adaptation projects are initiated, in the form of retrofitting of existing urban and suburban contexts, however, most strategies focus on protection using sea walls and so forth. Still, in many of the cities that we studied, there are possibilities of using nature-based solutions as buffers for water and implementing blue-green structures accommodating ecosystems and also providing recreational and multifunctional use. I see the possibilities for integrating contextualized landscape readings as the base for climate adaptation as a low hanging fruit, with the potential of adding spatial qualities while adapting to the new reality, in the context of everyday life. The objective is to see water and adaptation as an opportunity to create multiple benefits in urban landscapes, attending to both human and non-human species.

The objective is to see water and adaptation as an opportunity to create multiple benefits in urban landscapes, attending to both human and non-human species.

Photo: Rasmus Hjortshøj

From the exhibition Coastal Imaginaries in The Danish Pavilion

A need for more collaboration across the Nordic countries

Katrina Wiberg would like to see more collaboration across the Nordic countries, in and out of the academic context, and to learn more about various local traditions of living with water.

– We have an exchange with the landscape architecture education based in Tromsø, and some collaboration with the AHO in Oslo. In Sweden, we have some contact for research purposes. We should develop more research connections in the Nordic countries. Many institutions or research projects are too small for EU funding, so a Nordic collaboration would be a way to size up in relation to available funding on EU level. As water and climate change adaptation involves many interests and fields of knowledge, we should focus on interdisciplinary and trans-sectorial collaboration.

According to Katrina Wiberg, a primary research task is to identify and suggest solutions to conflicts of interests in land use.

Land use and land ownership sometimes stand in conflict with water situations. It is complex, but possible, to assess how changes in land use and changing waterscapes

can co-develop over time. In our research, we show that different land areas should have different functions in order to handle the dynamics of water better, but of course there are a lot of interests for every piece of land. We need to understand the difference between a shortsighted scenario, like building on harbor fronts to attract new residents, and a more resilient way of preventing future risks and thus, costs, like adapting our land use and structures to the prospect of rising sea levels.

Waterscapes as a driver of new practices

A change of attitude in our lives and new practices will be required, as e.g. we cannot expect the same crop yield on the exact same land in the future. This calls for new crops and practices in agriculture too. In terms of building at the harbor front, and costs, interestingly, insurance companies are front runners too in these questions, being among the first to analyze land use from the perspective of ownership.

According to Katrina Wiberg, the climate seems to be changing with a pace that calls for progress on climate adaptation. This progress may be encouraged by an awareness of what qualities can be added to our everyday lives.

– Our state funded opportunities add some progress, yet it is slow because the changes are often voluntary. Climate change is a matter of uncertainty, to which we have to respond through action. My point of departure is landscape architecture, and the aim is to develop an awareness of waterscapes as a driver of new practices, multiple benefits, hybrid land-uses, to us and other species, in urban landscapes.

Legislation and policies for sustainable architecture

Legislation as a tool to transform the construction sector in a sustainable direction

Photo: Frederik Ohlander

Sustainable development for future generations should be the very fundament of any law. If we find that the national law in its core does not support sustainable development, it will mean that we would have to rewrite the legal code. Our task today is to methodologically and philosophically reconstruct a logic or an ideology for why we build and if we have to build and with what methods, based on a fundamental understanding of sustainability and sustainable practices" - Kai Reaver, Head of Architecture & Chief Advisor Norwegian Architecture Association NAL.

The built environment is the result of a complex network of policies and legislations. The reason for each of these is to protect people, by providing rules for fire safety, structural integrity, and for use of safe materials. The rules are also there for our comfort and life-quality, such as energy performance, acoustic properties, and accessibility. But in a changed climatic context, there is a need to be as attentive to safety and comfort on a planetary level, as we have been in protecting the individual by laws and regulations.

The following interviews bring together the voices of researchers, policymakers, and contributors from non-governmental organizations, universities, architectural practices and EU advisors. Their knowledge is bringing together pieces of the puzzle of how to move forward in sustainability in construction and identifying the main obstacles for replacing unsustainable with sustainable practices in construction and architecture. They also point to the areas of the puzzle where pieces of legislation are missing, or where different policies or rules stand in the way of each other.

Policy work is in progress across the entire field of planning and construction, where research has provided knowledge, but there are still patches to cover, such as regulation that promotes efficient systems for reused materials. The sense of urgency is strongly conveyed by all the experts interviewed. Acting on the knowledge we have today is as imperative as the willingness to adapt to new data, and to do it without delay. The planet boundaries are set. It is people who have to make the move.

Photo: National Association of Norwegian Architects NAL

Kai Reaver, Head of Architecture & Chief Advisor Norwegian Architecture Association NAL

Building responsibly begins with asking 'Why build?'

Why do we build?

Kai Reaver is an architect, working for the Norwegian Architects Association (NAL) where his time is roughly divided into policy work and affiliated research, lecturing and teaching, organizational democracy, and national architecture competitions. Reaver is also a guest professor in Switzerland and Geneva and runs a small-scale architecture studio. With this wide role in the field, Reaver has identified a peculiar condition in architectural practice.

– Architects are currently balancing two tasks in their sustainable practice. On one hand, they deal with a very technical legislative component, and on the other hand they are implementing this in a design that is in the light of a public debate on style. Architects operate at a crossing of a society in which democratic participation is a part of the process of building and planning, and the technical requirements of EU-defined energy efficiency all other regulations applied to building systems.

At this crossroads, Kai Reaver has direct experience of the bureaucratic and technocratic side of the table, where the systematic approach is very time-consuming. From this side, it might be challenging to reverse all the way to the purpose of the legislation behind our plans and buildings.

I think that the first structural move is to really consider why we build. This includes the question of whether we have to build anything at all. Failing to ask this basic

question is probably the main obstacle to understanding the structure of legal matters; at the level of the first intuitive thought of building. That gut feeling saying that "we need to build" comes with an economy that tells us to get rid of what is there so that we can build new. It is almost a philosophical task to challenge the current go-to solution, where we "build our way out of each problem".

I think that the first structural move is to really consider why we build. This includes the question of whether we have to build anything at all.

The fundament of all laws

Facing this fundamental change of architectural practice and thinking, Reaver has gone all the way back in his argumentation and looked at the first paragraph of the planning and building law in Norway.

– Sustainable development for future generations should be the very fundament of any law. If we find that the national law in its core does not support sustainable development, it will mean that we would have to rewrite the legal code. Our task today is to methodologically and philosophically reconstruct a logic or an ideology for why we build and if we have to build and with what methods, based on a fundamental understanding of sustainability and sustainable practices.

Following this, every country should ask themselves this question, according to Reaver:

– Do we have the right foundation, or do we have to change it, and what incremental changes would be needed in the procedure?

Reaver reminds us that all kinds of detailed discussions will have to take place in every related field of building and planning, still from within the mindset of looking at existing conditions and assets, supported by a legally binding framework and sharing the same goal.

Democratic processes are at the core of this, since real solutions to sustainability are within this collective intelligence of the population. And even with respect to legal procedures, time is of the essence, Reaver reminds us:

– If we're going to be able to make the decisions as quickly as we need to do when the climate crisis hits us, we actually will not have enough bureaucrats and technocrats to do it. We have to rely on the citizenry to do it themselves through crowdsourcing, through local initiatives, through local disaster management. The people on the ground are actually the datapoints.

”

Sustainable development for future generations should be the very fundament of any law.

Activate the tools for participation

Reaver emphasizes that we need to activate the tools of participation and democracy and at the same time, we have to work on the legal structure. The way we often involve citizens and stakeholders is through hearings, Reaver points out, but there is a great difference between participation and “box-ticking for decisionmakers”. The latter is not good for the stakeholders, and it is not good for making informed decisions.

– We need the citizens to feel ownership over these processes so that they are able to do it themselves, but to keep democracy as the main function of a society that will have to go through fundamental changes. Formerly in Norway and many other countries, nearly all plans were initiated by the public sector and now it is the other way around; 90 percent of all plans are brought forward by private interests. This is an example of how we have lost contact with the citizenry and pushed these decisions over to the electoral process. Now we have a populist debate-climate where voters may think that their only influence on city decisions is to choose sides in this rhetorical political game. Still, the voters do have access to a direct participatory process within the planning process. As architects and planners, we have to get out of our offices and integrate ourselves with the communities that are going through changes, to engage in qualitative research with local citizens to understand their needs and to also understand what they know about their neighborhoods.

Reaver reminds us that citizen decision-making processes bridge the silo thinking. He uses the contemporary building process as a metaphor of how an actual building has become a compound of separate responsibilities; the façade is the concern of someone different than the fundament, and so on, where liabilities are on different dotted lines on the contract. All these contractual limitations are there because nobody wants to accept any risk outside of their own domain. These legal boundaries are going to disappear, and in turn we have to bridge these problems related to sovereignty and physicality, same as in national boundaries – climate change happens across any border, creating continuous grey zones of legality and responsibility.

> As architects and planners, we have to get out of our offices and integrate ourselves with the communities that are going through changes

A societal contract

Kai Reaver has thought a lot about how responsibility would be distributed between individual and society in a new legislative model.

– We have to somehow accept some sort of methodology or an understanding of the risk we are taking as professionals. We may not have all the information to mitigate all risks, but it is in our contract with society to act within the amount of information we do have. As an architect I try to make the best possible decision on my side, while trusting you to use your best judgment. This form of trust needs to be integrated within a legal framework.

Reaver's observation is that a lot of legislation today allocates the responsibility to the individual.

– Professional code of ethics or responsibility can function as a way in which to generate trust, but also to create a methodological platform of collaboration across disciplines where all of us are trying the best we can to solve the problem. We also have to accept each other's risk, and we have to be able to function within a general framework of collaboration. In this model, professional organizations like NAL will have to step up our game and talk about ethics and responsibility. But we have to accept that there will be much more risk involved with construction in the era of climate change. We have to find a way to keep professionals willing to practice within that increased risk, without fear of losing their license or their job. At the same time, we have to cultivate a high standard of professionalism that stops bad actors from exploiting that trust.

There is a silent knowledge in architecture that Reaver explains as the result of various components of phenomenological data, combined and re-combined in something that can best be described as intuitive methods. Maybe the time we live in will give us the chance to articulate this knowledge and exchange knowledge across disciplines, in a new moral landscape.

> As an architect I try to make the best possible decision on my side, while trusting you to use your best judgment.

Photo: Jukka Eratuli

Matti Kuittinen, Associate Professor, Department of Architecture, Aalto University

Ending business as usual in architecture

No more business as usual

Matti Kuittinen is an architect, researcher and educator, who has worked at the Finnish Ministry of the Environment for seven years, developing the regulation related to climate policies and construction, the climate declarations, circular economy and public procurement. Kuittinen is mostly working with environmental and ecological sustainability and resource consumption. The main obstacle to replacing unsustainable with sustainable practices in construction and architecture is in Kuittinens view not of legal or technical character.

– We have increasing needs for repair of existing buildings and infrastructure, but our material efficiency hasn't really improved in building construction over the past 100 years. To meet the housing needs of an increasing global population, we would need to build 2 billion new apartments by the end this century, while reducing construction emissions by 90 percent. Of course there are forward-thinking companies who are doing great work, but still the majority of the building sector hangs on to the idea of business as usual, leaving it to legislation to provide very stringent minimum requirements.

The majority of the building sector hangs on to the idea of business as usual, leaving it to legislation to provide very stringent minimum requirements.

A strong but slow tool

Kuittinen admits that there is a very important legislative development, especially in the EU, where the revision of the Energy Performance of Buildings Directive and the Construction Products Regulation have the potential to meet our goals. Still, we need to trust our systems' ability to change in order to keep up with the Paris agreement.

– Legislature is a strong but slow tool. The question is if legislation will be fast enough in a situation where many nations around the globe do not have any construction regulations at all. At the ministry we have initiated funding and support programs for companies who want to improve the sustainability performance of their solutions and products. This was before the depression in the construction sector that is hitting us very hard now, so it was actually sometimes difficult to get companies to apply for that sort of development funding. Now we have witnessed the most critical bankruptcy wave in construction companies since the late 1990s.

In relation to the ongoing depression, Kuittinen refers to a study conducted at Aalto University, looking at a carbon neutral scenario in 2050, where the researchers identified a few sectors that would be increasing in profitability.[10]

– According to this study, the most financially productive sector in 2050 would be the service sector, followed by the construction sector. But we need to make that transition. It's not going to happen just by waiting.

Legislate for transformation

Matti Kuittinen has recently published a policy brief on sustainability and construction, advocating for legislation in circular economy, so as not to lose momentum in development. Kuittinens proposal is to take a pause a time out from constructing *new* buildings in countries where the populations are constant and there is no need to build. In the EU, 74 percent of all construction materials are concrete, and we can't consume them in a similar manner. And in the EU, 16 percent of existing buildings are unused or underused, so reuse and repurposing would be

10. Sitra studies 185: Growth-positive zero-emission pathways to 2050

the first choice. The next best option would be to repair and refurbish buildings, and the third best option would be to use the foundations or frames of buildings as scaffolds, and the least preferred option would then be to build new ones.

Kuittinen establishes that in some cases new buildings would be justified, but they have to offer a very high added societal value. There is of course the challenge to match existing buildings with users, in the right places, as Kuittinen says:

-I have suggested that policies or support mechanisms should be introduced on EU level, to help match existing spaces with users. I have also suggested that this matchmaking service should be installed on a regional, national and municipal level to facilitate better use of resources in the existing infrastructure. Just imagine if the EU was a company – how could it afford to keep 16 percent of its premises empty? No company would allow that inefficiency. Kuittinen sees solutions not just in existing structures but also in building components.

- I am hopeful about legal development in the new regulation of construction products, where one of the key bottlenecks – such as the CE marking – will be eliminated finally.

The missing link in the value chain

Combined with a smart and new forward-thinking design, it could be more attractive and cost efficient to use materials that also have some nice patina in them, maybe even more attractive than the new. I'm imagining that an old building product could actually be more expensive than a new one. When all the quality and safety requirements are regulated, there will be a shift in how we appreciate and value materials. Soon we will see the end of the missing value chain and create the logistical chains needed for reuse of building material.

Kuittinen sees the change of mindset primarily in his architecture students' work in Sustainable Construction, where a majority of the students are focusing entirely on reuse of buildings.

– It is like "flying shame" of private air travelling – a similar "construction shame" is emerging among the young architects. I have also observed what could be called "aesthetical disillusionment", where a glazed shiny steel-frame skyscraper no longer stands as a symbol for progress and wealth, but as a monument over fossil-linear economy.

If we could apply a historical perspective, we might understand the acute situation that has literally been building up in our industry, says Kuittinen:

After the Second World War, most European countries had a shortage of many commodities. Back then, we had to be really careful in the use and re-use of resources and adapt to scarcity measures. Actually, we are living in a similar sort of shortage, not because of a war in most countries, but because we are taking the

resources from future generations.

Kuittinen goes even further back in history in search for the most efficient way to change society:

– What we need now is a new enlightenment, similar to the European enlightenment in the late 18th Century, when strong shifting values spread in society. This is wishful thinking, but at times, I think I can see it happening in the actions and thinking of a younger generation.

A glazed shiny steel-frame skyscraper no longer stands as a symbol for progress and wealth, but as a monument over fossil-linear economy.

Harpa Birgisdottir, Professor, BUILD, Aalborg University

Bridging the gap between research and practice

Bringing research into practice

Harpa Birgisdottir is Professor at The Faculty of Engineering and Science at Aalborg University, housing BUILD, or the Department of the Built Environment, and the researcher behind the implementation of LCA (Life-cycle assessment). Birgisdottir's team has created the LCAbyg tool that is used in the Danish construction industry today for calculation of the environmental impact of building materials throughout the entire lifespan of a construction project. Birgisdottir's work involves the evaluation of a handful of certification schemes, resulting in the decision to use the DGNB system to Danish conditions. The DGNB Certification System (Deutsche Gesellschaft für Nachhaltiges Bauen) covers the key aspects of sustainable building: environmental, economic, sociocultural and functional aspects, technology, processes and site.

In her research group for building sustainability, the focus is on sustainability assessment of buildings, including certification and voluntary sustainability classes. Bringing research into practice is a key focus for Harpa Birgisdottir.

– The academic world has its own measures for success, but today we need to bring the knowledge into the built environment, and we need to do this as quickly as possible. We aim to support the building sector's environmental sustainability and capability of contributing to a circular economy. Through research and international collaboration, we develop tools and knowledge for the construction industry. Construction accounts for 30 percent of Denmark's total climate impact.

A tool box for the building sector

Birgisdottir's work can be distinguished as two lines of strategy. Firstly, the need for regulations and legislation, and secondly, in response to this, develop efficient tools for the building sector to use – tools that are continuously aligning with the regulations.

The response from the building sector is unevenly distributed, even if many actors claim to want to do the right thing, they do not act forwardly.

– We need a broad response from the building sector, and we are very happy to have some really innovative actors, but right now we need to convince and educate the larger part of the building sector. And when it comes to the scale of the projects – big developments matter, of course, but the smaller projects have a big impact on the statistics because they constitute the great majority.

An important field of knowledge is how to handle buildings that are maybe 50-60 years old, which unfortunately face demolition. Today, the general opinion is that they are difficult to renovate, so we need to respond by providing knowledge both of the cost of demolition and how to use the existing structures. If all the buildings were listed, and maybe calculated for their value by material, social, cultural use, then a demolition permit would not be as easy to obtain as it is today.

> **Right now we need to convince and educate the larger part of the building sector.**

Absolute and relative sustainability

Harpa Birgisdottir makes a clear distinction between absolute and relative sustainability. With relative sustainability we try to improve our situation compared to business as usual, with the aim of reducing our impacts by 10, 20 or 30% related to current practice. Absolute sustainability is based on planetary boundaries and e.g. absolute carbon budgets in relation to the Paris agreement. Here there is a need for numbers and quotas of emissions, resource consumption as a budget basically, where we can work towards climate goals, and look at where numbers should be improved. Our current legislative practice is normally based on relative sustainability but needs to also be compared to – or based on – absolute sustainability as an overarching goal or benchmark

Birgisdottir confirms that legislation plays a big role, but that there is also a need for incentives for faster results.

– Denmark should aim at fulfilling the climate goals that we have agreed on by signing the Paris Agreement. But since our emissions shoot far above the goal, our sector may need the politicians to decide on a limit-value setting us back on track towards the Paris Agreement.

We need to get back on track with Paris agreement as soon as possible – and, ideally, today. We can start the process with small steps already today. But if we wait too long – then we need to take one enormous step in 10 years – and at that point it is perhaps too late.

Birgisdottir's work on the climate impact of buildings from the construction phase and along its entire lifespan, including production of elements, transport, and building methods.

– By reducing CO_2 emissions in the construction phase, we get an immediate effect.

Looking at the lifecycle of a building, 70 percent of emissions is a result of the choice of materials that we make today – if we change that, we have an immediate effect.

Looking ahead, Birgisdottir sees the need to keep the focus on climate requirements in construction, and to follow through on the head start where Denmark has been among the first countries to set climate requirements for new construction. But there is a great need to take care of the existing built environment, why a lot of research focus on setting requirements for existing buildings.

> **By reducing CO_2 emissions in the construction phase, we get an immediate effect.**

The need for municipal guidelines

As a researcher, Harpa Birgisdottir is hoping to see the result of her work being incorporated in the decision-making processes.

We have data showing that we can more than halve the climate impact in construction. We also have the methods, but it is unknown to most decision-makers. At a municipal level, you have to be aware of the consequences of plans. I don't work directly with physical planning, but I have knowledge about the consequences of development of larger areas and new buildings. Municipalities need roadmaps and guidelines on what they can do to achieve the goals, both in construction and in infrastructure. The Danish Road Directorate has developed a tool for life cycle

assessment of infrastructure (InfraLCA), but it is not concrete enough for municipalities to use. With pilot projects, we make this tool more operational so that it fits different types of municipalities. Municipalities need to know what the climate effect is when deciding on new construction, compared to the effects of reuse or renovation.

A concrete advice from Harpa Birgisdottir is to place knowledge in-house in the municipalities, since they have to deal with climate requirements in building permit processing, and of all the construction or demolition that takes place locally.

– Some municipalities have a high involvement and knowledge, others don't. There has not been enough focus on developing tools, guidelines, and roadmaps for municipalities. It is a question of who makes the choices and takes responsibility for this CO_2 burden.

Halving the climate effect

The first thing to do would be to look at the municipalities' own buildings, where they can set ambitious requirements for their own projects. When knowledge is increased at municipality level, the methods and results would be shared across municipalities, then nobody would have to reinvent the wheel. In the municipal processes of planning, tools and guides like the Reduction Roadmap and the Housing from 4 to 1 planet project, can facilitate setting ambitious requirements for what is to be built. So far, we have mostly worked with tools that focus on individual buildings, but we can also assist municipalities when they are working on new areas. There is plenty of data on new construction, existing buildings, and infrastructure that can be used for calculations for urban development areas or an entire municipality.

The need to act on this knowledge now is what matters, according to Birgisdottir:

– We have spent the last ten years completing the research, and in the next three years, we need to show real effect in good examples where climate effect has been at least halved. We need a much more ambitious reduction in climate impact than is currently being worked on, in order to comply with the Paris Agreement. All legislative levels need to be aligned so that we can close the performance gap.

We have data showing that we can more than halve the climate impact in construction.

Photo: Vandkunsten

Nel Schipull, Architect MAA, DGNB-Auditor, Ph.D., partner at Vandkunsten Architects

A legislative button to drive change in construction

Change starts with a number

Nel Schipull is an architect PhD, specializing in life cycle analysis and sustainable construction. Schipull was involved in advising the Danish building regulation process, particularly regarding the establishment of limit values as detailed in The Danish National Strategy for Sustainable construction. I The process, which involved a number of experts and stakeholders around the construction sector proved to be a challenging negotiation where the need to calibrate considerations to keep within planetary boundaries with financial and market interests. Amidst these deliberations, Lene Espensen, former Danish Member of Parliament for the conservative party and director of The Danish Association of Architectural Firms, emphasized that even modest progress can lay the basis for significant advancement.

Despite initial disagreement, the discussions culminated in agreement on a CO_2 emission limit of 12 kilograms per square meter per year – a compromise that left no one entirely satisfied. Schipull initially felt disheartened by settling on a target which was so far from contributing to the Paris agreement. However, Espensen reassured him, highlighting that consensus on the number itself represented a considerable achievement in its function as a tool for revising and reducing these limits every two years further underscored the progress made.

This is what you say about hard negotiations; a good result is something that

nobody is entirely happy about. But only if there is a number, you can change it, and that is actually what is happening now.

Schipull points out that the limit value represents a minimum requirement for emissions from construction. Nobody stops an architect who wants to exceed this ambition. The limit values can become the foundation of a whole new platform for competition and innovation for all actors in the sector.

– If you have produced the same product for 80 years and you think you can continue for another 80 years, then you are heading for extinction.

The shock of the expected

The capacity to change is paramount in our time. It is not as if we did not know what was coming, as Schipull recalls:

– We had teachers in school who told us about the immanent climate crisis. And there are books from the 1880s that describe what happens when you burn coal. Over the past 20 years the majority of people acknowledge that climate change is human-made. We have the annual report issued by IPCC (The Intergovernmental Panel on Climate Change) since 1990. And yet, we refuse to change. Even in this prospect of a violently changing world, we find ourselves agreeing more on our existing economical system than we agree on anything else – even saving the planet. We could have acted differently, but we live the consequences of a philosophy and an economic system that once decided that the Earth provides resources that they are free to get: externalities. Nel Schipull mentions another system thinking that has locked in a resource use way above planet boundaries.

– Housing building standards in Denmark today stipulate that soundproof elevators are needed in all new homes, as well as huge bathrooms, and a thermal quality standard that causes energy consumption for cooling in the summer. Still the old blocks in Copenhagen are the most attractive houses and they do not have anything of these technical fixes. Why is that? You put a sweater on in the winter and you open the old windows to the street in the summer. How do you put that intuitive individual act into an energy calculation?

Schipull takes an example from his PhD research to problematize the way that building regulations affect the built result in housing.

There is so much unnecessary stuff that weighs down the CO_2 budget in housing today, and we do not even get a better house. In my PhD I compared social housing from the 1960s with the equivalent housing built in the 2010s, where energy regulations have pushed us towards bigger apartments. A 65 square meter apartment in 1960 gave a net floor area of 55 square metres, and in 2010 the net floor area is 42, that is 13 square meters of usable floor space gone due to regulations. This is worth looking at, this was relevant in 2010s but should we

continue this excessive use of materials and resources and money. I think there is a misconception here.

> **Even in this prospect of a violently changing world, we find ourselves agreeing more on our existing economical system than we agree on anything else – even saving the planet.**

Pushing Responsibility Around

In the construction world, everyone is trying to move responsibility to the next party, because responsibility is also risk and risk can cost a lot of money, insurances and lawyers. When everybody is acting on their own interests, of course we cannot align in absolute sustainability or whatever term you could agree on. Trust is needed if we are to develop an intuitive alignment towards true sustainability. Expanding from this example of the conflicts within the same building, on the legislative level, there are regulations that are standing in the way of each other. One regulation might rule out five other regulations and things get complicated, if not impossible, very soon in the process.

The core question is – are we honestly prepared to let go of the idea of permanence of our systems, and meet the future with new perspectives?

– The thought that everything should remain as it is, is a very awkward idea. Yesterday is interesting, but it's not relevant. The future is relevant. I experience in my daily work that we actually need to work differently. We need to use different tools. We need to have different contracts. And there is not going to be one way to achieve something – we may have solutions today that will be obliterated tomorrow, and what is smart in one place is bad in another. There are many solutions we need to consider. What would be really stupid is standing still and trying to keep everything as it has been.

> **Yesterday is interesting, but it's not relevant. The future is relevant.**

Dani Hill-Hansen, Reduction Roadmap, Sustainable Design Engineer and Architect at EFFEKT, project manager and team member of the Reduction Roadmap initiative

Mobilizing the industry to push for climate-aligned building laws

Aligning policy with climate science

Dani Hill-Hansen is an Architect and Sustainable Design Engineer at EFFEKT architects. Dani has been part of the process of conceiving the Reduction Roadmap, which is an initiative to close the gap between Danish building legislation and climate science.[11] The Reduction Roadmap is a collaborative effort, Initiated by EFFEKT, CEBRA and Artelia that aims to ensure that the entire Danish building industry operates within Paris Agreement emissions levels. As a sustainable design engineer, Hill-Hansen has been investigating sustainable development for fifteen years, starting when the discourse focused on cradle-to-cradle, material innovation and indoor air quality. Since then, the definition and understanding of sustainability has changed, moving from relative to absolute approaches. As Hill-Hansen puts it:

Today it's quite clear that the primary planetary boundaries we need to work within are climate change, to create climate stability and biodiversity, and to foster healthy ecosystems. Within the industry they were quite good at measuring climate change impact and had design tools and policies in place to limit impact. Where we

11. The Reduction Roadmap addresses the need for new constructions to emit less than 5.8 kg CO_2-eq./m²/year by 2025 to align with the Paris Agreement, contrasting starkly with the current political requirement of 12 kg CO_2-eq./m²/year. https://reductionroadmap.dk/reduction-roadmap

need a lot more knowledge, frameworks, and legislation are biodiversity. We know the building industry is accelerating the biodiversity crisis, but we don't yet have the right knowledge foundation or legislation in place to mitigate further destruction.

While the Reduction Roadmap is currently directed towards the immediate legislation process, Dani Hill-Hansen has an answer to what a dream of long-term development would look like.

– My two dream scenarios look like this: Firstly, we align our policy with climate science. We have the data, and we have the building knowledge. It is possible, but we need the political will to implement common-sense policy. Secondly, we must set limits to growth. We live on a finite planet, and we have a global economic system that is dependent on unsustainable growth. This is the root cause of all our issues. To degrow the economy and set limits to growth in our industry, means setting sufficiency-based limits to how many and what types of buildings we construct in the future.

We know the building industry is accelerating the biodiversity crisis, but we don't yet have the right knowledge foundation or legislation in place to mitigate further destruction.

Finding the safe operating space

Acting here and now, Dani Hill-Hansen presents the process that Reduction Roadmap is involved in negotiations for the Danish building legislation for 2025, where the carbon emission limit value will be set for the following two years.

– We were surprised that there was no target for a safe operating space for the construction industry, it had not been defined even on a national level, so we reached out to researchers at Aalborg University, Aarhus University, Danish Technical University and Southern Denmark University to help us find out.

Dani Hill-Hansen explains that the project's goal is to provide the right knowledge, and hopefully through mobilization around this knowledge, align the building legislation with climate science and the Paris Agreement. Time is running short, but there is a hope that the current limit of 12 kg CO_2/m^2/year will be reduced to much lower than the 10.5 CO_2/m^2/year that was initially planned. The Reduction Roadmap data indicates a limit of maximum 5.8 CO_2/m^2/year in 2025.

– The Reduction Roadmap reduction targets is aligned with climate science data from the IPCC AR6 report, Denmark's commitment to the Paris Agreements 1.5°C warming degree scenario and the Danish building legislations standardized LCA and carbon limit policy. Aligning with these pre-existing legislative conditions creates a reduction target that all industry professionals can relate to, and in some ways, our government has already committed to following. The Reduction Roadmap targets are based on findings documented in The Safe operating space for greenhouse gas emissions by Petersen, S. et al., (2022) which documents that globally we must reduce our emissions by 96% to reach the safe operating space, defined by the Planetary Boundaries. Today, this 96% reduction equates to going from the average of 9.5 CO_2/m^2/year down to 0.3 CO_2/m^2/year. When the project was released in September 2022, we had 7–10 years to reach target levels, but in June 2023 the remaining carbon budget was updated. Consequently, we have 3–7 years to reach the target levels now. We realize that rather than having a reduction staircase, we have a reduction ladder and soon, unless we radically reduce emissions, there will be no carbon budget left.

> **the project's goal is to provide the right knowledge, and hopefully through mobilization around this knowledge, align the building legislation with climate science and the Paris Agreement.**

Creating a competitive field

There are few institutions in the building value chain that do not want to commit to the Paris Agreement, but Dani Hill-Hansen argues that we simply are not acting fast enough.

– In general, there is a tendency to make decisions to protect ourselves here and now, without considering the long-term implications of continuing with business-as-usual. And this is true on every level of decision making from contracts to investments to policy.

Our goal with the Roadmap has always been to create action and to mobilize the industry around knowledge. We know people cannot act or react to things they don't understand or don't have knowledge about. We see the roadmap as something that inspires action and gives people something tangible to relate to. And we find that there is a will to follow the roadmap targets, but no one can do it alone. We need bold leaders, both clients and politicians. If the Roadmap data is

implemented in the building legislation, we would have a competitive playing field and many of the fears around innovation and cost will be mitigated.

> **there is a tendency to make decisions to protect ourselves here and now, without considering the long-term implications of continuing with business-as-usual.**

Starting a movement

Dani Hill-Hansen emphasizes that participation is the key, and that there are important first movers in the building sector, who in turn attract others to join. A big part of the project was about communication and figuring out what are the right stories to tell to make the roadmap interesting for different acting groups.

– We tried to give the politicians a solution, not a problem, by presenting how much the building sector can reduce carbon emissions, in carefully researched data. We also help other people create change in their own networks. We presented the roadmap to a major engineering company, and then they in turn collected one hundred signatures of their colleagues to bring to their upper management. Eventually, the company was compelled by employees to sign the initiative. So many people have helped us along the way towards a successful mobilization, but also to point us in the right direction in terms of strategy and what people we needed to talk to.

As the industry continues to sign-up and mobilize, what is the response from the politicians?

– We find that politicians were willing to talk to us from almost all political parties. Most politicians don't see the building industry as a core part of what they do or are responsible for. When we met with them and could explain the big impact our industry has today, and how much we can contribute to national reduction targets, they were generally more interested. Through communication, we made the issue more accessible for them and presented them with an industry asking for stricter regulation.

> We tried to give the politicians a solution, not a problem,

We can do it

As the Reduction Roadmap is presented, with the backing of over 580 organizations saying, "we can do it", there are almost no other avenues to convince the politicians, but Dani Hill-Hansen still has work to do.

– We have a dialogue with the Housing Ministry who are concerned with consequences for the market – will its slow construction activity if we have set the limit carbon emissions too low? Are the material producers ready? Can we make the transition already by 2025?

Despite solid support and good communication with the politicians, Dani Hill-Hansen is not optimistic.

– I am quite pessimistic today about the prospect of having legislation aligned with climate science in 2025. I think we're going to overshoot our carbon budget and that we will be stuck in building legislation that is not going to enforce any change in how we build. The next chance to do it right will be in 2027, but that means another three years of a politically sanctioned overshoot. If, on the other hand, Denmark would show the world a building legislation aligned with climate science and aligned with the Paris Agreement – this would set a historically important precedent for other countries to do the same thing and for other parts of legislation to align with climate science. Anything other than listening to an entire industry who is asking for stricter regulations, is a missed opportunity for Denmark to lead the way.

> **I think we're going to overshoot our carbon budget and that we will be stuck in building legislation that is not going to enforce any change in how we build. The next chance to do it right will be in 2027, but that means another three years of a politically sanctioned overshoot.**

Ruth Schagemann, President of the Architects' Council of Europe (ACE)

The Evolution of Sustainable Building Practices Across Europe

Forming a narrative

Ruth Schagemann recalls that when starting her own architectural practice fifteen years ago, high level architecture was never about working within the existing building stock, it was always to build new, monumental landmarks. During this period, following the discussion in architectural practice, it is now a part of a legislative and political level in the European discussion.

– We really see this paradigm shift, where we transform our building stock in a high-quality way, and architecture is recognized for having an input.

Since her presidency of the European Architecture Association, Schagemann has noticed that this transformation happens all over Europe, starting like "islands of knowledge".

– These small islands of concepts are growing bigger and suddenly they are joining up to form a narrative that makes sense to everyone and finds its way into politics and public policies.

She identifies that we are now in the midst of this process, where best practice examples are shared. The Energy Performance of Building Directive (EPPD) of the Construction product regulation is a part of the European legislation which have been adapted to these changes as a way to get all the countries under one hat and indicate a positive change in legislation, and from this the next big step would be a transposition of this legislation on a national level.

Changing attitudes

With the EU elections coming up in 2024, from the citizen perspective, we expect to see changes of attitude. Schagemann is relieved to find that in the field of architecture, the most important pieces of legislation have been nearly adopted before the elections, as a result of a year of intensive negotiations and regular procedure on the Energy Performance Building Directive and on product regulation, which resulted in an approval at the end of 2023, and an expectation of a formal decision before the 2024 elections. To have a legal framework on EU level is crucial for the future development of the national regulation of the building sector.

– Having a law in place is like having a "button to press". It becomes the start button to start figuring out how to build instead of starting with the discussions of why limiting the amount of CO_2 emissions per square meter and to what number the emissions should be set.

There is however a concern on whether the high profile of sustainability that the mark of Von der Leyens office has been, will continue after the election. As President of the European Architecture Association, Ruth Schagemann believes climate change is not going to regarded as important as it has been in the previous five years, but hopes that Europeans will cast a conscious vote, in order to maintain the European values and the democratic approach. All votes count.

> **We really see this paradigm shift, where we transform our building stock in a high-quality way, and architecture is recognized for having an input.**

Identifying the costs

A sociopolitical challenge shared by nearly all European countries is the need for affordable housing, and this has to be achieved well within the CO_2 limits. Schagemann responds by expanding the concern a bit:

In our discussions we see two big dilemmas. The first is sustainability and affordability in housing, which has to be explored in detail to identify the costs that stand in the way of sustainable choices. Our job is basically to understand how much regulation we need and where. We look at regionally produced materials and the builders' responsibilities, but on the user end we ask the question of what a reasonable comfort level in a house is, and this differs a lot within the EU. In Germany, we have a high comfort level regarding sound insulation between

apartments, compared to France for example. As architects we are bound by contract to deliver within the local framework of legislation, but if the regulations change, costs may change. The other dilemma is achieving sustainability while maintaining architectural quality. Among architects this is not a problem, or even a question, but from the point of view of clients, private as well as public, there are preconceptions. The attitude that you cannot combine the two ambitions to achieve high profile architecture while making a sustainable building investment this attitude has to change.

Our job is basically to understand how much regulation we need and where.

Architecture crossing boundaries

Schagemann recognizes that legislation procedures are in themselves "silo processes":

– Fire regulations are treated as one legal task, sound as another, and every building is a compound of these legal systems. Architects are familiar with their national regulations but cannot be expected to be updated on the contract, liability and construction rules of other European countries.

Schagemann identifies this as a task for the Architects Council of Europe; to learn more about how the architects are working in the different European countries:

– We want to look into why the use of timber is compatible with fire protection regulations in the Nordic countries but is a problem in for example the Czech Republic. Knowledge on a national level has to be shared, it is the way of the future, but we also have to acknowledge that building regulation is difficult because architecture is regional – just look at the different shape of roofs in snowy conditions, and the stone walls of hot countries. Germany is like "little Europe" with 16 building codes on a federal level, so working in these conditions, you can really wonder why stairs are dimensioned in different ways in some regions.

Schagemann emphasizes the need to be flexible in terms of where to ask for harmonization of rules and be attentive to regional conditions, in order to take on the challenge of achieving legislative frameworks on a European level. The work on this takes place within the European Commission in the New European Bauhaus lab on regulation, as one of five labs.

”

We also have to acknowledge that building regulation is difficult because architecture is regional

The “one stop shop”

Another predicament is that current policies apply to projects of 5000 square meters or more, leaving a “wild west” of smaller buildings and single-family housing. Schagemann also identifies the 5000 square meters as a crucial number in the taxonomy, not least for the financial sector, which use this number as a marker of a “big player”. According to Schagemann, it is of great importance to facilitate sustainable choice, referring to the EPPD as a “one stop shop”. The legal framework supports architects in their work and supports citizens with their questions, and thus becomes everyday practice with craftspeople and builders.

– We should never underestimate legislation, even if it often ends up as a number, still it defines a level of what we have to achieve. But the way to achieve it and the design measures to be taken to get there are really up to the architect and the client. Legislation can never be an excuse to not achieve quality of the built environment. You have to find solutions for problems, and this is what architects do.

”

Legislation can never be an excuse to not achieve quality of the built environment. You have to find solutions for problems, and this is what architects do.

Conclusion

The findings from the 24 interviews underscore a critical need for transformation across multiple facets of the construction industry and its impact on the environment. The key learnings are organized into five major themes: mindset changes, legal and regulatory development, industry transformation, community involvement, and ecosystem protection. Together, these categories highlight the urgency for a paradigm shift away from traditional models of continuous growth and resource-consumption towards a more sustainable, circular economy that values existing assets and prioritizes environmental and community well-being.

A central theme is the necessity of a cultural shift, challenging the entrenched practices of constant building and consumption. This shift is coupled with the importance of political will and agile institutions that can respond swiftly to evolving scientific knowledge and the urgent climate crisis. The interviews also emphasize the need for a mature economic understanding that properly values ecosystem services, integrating these into land use planning and economic decision-making.

In terms of legal and regulatory development, there is a clear call for laws and policies that align with climate science and promote sustainable practices. The construction industry, in particular, is highlighted as both a significant contributor to environmental degradation and a potential leader in adopting circular practices. The shift towards prioritizing the reuse of existing buildings over new construction is presented as a key strategy for reducing emissions and preserving resources.

The interviews further stress the importance of community involvement and place-based development, advocating for local governance that aligns with the unique needs and values of each community. Lastly, protecting and supporting ecosystems through integrated, nature-based solutions is vital. This holistic approach requires rethinking soil and land use, embracing regenerative agriculture, and promoting sustainable water management practices.

About the Nordic Council of Ministers Programme Nordic Sustainable Construction

The Nordic countries have set a joint ambition for creating a sustainable and competitive construction sector by 2030.

Against the backdrop of mounting global concerns regarding climate change and resource depletion, the Nordic Council of Ministers initiated the Nordic Sustainable Construction programme as an investment in innovative and green solutions, where the goal for the Nordic region is to be a leader in sustainable and competitive housing and construction with a lower environmental and climate impact.

The project consists of 4 focus areas addressed through the work packages of the project:

- Work Package 1 – Life Cycle Assessment – Lead: Ministry of the Environment of Finland
- Work Package 2 – Circular Business Models – Lead: Nordic Innovation
- Work Package 3 – SUSTAINORDIC – Sustainable Construction Materials and Architecture – Lead: Form/Design Center, Sweden
- Work Package 4 – Emission Free Construction Sites – Lead: Ministry of Social Affairs, Iceland
- Work Package 5 – Project Coordination – Lead: The Danish Planning and Housing Agency

This publication is a result of Work Package 3, and the work package SUSTAINORDIC with the aim to identify the cultural change and legislative reforms that would steer the construction sector towards alignment with the Paris Agreement and other sustainability benchmarks such as social sustainability and biodiversity.

About this publication

Building within the Safe Operating Space - Nordic Insights on Sustainable Construction

AUTHORS:
Text: Malin Zimm
Research: Angelica Åkerman and Pernille Martiny Modvig
Other Contributors: Dorte Bo Bojesen

US2024-440
Cover photo: Norden.org / Anders Vestergaard Jensen
Published: September 2024

Nordic co-operation

Nordic co-operation is one of the world's most extensive forms of regional collaboration, involving Denmark, Finland, Iceland, Norway, Sweden, and the Faroe Islands, Greenland and Åland.

Nordic co-operation has firm traditions in politics, economics and culture and plays an important role in European and international forums. The Nordic community strives for a strong Nordic Region in a strong Europe.

Nordic co-operation promotes regional interests and values in a global world. The values shared by the Nordic countries help make the region one of the most innovative and competitive in the world.

The Nordic Council of Ministers
Nordens Hus
Ved Stranden 18
DK-1061 Copenhagen
www.norden.org

Read more Nordic publications on www.norden.org/publications