

Promoting sustainable materials and circularity in construction

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Summary: The construction industry is one of the world's largest consumers of energy and raw materials. Local and regional authorities manage a vast portfolio of public buildings and have enough of a purchasing power to significantly impact the market conditions to make a change in the whole industry. This workshop explored which good practices, pilot projects, policy measures and initiatives can inspire change, as well as exploring how to overcome current barriers to adoption of more circular approaches and biobased building materials. The workshop also included a site visit to a Timber construction 'Forum am Seebogen'.

Contents

1. Highlights	2
2. Good practices	4
3. Next steps	6

1. Highlights

Policy framework

The construction industry is one of the world’s largest consumers of energy and raw materials. In the EU, it is responsible for almost 40% of emissions and nearly a third of all waste. When buildings are demolished, only around 40% of construction waste is recycled or reused. In most cases, recycled construction material is used in second-grade construction, rather than new buildings. Adopting a circular approach in the building sector has great potential to deliver environmental, social and economic benefits. Circular construction requires rethinking how buildings are designed: reducing embedded carbon, using recycled or biobased materials, designing for material and component reuse, and extending life of buildings through maintenance.

The EU Circular Economy Action Plan considers the construction sector one of the eight sectors with the highest potential for circularity and outlines a set of actions to be taken. Similarly, the Waste Framework Directive sees construction and demolition waste as a priority waste stream. Local and regional authorities have an excellent opportunity to drive the change in the construction sector. Local governments manage a vast portfolio of public buildings and have enough of a purchasing power to significantly impact the market conditions. They can adopt green public procurement practices, develop pilot projects, raise awareness, support data sharing, and stimulate collaboration among stakeholders.

Biobased construction materials

If managed responsibly, biobased construction materials can have a lower carbon footprint compared to traditional materials and function as important carbon sinks. Timber is the most used renewable material for construction projects; however, purchasers should ensure that timber is sourced sustainably by demanding products that are certified as environmentally friendly. At the same time, it is important to develop new, regional value chains for other biobased construction materials such as clay or fast-growing crops including hay, straw and hemp for insulation purposes replacing high-carbon petrochemical-based insulation.

The participants of the interactive world café session on ‘Biobased construction materials’ pointed out that one of the **main barriers** to a greater use of sustainable construction materials is the lack of awareness, knowledge, and practical information amongst all players of the value chain ranging from policy makers to architects, end users and the operational level (installers, manufacturers, construction companies). Moreover, professional training programmes are outdated, and the value chain for biobased materials is still fragmented and without coordination and cooperation. The lack of awareness is resulting in a lack of trust in the new materials and a bad perception regarding their quality, durability and safety. At the same time, the participants underlined that the construction sector is dominated by a limited number of rather conservative actors with a preference to continue with business-as-usual and little interest to change and introduce ‘new materials’. This tendency is supported by a rather low pricing policy for the ‘regular’ construction materials and a lack of availability of the new biobased materials. Finally, a policy long-term vision and a favourite legal framework for biobased materials appear to be missing. In addition, the process of certification of building material remains too complex.

To achieve a greater acceptance of sustainable construction materials, the workshop participants suggested to work with information and communication campaigns that showcased the benefits of biobased materials (lower CO₂ footprint, indoor air quality, Life Cycle Costing, etc.), to share good practices and to update training and education programmes for the operational level. Participants also proposed that the public sector makes better use of its strong purchasing power in the construction sector to increase market demand for biobased materials. To this end, public authorities should consider introducing mandatory targets for the use of biobased materials in construction, in particular through public procurement. Economic imbalances could be redressed through specific business support schemes, subsidies, and incentives for the use of biobased materials. Furthermore, policy interventions could focus on strengthening the value chains for biobased construction materials (e.g. the Building Balance programme) and on streamlining and simplifying certification processes. In addition, land planning and building planning should encompass environment and energy certification to better highlight the positive benefits of sustainable construction materials.

Circularity in construction

Construction and demolition waste is generated in construction, renovation and demolition of existing buildings and makes for the Europe’s largest waste stream (around one third of all waste). It can include cuttings of new materials or damaged stock, and materials such as metals, wood, concrete, bricks, plastic, glass, asphalt, and hazardous materials such as asbestos. About 400 million tonnes of construction and demolition waste are generated annually, with concrete making at least one third.

Recycling and reuse of construction materials is a key component of circular construction. Given the high demand for resources, the European Union strives to make the building sector more circular. Nevertheless, the uptake of more circular approaches remains rather slow and recycling rates vary greatly across the EU. Many EU countries have succeeded in establishing markets for recovered construction and demolition materials. However, because of past building practices and the lack of high-purity materials recovered during demolition, the material streams arising from demolition and renovation works are currently not suitable for reuse or closed-loop recycling. Thus about 70% of construction waste material is downcycled and used in low value applications.

During a dedicated interactive session, participants were also asked to consider the **main barriers to circularity in construction**. Generally, it was felt that the construction sector is resisting change and that there is no urgency to switch to reusing or recycling materials. They identified the high costs of separating materials at demolition stage and for upgrading them for the market as main barriers. Participants also underlined a lack of long-term policies ensuring builders and investors that circularity is here to stay and called for specific certification schemes that would provide better quality guidance on recycled construction materials. Participants also noticed that existing knowledge is poorly translated into market uptake and that demand and supply chains for circular materials are not yet established. Moreover, participants observed that reliable business models for recycled construction materials were missing and that buildings were not designed for circularity.

Participants highlighted that to achieve **greater circularity in construction**, it was important to set clear targets for recycling and reusing construction materials and suggested to make it more expensive to throw away or downcycle material. Clear guidelines for end-of-life would support an increased use of recycled materials and subsidies would help bridging the gap between the costs of separation vs disposal. Participants also called for support programmes for circular companies and professional training and encouraged reuse centres and prolongation of life of objects i.e. doors and windows. They also discussed increased research and investments in technologies for proper separation of materials, demolition audits such as in Austria and the use of circularity passports. Last but not least, participants from Ukraine underlined that the country is in need of good practices on how to sort and process construction waste materials.

2. Good practices

Biobased materials for construction

- **Regional public procurement and other policy measures for sustainable construction, Valencia (Spain)**, REDUCES project – The Regional Government of Valencia has developed the **Green Guide on public procurement** environmental measures in the building sector to boost innovation and circular economy. The guide facilitates the tendering and contracting of construction works, as well as the harmonisation in the sector. It aims at unifying technical and economic references, quality control, environmental and technological criteria. Moreover, it enables the optimisation of the resources used, reduces execution times, avoids confusion, conflicts, delays, and cost overruns in procedures.
- **‘Accelerating the adoption of biobased raw materials in the construction sector’, s’Hertogenbosch (The Netherlands)** – The Building Balance programme aims at creating demand for biobased materials in the construction industry and among its clients. It actively helps processors to scale up, certify and connect them to customers in the construction industry and growers of the raw materials. In addition, it also contributes to creating the right market conditions to increase the chances of acceleration and upscaling. Building Balance measures its success by a rapid increase in biobased material use in the construction industry, delivered by satisfied entrepreneurs throughout the chain.
- **‘The cluster perspective on bioeconomy and circular economy wood’, Graz (Austria)** – The Styrian wood cluster is supporting companies in the forest-based sector through an interdisciplinary team of architects, engineers, innovation managers and communication experts. It brings together

170 partners including SMEs, manufacturing companies and research institutions. The cluster supports innovation projects, networking and international cooperation, facilitates entering new markets and provides up-to-date information about the wood value chain. To make a valuable contribution to a successful future of the wood value chain, the cluster has formulated the Wood Cluster 2025+ strategy as an inspiration and agenda for the Styrian forest-based sector.

- **‘Sustainable Construction in Hamburg – insights on learnings and current actions’, Hamburg (Germany)**, KARMA project – The Hanseatic City of Hamburg has many interesting initiatives to support more circular construction in the city. Over the years, Hamburg’s HafenCity has become a test bed for sustainable building. From a timber-built high-rise to the zero-emission house (completely carbon neutral and dismantlable), many forward-looking projects are bringing new methods and materials into construction practice, thus generating important impetus to the real estate sector. An interesting example is the **HafenCity Ecolabel**, which has been launched in 2007 as Germany’s first green building certification system.

Circularity in construction

- **‘Green deal circular construction’, Mechelen (Belgium)**, KARMA project - Green Deals in Flanders are innovative green cooperation projects on various topics. By taking part in such a deal, one enters into a voluntary agreement with the Flemish government. The aim is to undertake sustainable actions and learn from other organizations. **The Green Deal on Circular construction** mobilised more than 370 organisations to work together to embed circular construction as common practice in Flanders. Together they raised awareness about the benefits of circular practices and developed a number of pilot projects.
- **‘Building with urban mining’, Recycon (Denmark)**, INERTWASTE project – The Danish Recycon company produces concrete with 100% recycled concrete aggregates and ordinary cement. The carbon footprint of such product is half of regular concrete. The company is making use of all leftover materials from construction and renovation. They process different fractions of building materials, such as bricks, tiles and sanitary ware into new aggregate materials. Use of recycled materials is significantly reducing the pressure on virgin materials and thus reducing an environmental impact of the construction industry.
- **‘Reuse centre for building material’, Lessebo (Sweden)**, POTEnT project – Building materials have no tradition to get reused. However, in the Swedish Municipality of Lessebo a **reuse centre for building materials** has been created to show that it is possible to create a secondhand market for the materials. Individuals and enterprises leave their building materials at the reuse stations and customers buy the materials with doors and windows being the most popular items for reuse. The reuse centre is run by unemployed people in a labor market project and besides the environmental success, it has also proven to be socially sustainable.
- **‘Stimulating demand for circular construction skills’, Prague (Czech Republic)** – The overall aim of BUS-GoCircular was to address and overcome the challenges of the stimulation of demand for green skilled workforce, along with hands-on capacity building to increase the number of skilled workforce across the value chain. The project developed and implemented a circular construction

skills qualification framework with a focus on multifunctional green roofs, façades and interior elements. A large number of materials for policymakers and practitioners were developed, including training materials for trainers, training materials for public procurers, a guide for public authorities on stimulating demand for circular construction skills and many more.

- **'DECORATOR: Circular transformation in architecture and construction'**, St. Pölten (Austria) – The project is aspiring to catalyse the circular transformation of the built environment in the Danube Region by conceiving the region as a real life-laboratory. The project ties in with the New European Bauhaus initiative pursuing circularity and the transitioning towards a sustainable future as an aesthetic rather than exclusively technological project. At its heart, DECORATOR is a strategic policy development and explorative and piloting project. It develops and tests a new model of collaboration and intervention structured around the cradle-to-cradle approach.

For more information on the good practices, see the accompanying slides.

Site Visit

- **Timber construction 'Forum am Seebogen'** – The architectural outfit 'heri & salli' showed participants their project 'Forum am Seebogen' which emerged as the winning project from an integrated concept competition by the City of Vienna. The timber construction is important in several respects: The possibilities of modular and system timber construction are further developed here and explored in an innovative way. A contemporary prototype was developed to create high-quality living space in a short construction time. Despite the prefabrication, very different room solutions and apartment typologies are possible. Due to its location and concept, the "forum" on the first floor will fulfil a cross-site function and have a largely public character. In addition to the combined units and mini labs, a spacious office area is located on the top floor, which completes the concept of living and working.

3. Next steps

As a result of the workshop, the recommendations on policy measures and next steps for the participants can be summarised as follows:

- Set clear targets for the use of sustainable construction materials in public construction projects
- Showcase the benefits of biobased and recycled construction materials
- Launch targeted information and awareness-raising campaigns and highlight regional lighthouse projects
- Offer training, education and opportunities on sharing experiences including on sorting and processing construction materials
- Increase market demand on through public procurement of sustainable construction materials
- Provide specific subsidies and incentive schemes
- Foster reuse of construction materials
- Encourage the collaboration and cooperation of local value chains for biobased and recycled construction material
- Develop clear guidelines on end-of-waste and simplify certification.

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- **Leading the way towards waste prevention**

Webinars

- **Collection and recycling of construction and demolition waste**
- **District approaches to sustainable energy**

Peer Review & Matchmaking Reports

- **Biobased building materials** - Province of Zeeland, the Netherlands
- **Financing and incentivising energy renovation of condominiums** – Métropole Européenne de Lille, France
- **Circular Bioeconomy** – Province of Noord Brabant, the Netherlands
- **Reducing the carbon footprint of buildings** – Partnership of Latvian Constructors
- **Development of a circular construction industry** – Federal Ministry of Energy, Mining and Industry, Bosnia and Herzegovina

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