

Insight report

HOW CIRCULAR CONSTRUCTION BUILDS A SUSTAINABLE SOCIETY



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FOREWORD

Within the framework of the strategy for Ragn-Sells Group and the commitment to reduce CO₂e emissions, the construction sector has been selected as one of the focus areas. According to the Global Alliance for Building and Construction, hosted by UN-Environment, in its 2022 global status report, the construction sector is one of the major contributors to global CO₂e emissions and has a crucial role to play in addressing the climate crisis. Over 34% of the world's energy demand is accounted for by this industry, along with about 37% of all energy and process related CO₂e emissions.

The dynamic industry of construction contributes significantly to the shaping of the world in which we live by creating the structures and infrastructure that serve as the foundation of our society. Furthermore, we already know that in the next 100 years, we will need to build more urban areas than currently exist on earth. The development of these new urban areas will also need to have a zero CO₂e footprint, unlike how the situation is today.

We have several difficulties we need to address, including balancing quality and cost, controlling risks, ensuring worker safety, and addressing environmental and social issues. Due to the rapid pace of urbanisation and industrialisation, the sector has come under increased scrutiny for its environmental effects, particularly its contribution to greenhouse gas emissions.

To address this challenge, the circular economy provides a sustainable approach that emphasises material reuse and recycling while also serving as a potential future urban mine to produce new building materials.

Ragn-Sells recognised that there is no waste in a circular economy, which means there is no need for a waste management company either. Therefore, we invite stakeholders from the different material value chains in the construction sector to come up with input on how we can find a new path forward. In this work, we hope to promote more partnerships with stakeholders along the entire value chain by exploring innovative solutions and enabling the market to adopt them.

We see this as the beginning of the beginning, where the construction sector contributes so that we as humans can start to live in balance with what nature can produce without compromising the needs of future generations.



Anders Kihl
Director of Strategy
and R&D
Ragn-Sells Group



Eli Jacobsen
Head of Innovation
Management
Ragn-Sells Group

EXECUTIVE SUMMARY

This report focuses on three thematic areas: innovation, finance, and policy in a future circular construction sector, and proposes new plans for stakeholders to collaborate on. We can now finally see that the legislators also have started to act, specifically targeting the construction sector with demands on increased reporting and by introducing more circular policies.

What becomes clear in this study, that started in March 2023, is the lack of collaboration across the value chain. In the six roundtables that we arranged during spring 2023 we invited the full material flow to each roundtable, and realised that many of them had not met before. In a circular economy we need to collaborate to create circular flows and therefore we need to meet to generate synergies and to co-create the future.

The construction sector is incredibly climate intensive. The sector has the lion's share of emissions, with 50% of emissions caused by raw materials leading to 90% water stress and 90% biodiversity loss. Only 7.2% of the global economy is circular and the increased virgin extraction outpace the increased recycling. If we doubled the circularity rate, plus delivered on existing National Determined Contribution's (NDCs), it would get us well below the ambitions set in the Paris agreement of a global temperature within the 2-degree target.

In a circular system, there is no waste and raw materials are sourced primarily from our urban flows, also reducing the risk of overshooting our planetary boundaries. However, transitioning from a linear dependency on traditional sourcing

methods into a circular flow of material comes with its challenges. Circularity is today hampered by flawed pricing models, standards that prevents the use of non-virgin raw material, and legislation that has a focus on minimising what is today called waste.

Virgin material extraction do not fully bear the cost they incur. There is simply no consequences for the producers associated with the continued extraction of virgin materials, even though this practice is responsible for half of the world's climate emissions. When material flows become circular, construction's impact on climate change will be substantially reduced.

A second study to understand the consequences to the construction sector value chain in regard to new policies under development, will start already in June 2023. Based on this, a follow-up report focusing on these policies is planned to be published in the last quarter of 2023.



Pär Larshans
Director of Sustainability
Ragn-Sells Group

INTRODUCTION AND BACKGROUND

This report aims to investigate practices that support the construction sector in adopting a circular approach, including proactive environmental strategies and new technologies that promote resource efficiency, innovation, and sustainable consumption.

The UN 2030 Agenda and Sustainable Development Goals (SDGs) have spurred governments and businesses to prioritise sustainability in the construction sector. Affordable green technologies offer a chance to reorient development trajectories, deploy local scientific capacity, and reduce environmental harm.

The European Union has set ambitious goals outlined in The European Green Deal¹ to become the first climate-neutral continent by 2050. The Green Deal proposals target the construction sector as one of the main contributors in shifting towards a greener future. The commission aims at renovating 35 million buildings by 2030 and increasing building's

energy efficiency which would result in creating 160,000 green jobs in the construction sector.²

Prioritising innovation, value chains, and life cycle thinking is crucial in addressing unsustainable consumption patterns, which significantly contribute to climate change, land degradation, resource depletion, and air and water pollution. Resource efficiency and sustainable consumption practices offer key solutions to these challenges, benefiting the environment and promoting sustainable development. However, it is essential to integrate green thinking into decision-making processes, supported by forward-thinking leadership that invests in education, innovation, and scientific research to explore green opportunities for the local economy.

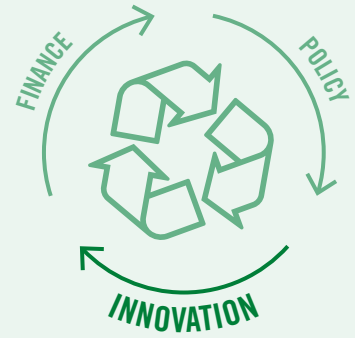
This report consolidates insights from policymakers, businesses, and civil society to identify opportunities for circularity in the construction sector.

THE GLOBAL GOALS



01

INNOVATION



The construction industry has undergone significant changes in the last few decades, gradually embracing technological advancements and innovative practices. These adaptations have improved the quality of construction projects, reduced the time and cost of construction, and increased the safety of workers, empowering the industry to meet the increasing demand for sustainable, efficient, and cost-effective construction practices. This chapter will explore the relationship between construction and innovation based on the insights collected in the six roundtables conducted by Ragn-Sells and by examining the impact of innovation on the construction industry, the challenges of implementing innovation in construction, and the future of innovation in construction.

Innovation in the industry

Innovation and adaptation in the construction sector fall at the heart of Europe's movement towards a greener life and more sustainable future. The sector was encouraged to embrace innovation in the Green Deal through the New European Bauhaus initiative that manifests the deal's goals into all aspects of our surroundings and living spaces. The New European Bauhaus is a transdisciplinary initiative that brings together citizens, experts, businesses, and institutions together to re-imagine sustainable living in Europe and beyond.³

Accordingly, as the construction industry continues to evolve, it is expected to continue to adopt new technologies and methods to remain competitive and meet the demands of a safer future. This helps to maintain the competitiveness of the construction sector and meet the needs of clients and stakeholders.

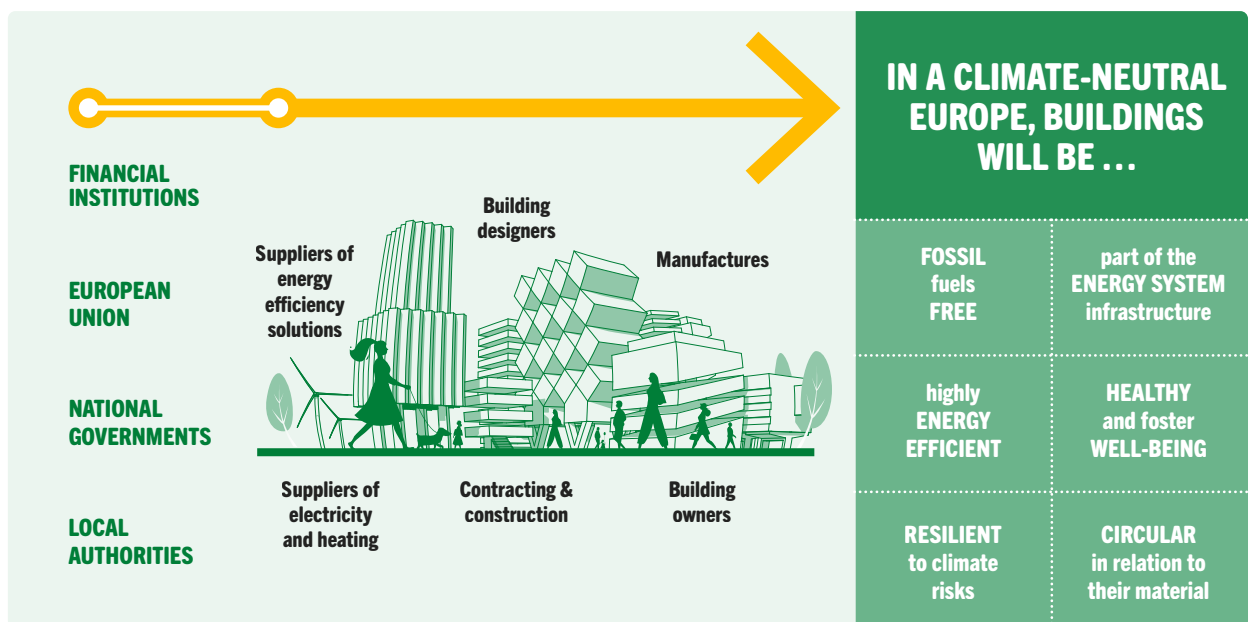


Fig. 1 An Action Plan for the Renovation Wave: Collectively achieving sustainable buildings in Europe

“SEE CIRCULARITY AS PART OF THE BUSINESS.”

Jonas Klevhag, Director Collaboration, The Bridge by Altitude (Malmö Roundtable)

Innovation in practice

The construction industry is on the point of a technological revolution, with new technologies and innovative practices transforming the way buildings are designed, constructed, and maintained. The following section explores such innovations and practices.

● Building Information Modelling (BIM)

BIM is a digital representation of a building's physical and functional characteristics. BIM technology allows architects, engineers, and contractors to create a 3D digital model of a building, which provides a more accurate representation of the building and helps to identify and solve potential issues before construction begins. BIM can be used for design, construction, and maintenance, and it helps improve collaboration and communication among stakeholders, thus reduces project risks and errors, and improves project outcomes. The European BIM market is predicted to grow by 13% to reach EUR 2.1 billion in 2023⁴ aiming to help the construction sector to be more (cost) efficient and sustainable by enabling smooth data exchange and sharing between partners in the value chain.⁵

● Prefabrication and modular construction

Prefabrication involves the manufacturing of building components off-site, which are then transported to the construction site for assembly. Modular construction, on the other hand, involves the construction of entire building sections off-site and then transporting them to the construction site for assembly. Prefabrication and modular construction can significantly reduce construction time and costs, increase construction quality and affordability, and improve safety on construction sites. Europe's modular construction market is expected to reach USD 28 billion by 2030.⁶

● 3D printing

In construction, 3D printing is used to create building components such as walls, floors, and even entire houses, utilising materials like plastic and metal. It is being used to create building components with complex geometries and designs that would be difficult or impossible to create using traditional construction methods. 3D printed structures or even buildings can help reduce construction time and costs cut down on transport emissions, improve construction quality, enable more creative designs, lower heat loss, and move towards greener buildings.

● Drones and robotics

Drones and robotics are transforming the construction industry as they have an impact on improving safety, efficiency, and accuracy. Such technologies are used for tasks that are dangerous, difficult, or time-consuming for human workers. Drones can be used to survey construction sites, monitor construction progress, and inspect structures, while robotics can be used for tasks such as bricklaying, welding, and painting, which can reduce labour costs and improve construction quality.

● Augmented Reality (AR) and Virtual Reality (VR)

AR is one tool that business leaders across the industry can harness to build more conscientiously and sustainably, reducing errors, minimising waste, and improving efficiency, resulting in lower emissions.⁷

Virtual and augmented reality technologies in the construction industry help create immersive experiences for architects, engineers, and clients as they improve design, communication, and training. AR and VR can create 3D virtual environments, also known as digital twins that are updated to reflect real-time changes which allow stakeholders to visualise and interact with building designs, simulate construction processes, identify potential issues before construction, and train workers. To the surprise of no one, the Netherlands is at the forefront of this development.

● Transparent material flow

Construction and demolition waste (CDW) represents one-third of the total waste generated in the European Union.⁸

The solution would be a circular economy; however, a major obstacle to the increased use of secondary construction materials is the lack of large-scale, well-declared recycled raw materials, the quality of which is guaranteed to the same extent as their virgin counterparts. The use of modelling software powered with artificial intelligence (AI) technologies help optimise building design, track and detail the exact composition of building elements, enabling recycling, reducing waste, and maintaining the material value through the loop; again, leading to new ways of appreciating the value of a building. For example, AI can be used to analyse construction site data to identify potential safety hazards and reduce the risk of accidents and map potential secondary critical raw materials to identify possible recycling projects.

“A digital twin allows for the more resourceful use of a building's assets from construction throughout its life, such as documenting its materials and properties, smarter operation, or creating the foundation for new business models that share resources between stakeholders.”

Elise Grose, Head of Sustainability, SWECO Architects

Whether an industry goes circular or not depends on the value of the materials within it. Worthless materials are considered as waste, while valuable materials are reused or recycled. Increased value means less waste.⁹

Transparent material flows is a key area for Ragn-Sells and one of our sustainability targets. There are also detoxification touchpoints that merit exploring. When it comes to waste, in Sweden alone, almost 36 million tonnes of waste is created each year. The construction sector is no exception and generates more than 14 million tonnes of waste each year according to the Swedish Environmental Protection Agency.¹⁰

● Collaboration and knowledge sharing

The EU can foster collaboration and knowledge sharing among stakeholders in the construction industry by establishing platforms, networks, and partnerships. It can facilitate the creation of networks of circular construction stakeholders, including manufacturers, architects, contractors, and research institutions, to exchange experiences, share knowledge, and collaborate on research and innovation projects. The support of the establishment of collaborative initiatives, such as Living Labs or innovation clusters, can bring together different actors to test and implement circular construction solutions. Additionally, the organisation of conferences, workshops, and seminars to facilitate dialogue and knowledge transfer among stakeholders can be a crucial step to embracing innovation in the industry.

Challenges of implementing innovation in construction

While the adoption of new technologies and innovative greener practices does not only transform the construction industry but is also in Europe expected to meet the Commission's 2030 and 2050 goals, some challenges need to be addressed. One of the main challenges is the resistance to change in the industry, as it is a traditional industry that has been slow to adopt new technologies and methods. The challenge also relies upon shortages in resources, be it skilled labour or funding opportunities to meet the significantly high expenses of greener projects, which may affect the quality of projects and the time consumed. Finally, adopting digital solutions and cloud-based collaboration technologies in construction raises concerns about data security and privacy, which itself suggests a learning curve and significant expenses.

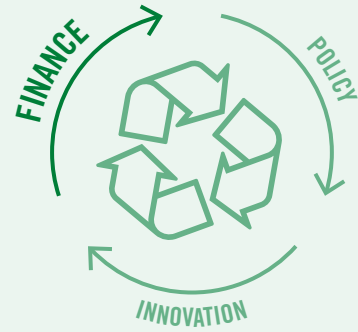
In that light, a holistic approach to advancing the construction industry is needed. Not only in one geographic spot, but the goal requires universal collaboration between nations and stakeholders and institutional and practical adaptation to new targets and needs. Working on a greener tomorrow would inevitably require cooperation in all fields and industries and from everyone whether legislators, business owners, or citizens.

“CIRCULARITY IS A NEW PROCESS.”

Ditte Lysgård Vind, CEO The Circular Way (Copenhagen Roundtable)



FINANCE



To meet its climate goals, Europe would need to invest 275 billion Euros in buildings annually. The construction sector is a capital-intensive industry, meaning that significant amounts of financing are required to fund construction projects. Financing in the construction sector can come from various sources, including traditional bank loans, private equity, venture capital, insurance companies, and public finance. However, accessing finance in the construction sector can be challenging, especially for small and medium-sized enterprises (SMEs) that may not have the necessary collateral or credit history to secure traditional bank loans.

Financing in the construction sector is a critical aspect of the industry, and construction companies have various financing options available to them. However, accessing these options can be challenging due to the high level of risk and large upfront capital investment required. Consequently, construction companies must carefully consider their financing options and use risk management tools to mitigate project risks.

Financial support for green transformation: Driving sustainable investments and meeting EU climate goals

With the changes in the industry and the shifts in the requirements and expectations, new policies and support systems are in place to help the industry transform into a greener one. Meeting the 2030 EU goals suggests the need

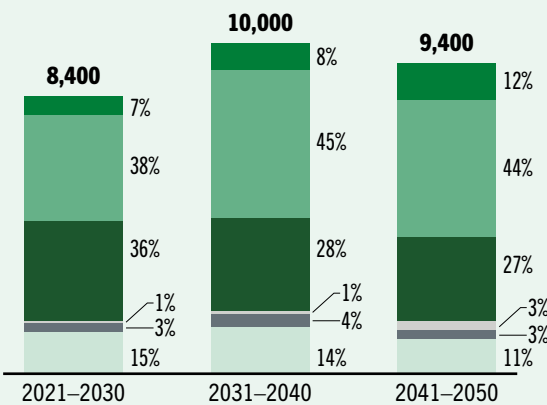
“The construction sector is challenged by many different expectations at the same time. There is still a great need for housing in Sweden, especially affordable housing – and it is expected that it will be built at a low cost. At the same time, we must keep the quality and reduce emissions radically.”

Catharina Elmsäter-Svärd, CEO, Swedish Construction Federation

€28 trillion in investments required in Europe over the next 30 years

McKinsey net-zero for Europe perspective, based on cost optimal decarbonisation pathway to 2050.

Total CAPEX in EU-27, Bn EUR (total within time bracket)



Total CAPEX by sector 2020–50, %

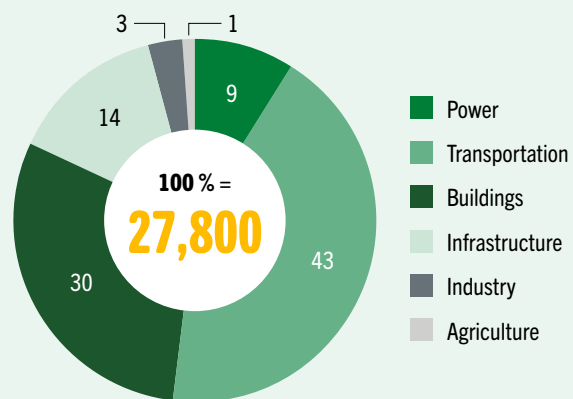


Fig 2. 30% of the 28 trillion Euro investments by 2050 for building sector.

to invest approximately 350 billion Euros more every year during the 2021-2030 decade to create the right environment for transitioning into a climate-neutral, green, competitive, and inclusive economy. Without finance, it would be difficult to reach decarbonisation by 2050, where the building segment is the second largest, requiring 30% of 28 trillion Euro investments.¹¹

In that vein, the European Commission, as part of the Green Deal, has presented the European Green Deal Investment Plan, which aims to dedicate at least 1 trillion Euro to sustainable investments over the next decade.¹²

Also, a new Social Climate Fund has been put in place to assist EU citizens who are at higher risk of energy and mobility poverty in their transition. The fund is estimated to provide 72.2 billion Euros over seven years in funding for the renovation of buildings, access to zero and low emission mobility, or even income support.¹³

According to the EU Cohesion Policy supporting EU countries and communities implementing large investments that contribute to the European Green Deal, at least 30% of funds received must be devoted to the green deal priorities while contributing 37% of the cohesion fund to 2050's climate neutrality goals.¹⁴

Unlocking value and profitability through Material banks and Circular construction

Building in line with the new sustainability regulations and expectations calls for re-imagining buildings and landfills as Material banks.

Large construction projects are essentially stockpiles of valuable raw materials. When this is actively considered from the beginning, through planning, architecture, and construction, intending to profit from material value in a later phase, the building becomes more valuable, affecting basic profitability, financing opportunities, and other tangible issues.

“This concept details nicely with Ragn-Sells’ work on profitable circular construction.

Annika Fernlund, Hubpark (Malmö Roundtable)

In traditionally run projects, the costs of building materials and labour are simply plotted against projected returns on the sale or lease of the building, creating strong incentives to seek out the cheapest materials possible for the project manager. In 2023, this is an irrelevant way of looking at value. Budget management and profitability calculation models need to be updated, considering a much wider spectrum of values and “measuring the correct currencies”, in the words of one interviewee. This includes, but is in no way limited to, material reselling value, brand equity, and talent recruitment.

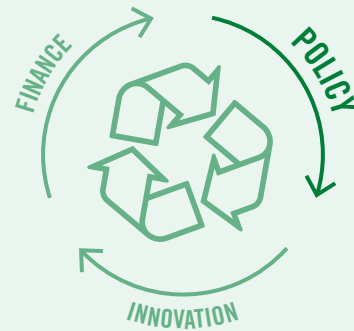
Such new models, along with closer collaboration across the value chain, will help overcome the high prices due to higher emission prices under the ETS. CBAM will have a huge impact as climate-intensive imports are made to carry the same costs as European production. For the true resource costs and returns to be visible, the silos separating actors in different phases of the value chain need to be broken down.

Challenges to financing

One of the main challenges to financing in the construction sector is the high level of risk associated with construction projects. Such risks vary between delays, cost overruns, design flaws, and regulatory changes, which can lead to project failure that results in significant losses for investors. To mitigate these risks, construction companies and investors often use various risk management tools, such as insurance, guarantees, and performance bonds. These tools can help protect investors against project failure and provide a level of comfort to lenders that their loans will be repaid.

Another challenge in financing construction projects is the large upfront capital investment required. Construction projects typically require significant amounts of capital upfront to cover land acquisition, design, and construction costs. This upfront investment can make it difficult for construction companies to secure financing, especially for smaller projects. To address this challenge, construction companies can explore alternative financing models such as leasing, equipment financing, and sale-leaseback arrangements. These financing models can help construction companies free up capital and access financing for their projects.

Finally, financing in the construction sector is also subject to various regulations and legal frameworks. These regulations can include zoning laws, building codes, and environmental regulations, among others. Construction companies must navigate these regulations to ensure their projects comply with the law and receive the necessary permits and approvals.



According to the UN, the extraction and processing of natural resources, mainly for the construction industry, account for about 50% of climate change, 90% of biodiversity loss, and 90% of the threat to access to water. Transitioning to a circular economy is crucial to our ability to mitigate climate change, the depletion of our natural resources, and the risk of overshooting planetary boundaries.

On a global level, in a 2022 report¹⁵, the Intergovernmental Panel on Climate Change (IPCC) highlighted the need for circular material flows for the construction industry to contribute to the Paris Agreement. The report came in support of the International Chamber of Commerce (ICC) report in 2021¹⁶ that highlighted the challenges with circular material flows in trade. On a European level, the Green Deal¹⁷ has led to the development of new regulations for the construction sector and a new reporting standard, CSRD¹⁸. The taxonomy suggested focuses mainly on raw material supply, and the Environmental Product Declaration (EPD)¹⁹ is starting to become compulsory in many countries, driving the entire industry of construction to display its environmental impact. The focus has also started to shift from focusing on only Scope 1 and Scope 2 emissions to Scope 3 emissions, highlighting the huge CO₂e impacts that are in the material itself, meaning that the more we can use the material we have already produced, the lower the CO₂e footprint will be.

When national policies are implemented, there is a huge risk that they can become barriers to trade between nations, even within the EU, and prevent the needed circular transformation. Thus, the transition towards a circular construction industry requires a comprehensive policy framework that addresses challenges on global, regional, and national levels. This section explores challenges related to circular material flows and sourcing risks as well as suggests key policy changes.

Transitioning to a circular construction sector: Rethinking resource use and waste management

A more sustainable use of resources in the construction sector is a large and important part of the transition towards a circular future. The extraction, manufacturing, and trans-

port of construction materials account for a large part of our impact on the environment. The same logic applies to the handling of construction waste.

Many nations and the EU have committed to transferring to a circular economy and have action plans in place to make it happen. However, the traditional linear economy includes several obstacles to such a transfer, and the main obstacle is the current view on waste and the unsustainable use of virgin resources.

Every year, about 100 billion tonnes of raw materials are used in the world. In only five years, the extraction of virgin materials has increased by 10 billion tonnes. Since the turn of the millennium, this extraction has increased by 70%, and since 1970 it has tripled. At the same time, only 7.2% of the global economy is circular, meaning that it consists of materials that have already been used, replacing virgin materials.

Since the 1970s, regulation of waste has been developed based on the principles of the waste hierarchy, or the “ladder of Lansink”²⁰ – a foundation for laws, taxes, permits, and practically all waste related policies. However, the waste hierarchy principle, applied extensively in Europe, risk directing our focus in the wrong direction, counteracting the possibility of establishing large-scale circular flows.

In an attempt to introduce a resource focus instead of a waste focus, Dr. Lansink and Dr. Aid 2018/2019²¹ proposed a conceptual novel idea suggesting the replacement or addition of the waste hierarchy with resource principles.

Three key principles highlighted by Dr. Aid and Dr. Lansink include:

- **Time** – Material needs to be available when required. By including the material in our resource flows, long-term storage solutions become necessary for future use, for example material banking.
- **Place** – Considering the sites of future projects and close infrastructure locations becomes essential. If we know where future material will be needed, we can keep the material close.
- **Function** – Materials should be kept in a condition that allows for their immediate utilisation when needed.

High-grade products with high-recycled content

Materials with high durability used in structural elements

- ⊕ Prolong construction's life span, thus contribute to waste prevention
- ⊕ Creates demand for recycled materials in closed loops, increases quality of recycling
- ⊖ Low price of virgin materials vs high cost of waste processing
- ⊖ Doubts on quality of recyclables, lack of standards

Design for disassembly

Design construction products so they are easy to separate into components that can be reused, reassembled, reconfigured, recycled

- ⊕ Re-use is part of waste prevention, separation of components makes recycling easier
- ⊖ Higher complexity of disassembly
- ⊖ Potential conflict with other legislation such as energy efficiency
- ⊖ Lack of knowledge and information
- ⊖ Very long time delay between implementation and results

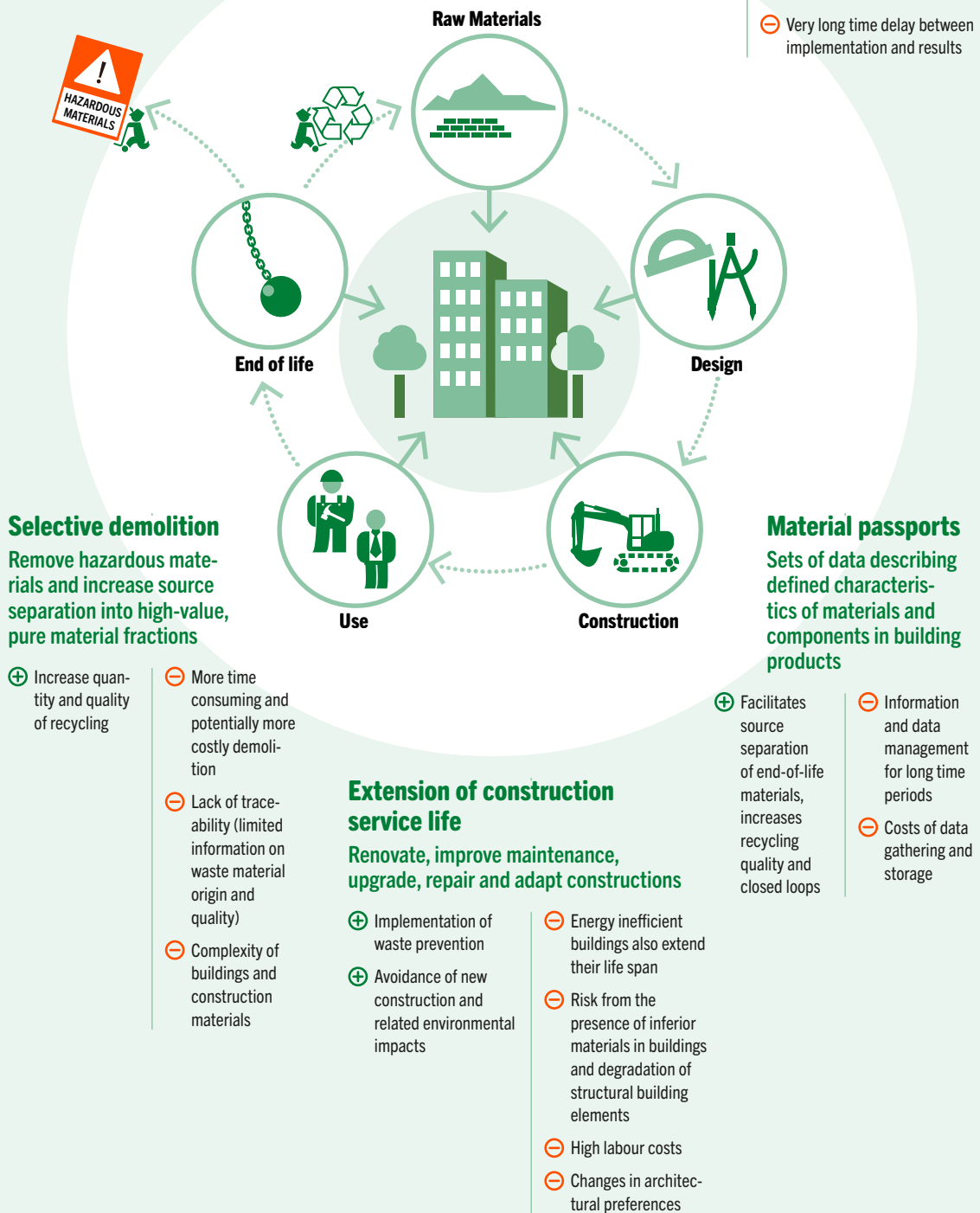


Fig. 3. Examples of circular actions that improve the management of construction and demolition waste

“DARE TO LISTEN AND DARE TO BE VULNERABLE.”

Yasemin Ahran Modéer, CEO of Altitude Meetings

Key policy measures for a sustainable building sector

The construction sector in the EU faces challenges in achieving circularity, despite its significant waste generation and contribution to greenhouse gas emissions. To address this, the European Recycling Industries' Confederation (EuRIC)²² recommends specific policy measures at the EU level:

- **Adoption of EU End-Of-Waste (EOW) criteria:** Establishing EOW criteria will enhance the safety and demand for recycled construction materials, enabling their use in new constructions and substituting primary resources.
- **Mandatory recycled content targets:** Mandating the use of recycled construction materials throughout the EU single market will drive circularity and require planning and investment stability for recycling facilities.
- **Strengthening information requirements:** Robust disclosure of environmental and climate performance, circularity, and toxicity information through Environmental Product Declarations (EPDs) is crucial for effective decarbonisation and consumer awareness.
- **Mandatory EU-Green Public Procurement (GPP):** Developing GPP criteria for construction products will create a significant demand for sustainable materials and support the decarbonisation of the construction industry.

By focusing on these points within the context of the EU, policymakers and stakeholders can work together to create a conducive policy environment that accelerates the transition to a circular construction industry throughout the region.

Challenges and considerations

Recent global incidents, including the pandemic and Russia's war on Ukraine, have shed light on the vulnerability of global supply chains, prompting actors within the industry to recognise the significance of this issue. The “Swedish cement crisis” of last year further highlighted the importance of reliable sourcing of key materials and its direct impact on business operations.

From a political perspective, ensuring a national and sustainable supply of key materials significantly impacts both the nation's and Europe's economic resilience and independence.

Circular construction is an opportunity for the construction sector to reduce emissions and climate impacts. However, there are still major practical obstacles around standards, legislation, and raw material supply. New material is cheap compared to recycled material, resulting in both a lack of supply and a lack of demand for recycled materials. New circular business models in construction are therefore required focusing on increasing reuse and material recycling. Below are some recommendations:

- Materials should be in a condition that allows for their immediate utilisation. Therefore, the existing law for sorting in the construction sector needs to be complied with. Supervision needs to be both expanded and enforced, so that useful raw materials are returned to the cycle. Possibilities to sanction those who do not follow the law need to be introduced.
- It is essential to devise quota systems that account for the unique characteristics and recirculation capacity of individual materials.
- Current legislation and regulations, such as landfill-law taxes, make it more difficult and expensive to reuse materials. For instance, the Swedish landfill tax stipulates that materials not suitable for immediate use cannot be stored for longer periods. This, in turn, incentivises disposing of landfill material in the form of unnecessary constructions to avoid paying the tax, and it attracts grey zone actors to enter the market.
- Coherent regulations for transporting materials for reuse are lacking. Officials struggle to interpret the legislation, causing significant administrative burdens and fines. Even within a single country, these challenges persist, inhibiting the transportation of reused materials.

However, none of these efforts will be fruitful unless we adopt a collaborative approach on both the strategic and practical levels. We will also need proper pricing, taking into consideration the full cost of how it impacts our ecosystem. Principles for a future circular economy must be adopted before they can be implemented, and this requires collaboration with all industry players and an exchange of experience.

“We need to work across the value chain and stop our work in silos to change the flow of material and we need legislation that allows us.”

Jenny Svärd, CEO Construction Material Industry Federation in Sweden

APPENDIX

The following appendix presents interviews on sustainable energy and the circular economy, focusing on the construction industry. The interviews bring the insights of three experts in the field to share their experiences regarding various aspects of sustainable construction, including societal demands, regulatory challenges, digitalization, profitability, and barriers to the transition.

The participants provide valuable perspectives on the importance of adopting circular practices and highlight the need for collaborative efforts and legislative support to drive positive change in the industry.

Furthermore, the appendix presents six roundtable discussions on sustainable energy and the circular economy, in the construction industry. It highlights key messages shared by the speaker's emphasising circularity and long-term value. The speakers provide valuable perspectives on how to participate in advancing sustainable practices and transitioning towards a circular construction industry.

ROUNDTABLE – MALMÖ



The roundtable discussion on the circular construction industry in Malmö yielded valuable insights addressed by the speakers:

Yasemin Ahran Modéer, CEO Altitude Meetings

Ditte Lysgaard Vind, Chairwoman at Danish Design Council

Annika Fernlund, Hubpark, Sweden

Jonas Klevhag, Director of Collaboration, The Bridge by Altitude

Participants: 23 persons at Malmö Studio, 15 March 2023

Recommended key points and instruments

- Scaling up pilot projects and transitioning them into full-scale implementations.
- Encouraging collaboration and risk-sharing among market actors to pursue sustainable initiatives.
- Addressing sustainability challenges in deals, avoiding short-term approaches.
- Embracing flexibility to enable circularity in the construction industry.
- Maximising property value by evaluating the entire life cycle.
- Promoting circularity and reuse in retail environments.
- Harnessing the power of data for informed decision-making and analysis across various contexts, such as material comparisons, life cycle analysis, long-term risk assessment, material inventory, and usability analysis over time.
- Fostering collaboration among market actors for circular practices.
- Incorporating soft values (social and environmental) into the decision-making process.
- Thinking at a larger scale for scalable sustainable solutions.
- Taking into count the dismantling phase and value from the construction stage.
- Advocating for enhanced governance and regulations that demand increased circularity and reuse in the construction industry.
- Revising standards to reflect the principles of circularity and reuse.
- Facilitating material circulation through revised waste regulations.

Jenny Svärd, CEO Construction Material Industry Federation in Sweden



The construction material sector faces challenges to source raw materials and at the same time complying with all changes in legislation, standards, and other requests from stakeholders.

The changes in different policies and regulations have never been so extensive as in the last couple of years. “It is very hard for the industry to catch up with all different new demands from different stakeholders”, says Jenny Svärd, CEO Construction Material Industry Federation in Sweden. In the global context, the IPCC's 6th assessment report highlights the necessity of circular material flows for the industry to contribute effectively to the Paris Agreement.

At the European level, the Green Deal has led to the development of new regulations, including the standardised reporting standard, CSRD. The focus on raw material supply and the increasing relevance of Environmental Product Declarations (EPDs) are gaining prominence, with potential moves towards compulsory implementation.

In Sweden, several new standards are being proposed, such as Boverket's climate declaration with a material focus, the Ministry of Finance's study on economic steering mechanisms to support circular transformation, the circular economy delegation's development of a circular economy plan, and SIS's efforts to implement new circular standards for the construction sector.

The SBTi (Science-based target initiative), a voluntary standard, is garnering attention as it addresses Scopes 1, 2, and 3 emissions reductions in alignment with the Paris Agreement. In the material industry, Scope 3 emissions typically have

the most significant impact, with up to 90% of total emissions attributed to materials. This emphasises the importance of responsible sourcing and treatment of raw materials in the industry's future.

What challenges make it problematic to source from recycled sources?

Regarding challenges in sourcing from recycled sources, both chemical and waste legislation present obstacles. Declaring the chemicals included in the material and defining waste in an end-of-waste process are complex tasks.

Examples of challenges:

- When it comes to concrete, you are not allowed according to building standards, to use more than 5% of recycled material.
- The sorting of material at the construction sites is very limited where production leftovers that have not become waste yet and the chemicals included in them are known, are hard to separate.
- Quota obligation for material needs to be set on individual materials, some materials like steel that already have a high degree of circulation are not suitable for recycling quotas.

What can the industry do better?

When it comes to the production leftover today approximately 20-30% is recirculated, a good best practice is the flooring industry with a joint system in place. We would like to implement work across the value chain of raw materials, from designers, developers, us in the material sector, the construction industry, real estate owners, and finally recyclers.

On the wish list for changes

In terms of waste legislation, we need a new waste definition that prioritises quality over the origin of the material. To facilitate sourcing from recycled sources, we require unhindered supply and the incorporation of a material bank principle into European legislation would be highly beneficial. Additionally, adopting standards that embrace new techniques, such as sourcing raw materials from urban flows rather than solely relying on virgin sources, is essential.

ROUNDTABLE – COPENHAGEN



The roundtable discussion on the circular construction industry in Copenhagen yielded valuable insights addressed by the speakers:

Niels Jakubiak Andersen, Executive Director, Næste

Ditte Lysgård Vind, Chairwoman, the Danish Design Council

Anders Sørensen, Sustainability Director, Enemærke & Petersen A/S

Morten Dysted, Sales Director, Leca, Saint Gobain Denmark

Hanne Tine Ring Hansen, DGNB-auditor, SJ Engineering Enterprise

Lau Raffnsøe, Director, Council for Sustainable Building

Participants: 10 persons at Saint Gobain premises in Copenhagen, 15 March 2023

Recommended key points and instruments

- Large-scale reuse in the construction sector is still a significant challenge.
- The high price of reused materials, sometimes even surpassing virgin materials, is a major obstacle.
- The push for production responsibility and legislation is driven by financial considerations.
- The demolition culture needs to change, emphasising separation and proper handling of materials like stone wool, glass wool.
- Legislation should focus on selective demolition for structures over 200 sqm.
- The importance of design, construction methods, and production processes in achieving different fractions of materials.
- “Circularity is a tool and Regenerative is the Goal”.

Anders Bang Kiertzner, Director, Lendager Denmark



On achieving large-scale reuse in the construction sector

Anders Bang Kiertzner, Director of Lendager Denmark, acknowledges the construction sector's lag in large-scale reuse despite successful alternative resource approaches. However, there are promising signs of progress and growing demand for sustainable construction. Urgent partnerships are needed to provide necessary materials, and major players are recognising the importance of adjusting political systems to support sustainable practices.

On higher costs of reused materials compared to virgin materials

The higher costs associated with reusing and recycling materials are affected by uncertainties in availability, condition, quantity, and local regulations. In Denmark, reusing abundant red bricks at a comparable cost to new bricks requires clients to invest in investigations. Decision-makers often prioritise financial considerations, necessitating comprehensive stakeholder engagement to address technical aspects, aesthetics, and construction plans. Lendager Denmark has achieved cost clarity through their extensive experience in executing building projects over the past twelve years. Utilising proactive estimates known as "ghost budgets" that closely align with targets allows for informed decisions based on data-driven analysis.

On production responsibility and legislation

The commercial entities' linear model of pushing materials without taking responsibility requires a fundamental shift.

Full-scale accounting that considers negative externalities is crucial, as ultimately someone pays for these transactions. Businesses should embrace more ambitious service and business models such as circular asset management and take-back models. Rather than demolishing them, existing buildings should be seen as valuable assets that can be repurposed or adapted for a sustainable approach. Regulatory discussions are necessary to introduce programming flexibility and move away from forcing functions onto buildings. Preserving old and historic buildings, instead of tearing them down based on aesthetics or outdated preferences, is vital for promoting sustainability.

On legislation for selective demolition

Instead of making demolitions illegal, Bang Kiertzner suggests emphasising requirements and due diligence for allowing demolitions. CO₂ emissions from demolition should be accounted for, considering their impact on a building's carbon footprint. A broader discussion about demolitions is needed, considering the environmental impact and not solely maximising profit or square footage.

As activists, Lendager Denmark actively engages with political entities in Denmark and Europe, providing them with data and project experiences to influence legislative frameworks. Sharing experiences and data is vital for informing policymakers' in their decision-making process. While initially excluded from the new building regulation in Denmark, reuse was later allowed on a test basis, enabling data collection and evaluation of its effectiveness.

Final notes and importance of design and building process

Driving change requires grassroots movements, believers who demonstrate progress, supportive societal frameworks, and responsible private companies. Companies must recognise that taking responsibility for their products will shape their future business models.

Lendager Denmark's architectural approach follows the principle of "form follows availability," emphasising the importance of dialogue between project partners and the materials utilised. This approach requires trust, understanding of portfolios, risk management, and collaboration.

ROUNDTABLE – OSLO



The roundtable discussion on the circular construction industry in Oslo yielded valuable insights addressed by the speakers:

Kristine Nore, Partner, Omtre AS

Olav Sunde, Partner, Resirqel AS

Odd Anders Amdahl, Leader HMS, ØM Fjeld AS

Hans Joachim Motzfeldt, Sustainability Responsible, Kesko Norge AS

Tom Tegnander, Program Director Gyproc, Saint Gobain Byggevarer AS

Runar Bålsrud, Executive Director, Avfall Norge

Participants: 34 persons at Oslo Thon Hotel Opera, 10 May 2023

Recommended key points and instruments

- Structured approach needed: Transition from demolition to dismantling to realise the potential of reuse and material recycling in construction.
- Intensive efforts required: Overcoming measures and political challenges to gain momentum.
- Standardising materials for reuse becomes increasingly crucial.
- Clear definitions needed: Improve the understanding of reuse of materials and building products by defining the terms.
- Circular solutions for competitiveness: Future competition in the construction industry will revolve around the best circular and sustainable solutions.
- Mapping and registrations: Requirements for reuse mapping and registrations of buildings as material banks.
- Circular economy transition: Fundamental in Avfall Norge's new strategy, requiring concerted measures and follow-up.
- While climate and carbon pollution receive attention, other circular economic projects lack support schemes that organisations like Avfall Norge can contribute to.
- Low material recycling rate: Sorting requirements in the construction industry need improvement as the material recycling rate remains low, and reuse is not yet adequately measured.
- Stricter environmental requirements: Norway surpasses several European countries in terms of environmental regulations, prompting a need for increased material recycling.
- Shift in thinking required by all stakeholders to embrace sustainable business practices and advance the green transition.
- Risk-taking and collaboration: Projects necessitate a willingness to take risks, with the instrument apparatus and financial industry contributing to risk mitigation. Collaboration between the private and public sectors, as well as across industries, is essential, along with improved communication.
- A market for economically sustainable circular solutions within the building industry must be established or strengthened.
- Establishment of a National Knowledge Arena for circularity in the construction industry, encouraging participation and sharing of knowledge, projects, and experiences.

Kristine Nore, Partner, Omtre AS, Norway



Large-scale reuse in the construction sector is still a “work in progress”. While there are ongoing projects related to wood waste and a growing focus on design for deconstruction, there are several factors contributing to both progress and hindrances.

Factors such as regulations for design for deconstruction and the emergence of circular economy projects contribute to progress. However, clear definitions, measurements, and a change in attitudes and mindsets towards circularity and reuse are needed to overcome existing barriers and accelerate large-scale reuse.

“Regulations play a crucial role in establishing accountability and encouraging responsible practices”, says Kristine Nore, Partner at Omtre AS in Norway. By placing responsibility on producers to consider circularity throughout the entire life-cycle of their products, legislation can incentivise sustainable production, waste reduction, and the implementation of circular economy principles.

Legislation for selective demolition exists to support sustainable practices, but challenges can arise during implementation. Collaboration between the industry and policymakers is crucial to address challenges, ensure effective implementation, and create an enabling environment. This collaboration should focus on standardising techniques, raising awareness, changing attitudes, and defining and measuring design for deconstruction.

Design and the building process play a crucial role in promoting circularity in the construction sector. Emphasising design for deconstruction and incorporating circular principles from the outset can enable easier reuse and recycling of materials. By considering the entire lifecycle of a building, including its end-of-life phase, and implementing strategies such as modular construction and the use of reversible connections, the industry can facilitate the future dismantling and repurposing of structures.

ROUNDTABLE – BORLÄNGE



The roundtable discussion on the circular construction industry in Borlänge yielded valuable insights addressed by the speakers:

Patric Lidström, SSAB

Kimmy Dalbjer, Mockfjärds Fönster

Christian Olhans, Borlänge Energi

Participants: 22 persons at Scandic Hotel Borlänge,
16 May 2023

Recommended key points and instruments

- Laws and regulations, company management, material inventory, and EPDs are very important for better business development.
- Complexity when reusing a shorter lifespan can be resolved by a system analysis.
- Complexity in reuse and new production requires that the warranty must be resolved!
- Extended requirements at all levels of the projects in construction.
- Follow up builders/construction and their demands. Nothing will happen unless breaching the law/regulations will result in fines.
- Climate Bonus, who is following this up?
- The requirements must be set together with the contractors. Is it possible to measure and where do you have to put bonuses and initiatives etc.?
- LOU's importance and procurement in construction projects can facilitate permit matters and how can the "500 doors" be saved?
- Research and knowledge on how to take care of buildings must be followed and collaborate the same conditions when tenders are submitted.
- Guidelines are drawn up in dialogue with the property owners and must be done together with relevant actors to easily understand the regulations with user-friendly consequences.
- Compliance and countering greenwashing – how can we do it right?
- What is possible to sort? Are there better purchases that result in more recycling?

Elise Grosse, Head of Sustainability & Circular Construction, Sweco



On pressure, demands, and regulation from society, with regards to climate

The construction sector says, loud and clear: 'Yes, we can do this!' But the question remains – who is going to pick up the climate tab?

To ensure fair competition, companies are in urgent need of tough restrictions on everyone.

The zero-climate footprint of reused construction material help companies adhere more to regulations from Boverket for example demanding climate declaration and significantly impacting projects.

The Swedish Transport Administration is the single largest procurer, and Swedish municipalities alone are behind seven out of every ten calls for tenders. Thus, the Swedish Administration plays a significant role in transitioning towards circularity by developing a secondary materials procurement routine.

On rigid city planning

Swedish architects love the challenge of designing buildings with refurbished materials! Now lawyers, economists, and public servants need to be equally creative.

Architects are equipped to handle the task of reusing materials and see it as an aesthetic challenge. Municipal aes-

thetic design programmes often lack the flexibility to accommodate repurposed construction materials. Cities need to be adaptable to leverage suitable materials without compromising quality standards.

A broader perspective and collective efforts are needed to prioritise climate change and resource scarcity over traditional interpretations of legislation such as protests against demolitions.

On new currencies to describe circular resources

We need to start measuring the correct currencies!

Budget management and profitability calculations should consider a wider spectrum of values. Traditional cost-focused approaches with disregard to projects' returns causes of seeking cheap materials are irrelevant in 2023.

Consideration should be given to material reselling value, brand equity, and long-term pricing, as the basis for return on investment and talent recruitment. Supply risks, such as those revealed during the pandemic and global conflicts, should also be factored in. Domestic, reliable sourcing of key materials is crucial for economic resilience and independence.

On digital twins and digital platforms as circular marketplaces for reuse

What if we had an overview of all buildings and available building components across Europe? If we could match demolition projects with construction, we could save emissions and close the circular loop.

Digital tools representing buildings in real-time allow for assessing the potential reuse of building components, making existing values visible, and enabling better matching of demolition and construction. The Netherlands leads in implementing digital twins, and more cities are adopting open data and digital twin initiatives.

A comprehensive overview of buildings and available components across Europe could optimise resource usage and reduce emissions. Thus, EU legislation focusing on digital product passes can further support the circular economy.

ROUNDTABLE – TALLINN

The roundtable was co-hosted by NGO Green Tiger and Ragn-Sells ensuring a neutral and inclusive dialogue on the circular construction industry in Tallinn and yielded valuable insights addressed by the speakers:

Pärtel-Peeter Pere, Parliament Member, NGO Green Tiger, Estonia

Rein Kalle, Tallinn City Government, Estonia

Indrek Kajakas, Member of the Management Board of Green Marine, Estonia

Mait Adler, Quality specialist, Merko Construction Estonia

Reet Siilaberg, Manager of Circular Economy Department in Environmental Board, Estonia

Gorel Grauding, Advisor at Department for Environmental Management, Estonian Environmental Ministry

Participants: 20 persons at Ülemiste Technopolis, Õpiku Conference Centre, 30 May 2023



Recommended key points and instruments

- Infrastructure in Estonia is inefficient due to the over-all city landscape – new areas are inhabited, widespread development of private housing take over farmland, while the current cities still have sufficient room to create living space. This leads to inefficient use of infrastructure and Estonia becoming more car dependent.
- Activities concerning increased circularity of the Estonian construction industry are not compatible with the priorities set on state or EU level development programmes.
- The environmental footprint of the Estonian construction industry should decrease by 85% by 2040.
- 80% of the Estonian construction waste is created in the Tallinn capital and its surrounding areas.
- The renovation target of the Estonian housing market in the next decades will need to increase the renovation capacity five times compared to today.
- No legislation to support the reuse of reusable materials from construction sites.
- A legislative push is needed to reach the 40% milestone for reuse of construction waste materials by 2028 (set in State Waste Plan)
- Reuse goal ownership should be clearly stated. The ultimate responsibility for achieving the recycling target lies on the waste generator – construction company.
- An inclusive collaboration is needed to reach the goals, as the issues are embedded in the different fields.
- The public procurement conditions should include the CO₂ limits of constructing new buildings, this will have positive impact for using lower carbon materials.
- Estonia should use more timber as a renewable material with significantly smaller environmental impact.
- The concept of Material Banks is discussed to save the materials and critical raw materials for future usage.
- More resources to public sector are needed to control the waste management industry.
- Relying solely on the "polluter pays" approach is no longer sufficient. When construction waste is discarded without proper sorting, then construction companies can pay more but waste handlers often seek cheaper final treatment solutions, it will lead to various problems.
- It is crucial to implement comprehensive waste management strategies and regulations that prioritise reuse and responsible disposal of construction waste.
- Rules of sorting the construction waste should be set on state level.
- Tax reduction should be discussed for responsible behaviour on construction sector to motivate the sorting while it's not legally binding yet.

Pärtel-Peeter Pere, NGO Green Tiger, Estonia



How can circularity be seen as a tool, and what does the concept of regenerative practices entail?

“Technology is the answer, but what was the question?” said architect Cedric Price in 1966. Any technology is a tool. What to do we want achieve with it, that is the question.

Circularity and regenerative practises are both tools for achieving a significantly lower carbon footprint in the built environment, as we can make better use of secondary materials without the need to extract virgin materials. They are tools for achieving cheaper buildings by virtue of building less and reusing existing buildings, materials, and construction elements. Finally, they are tools for exploring new innovative architecture.

Prizker award winning Lacaton & Vassal have focused a great deal on making the most of what we already have. Their redesign of Palais de Tokyo in Paris is a very interesting example of how to celebrate and bring to front the raw materials of a building. Done in this context, a cultural palace, this approach invites the thought of we can and must rethink our approach to how we build, renovate, design, experience and think about buildings.

There are emerging technologies waiting to be scaled sooner or later, such as bio-cement that uses microbes. However, we need to be very cautious and not resort to techno-optimism. Techno-optimism is the blind faith in technologies that do not yet exist (or are almost there) and it poses a serious threat to making any significant progress in adapting to the climate crisis as well as avoiding the worst, because it often serves as a comfortable excuse for not doing anything. We need to act – now – with what we have. Especially given that green transition in any industry is about a lot of small things and a change of mentality. It translates into new business models, regulations, and a new green economy. We need not wait for anything. We can turn our eyes towards bio-based and renewable materials, such as bamboo, timber, and bio-composites, which all are on the rise in construction.

These materials offer high potential for reuse and can contribute to a more sustainable and circular construction sector.

What are the potential benefits of moving towards a regenerative approach in construction?

As a general note, the benefits are clear, but given that we do not have time, it may not hurt to underline the benefits at their most basic level. By adopting circular practices, such as material reuse, resource conservation, and waste reduction, construction activities can minimise negative environmental and social impacts, and contribute to the regeneration of natural systems. Circular approaches promote the efficient use of resources, reduce waste generation, and limit the extraction of new materials, which in turn helps protect ecosystems, conserve biodiversity, and mitigate climate change.

Based on your expertise, what are the key actions that need to be taken to promote large-scale reuse and achieve a more circular construction sector?

The transition to a sustainable economy and society is a question of survival. It is not a political left-right question. It is rather a question of thinking in terms of the individual and the collective. We need to consider others today – and we need to consider future generations.

Governments need to create an environment where it makes economic sense for companies of all sizes throughout the supply chains to work with circularity. If it does not pay, it will not happen. For example, we could consider taxing materials or processes that have a measurably high carbon footprint. This in turn would motivate the market to offer solutions and products that have a low carbon footprint.

This is a regulatory and political issue and therefore very worrying, because we do not have time to wait until politicians start understanding science behind climate crisis or listening to scientists. If you put “politics” and “climate crisis” into one sentence, the outcome can often be a culture war. Which would be as useless as it would be dangerous.

Are there any emerging trends, technologies, or innovations that you believe will significantly impact the future of material reuse in construction?

The FutureBuilt programme in Norway, and projects like Kristian Augusts Gate 13, demonstrate successful examples of material reuse in construction. Additionally, the Estonian Academy of Arts' 369 Pattern Building project showcases modular systems that combine timber, circularity, and factory construction. These innovations aim to reduce environmental impact, optimise material use, and enable the extension, disassembly, and reassembly of buildings. These trends and technologies hold promise for the future of material reuse in construction.

ROUNDTABLE – STOCKHOLM



The roundtable hosted by Ragn-Sells ensured a neutral and inclusive dialogue on the circular construction industry in Stockholm and yielded valuable insights addressed by the speakers:

David Neuschutz, Regionchef Stockholm, Sweco Architects Sweden

Jenny Svård, CEO Construction Material Industry Federation in Sweden

Anders Bang Kiertzner, Director, Lendager Denmark

Kristine Nore, Partner, Omtre AS, Norway

Laura Linnala, Project Leader, Swedish Institute for Standards (SIS)

Mikael Malmaeus, Researcher, IVL Swedish Environmental Research Institute

Jonas Klevehag, Director Collaboration, The Bridge by Altitude

Susanne Åkesson, Uppdragsägare, Boverket

Astrid Mäehans, Sustainability Strategist, Folksam Group (Folksam & KPA Pension)

Stefan Wallander, CEO, NREP

Marcus Wangel, Confederation of Swedish Enterprise

Cecilia Tall, Programme manager RE:Source

Anna König Jerlmyr, Former Mayor of Stockholm, former Member of Parliament, Sveriges Riksdag (M)

Stina Larsson, Member of Parliament, Sveriges Riksdag (C)

Markus Kallifatides, Member of Parliament, Sveriges Riksdag (S)

Katarina Luhr, Member of Parliament, Sveriges Riksdag (MP)

Participants: 55 persons at the Confederation of Swedish Enterprise, 31 May 2023

Recommended key points and instruments

- Demolish smaller buildings and design new buildings according to the possibilities offered by current sites. It is noticeable in demolition that there is a demand for reuse.
- Property owners have not shown much willingness to share material between companies.
- An new type of actor is required who can handle large material flows, logistics, storage, and systemisation of products/building parts to be reused. Ragn-Sells can be one such party.
- There is a great interest and need for circular solutions in many industries, but the financial part has not caught up. Who dares to take the lead, who wants to take the investment?
- In this recession, can you as a home builder afford to invest in circular solutions, or maybe that is what will make you stand out.
- A regional reuse centre is needed to know where there are demolition sites/material banks. There are examples in Stockholm that are promising.²³

- More digitization is required to derive materials and to be able to easily buy/sell materials or products.
- Improvement and change of knowledge and skills are needed to meet the circular transition. Reuse will require labour. New professions will emerge.
- Insurance companies are in a unique position to be involved in driving the circular transition. Invest and set requirements. These companies also have an extremely large amount of data on behaviours, damages, renovations, etc. that the business community can have a lot of use for in planning buildings.
- Much has been done in silos but scaling up is difficult and needs financial incentives that policy could provide.
- Regulatory relief or changes in legislation are needed to help manage products and materials as resources. Decision-makers must find the right instruments.
- A larger harmonised regulatory framework in the EU is needed for scaling up,
- Cooperation, cooperation, cooperation were the key word of the discussions and is an absolute requirement to achieve increased reuse, recycling and circularity.
- Governing bodies must set requirements for reuse and recycling.
- Make it easier to turn waste into materials.
- Better models for sharing and buying materials for reuse.
- What do we need to do to achieve taxonomy?
- Simplify moving materials between countries and the sharing economy – VAT Free
- To enable the transition, require the participation of all actors in the value chain: policy-financiers-clients-architects-planners-contractors-recyclers-material suppliers. If it does not work for one party in the supply chain, there is a risk that the chain will be broken and the transformation will be slowed down.
- Standards and guarantees shall be secured so that recycled materials can be safely used in new constructions.
- The logistic chain is also very important. This in order to capture geographically dispersed materials to central locations and in an environmentally friendly way make them available in other locations, despite great distances.
- Increased requirement for reused/recycled materials and products in procurement lifts the entire recycling chain.
- Anticipating needs is a key, digitizing to be able to see what materials for recycling are available, where they are and when they become available.
- Focus on the critical materials!
- Notable: 90% of buildings needed by 2050 already exist!
- The challenge is perhaps less in new production, more in adaptations and upgrades.

Catharina Elmsäter-Swärd, CEO Swedish Construction Federation



On managing expectations and balancing interests

We want to contribute to the green transition, but we want to do it in a way that is competitive and does not make us vulnerable and dependent on imports.

The construction sector:

- Plays a crucial role in Sweden's transition to becoming fossil-free.
- Faces multiple expectations simultaneously, such as the increasing need for affordable housing, cost efficiency, quality maintenance, and significant emission reduction.
- Strives to balance these expectations, aiming to create both climate and social benefits while remaining competitive and less vulnerable to imports and external circumstances.

On embracing change

There seems to be a fear that construction waste will be landfilled, while it is a place to store resources waiting to be used.

New perspectives are emerging in the construction sector and like the vision of zero traffic deaths, where cars should prevent accidents, construction now involves considering demolition during the planning stage.

Crises like the cement crisis from the Slite quarry have prompted actors to explore innovative ways to reuse concrete.

Embracing change starts with larger companies in the sector with small and medium-sized enterprises (SMEs) following the lead.

On profitability

When we build today, we already think about how we can demolish the building responsibly and sustainably – how can we use the materials again and again.

We need to recognise the value in construction waste as stored resources waiting to be utilised, rather than being perceived as landfill material. However, a circular construction economy can still be both time and cost-ineffective.

Permits for circular solutions are sometimes denied because the product is classified as waste, hindering progress. Management and storage of construction waste after demolition with material taxed as landfill and shipped at high transport costs hinder profitability.

Regulatory barriers must be removed to enable the reuse and recycling of construction waste.

On barriers to the transition of the construction sector

We need to understand the big picture. We need best practice examples of what is possible to recycle from waste that is easy to understand, and showcase the competitive benefits of doing it as well as the dangers of not doing it.

A lack of knowledge about opportunities is a barrier for construction companies, builders, and procurers. If construction companies knew that there was a market for recycled waste, they would be motivated to sort and maintain clean fractions.

Room for trial and error is crucial, and construction companies should have the opportunity to test new ideas on a smaller scale, and pilots can help by showcasing the benefits of recycling waste and the competitive advantages of embracing circular practices.

Inconsistent demands and climate ambitions from different procurers and municipalities create confusion for industry members, calling for a consistent pace and ambition nationwide.

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Elise Grosse, Head of Sustainability and Circular Construction at Sweco

Pärtel-Peeter Pere, Estonian Parliament Member, NGO Green Tiger

Kristine Nore, Partner, Omtre AS in Norway

Anders Bang Kiertzner, Director, Lendager in Denmark

Jenny Svärd, CEO Construction Material Industry Federation in Sweden

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