News

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Towards a more sustainable building sector

Review of the learning process on “Climate Positive Built Environment Using Bio-based and Re-used Materials”

The building sector must become more sustainable: It is responsible for up to 40 per cent of all CO2 emissions worldwide. The construction industry also consumes many resources, as valuable building materials are rarely recycled. Moreover, it's not just about the construction phase: the way a building is constructed plays a decisive role in how much energy is used for heating or cooling throughout the entire life cycle of the building.

Experts discuss during the dialogue event | Photo: Raquel Gómez Delgado

In order to fight climate change and protect the environment, the construction sector urgently needs to be decarbonized. There are many innovative ways to do this, for example with bio-based materials such as wood, clay and bricks or by recycling used materials.

Local authorities play a key role in making the construction sector more sustainable: as innovation drivers in their own buildings and in the design of building regulations.

As part of a yearlong learning process organized by Connective Cities, representatives from local authorities and research institutions as well as planners and architects shared their experiences and knowledge of climate-friendly constructions and inspired each other's work.

Dialogue event: What must be done and what can we do?

The learning process began with a dialogue event in Potsdam from 13 to 15 November 2023, at which participants from Bhutan, Indonesia, Nepal, South Africa, Berlin, Heidelberg, Lörrach, Munich, Stuttgart and Potsdam reported on how they are shaping the green transformation in the building sector. In Heidelberg and Munich, the aim is to reuse as much existing building material as possible when constructing new urban neighborhoods on former military sites. Architect Nyoman Popo Priyatna Danes explained how traditional and modern technologies were combined in the construction of a hotel complex in Bali. It was important to sensitize the population to the fragility of the landscape and to ecological economic activity.

According to Dr. Susanne Winter from the World Wide Fund For Nature (WWF) Germany and Peter Heuer, Chairman of the Potsdam City Council, it is important to find a sustainable balance between the protection and use of forests when building with wood. Wood for the construction industry must come from sustainably managed forests. Prof Dr. Jürgen Kropp from Bauhaus Erde and the Potsdam Institute for Climate Impact Research (PIK) pointed out that bio-based building materials could mitigate the dangerous heating of cities and that, contrary to some opinions, wood is a stable and durable building material.

The dialogue took place in cooperation with the City of Potsdam, Bauhaus Erde and PIK.

-> Good practice I: Lörrach plans Germany's first industrial estate in timber construction
-> Good practice II: Banepa preserves traditional building methods using bio-based materials

Virtual exchange: tradition, progress and the most solid data basis possible

Shell construction with sustainable materials in Nepal | Photo: Daniel Rank

At the first follow-up event of the learning process on 27 February 2024, Karma Wangchuk, urban planner from Bhutan, and Matthias Schäpers, Senior Project Manager of the Climate-Positive Cities and Communities Initiative at the German Sustainable Building Council (DGNB), presented two approaches to climate-positive construction:

Bhutan, which is largely located in the Himalayas, wants to transform its construction industry by focusing on the circular economy and the use of renewable and bio-based materials. The idea is to create synergies between sustainable forestry, a robust construction sector with the lowest possible impact on the environment, healthy urban landscapes and a green economy with high-quality jobs. Wood plays a central role as a traditional building material.

A carbon footprint assessment can help to make the construction sector more climate-friendly, reported Matthias Schäpers. The entire life cycle of a building, its ecological, economic and social performance and the holistic nature of a construction project are taken into account. When talking about sustainable neighborhoods, we don't focus just on CO2 emissions, but also on biodiversity, resilience, health and climate impact adaptation. Because carbon accounting is a complex and costly model, it cannot be implemented in many countries, partly because they lack the financial and human resources for such a major endeavor.

Adapting Nepalese approaches in Germany

During a delegation trip to Nepal in October 2024, experts from the cities of Heidelberg and Munich and the Technical University of Munich learnt about different approaches to restoring and reusing historic buildings. The delegation group also discussed ways of using more recycled materials in new construction. In the city of Banepa, the experts learnt how much more sustainable traditional Nepalese architecture is than modern construction methods. Local workers are specially trained so that knowledge of traditional building techniques is not lost. The city administration is currently discussing regulations for the increased reuse of building materials and giving great importance to the sustainable procurement of building materials such as wood. A visit to the Living Mountain Lab of the International Centre for Integrated Mountain Development (ICIMOD) showed that hybrid construction methods using steel, concrete and rammed earth are also possible.

Workers in Nepal produce wooden elements using traditional construction methods. Photo: C-RP-Foundation

Outlook: What's next?

The learning process ended on 11 December 2024 with a virtual exchange and the outlook for future information, exchange, cooperation and funding opportunities.

The International Building Exhibition 2027 in Stuttgart will focus intensively on material lifecycles in the construction sector over the next few years. A digital hub combines everything needed for circular construction in the city region: a platform on which materials are offered for reuse, as well as a knowledge platform with innovative ideas, practical examples, data, an overview of stakeholders and educational materials. The IBA'27 "Urban Mining Scan" shows the material flows for five construction projects in the Stuttgart city region and a chatbot based on artificial intelligence on questions relating to material cycles in the construction sector is available online.

The Connective Cities Community is an open platform for working groups on various topics and for different regions of the world. For instance, there is a working group focusing on cost-effective construction of housing in sub-Saharan Africa. Connective Cities' current learning processes on the reutilization of public buildings from the 1960s and 1970s also offer numerous points of reference for sustainable construction.

Finally, the Service Agency Communities in One World (SKEW) at Engagement Global offers municipalities financial support and technical assistance for municipal partnership projects. The funding programmes include the low-threshold small-scale project fund and the Sustainable Municipal Development through Partnership Projects (Nakepa) program.

Seven insights from the learning process:

1. **Achieving a sustainability turnaround in the large construction sector is not easy, but it is urgently needed and there are numerous promising starting points.**
2. **Bio-based raw materials such as wood must be available in sufficient quantities from sustainable cultivation.**
3. **Legal and political requirements should promote sustainable construction and building regulations should facilitate the recycling of materials.**
4. **Good practice examples and innovative ideas need to be disseminated, old ways of thinking broken down and the population convinced of the benefits of more sustainable construction**
5. **Pilot projects can show that building materials can be reused as efficiently as possible.**
6. **Material cycles must become even more important in the construction industry.**
7. **The on-site processing and storage of building materials is essential for the recycling of building materials and it is also possible in confined spaces.**

Voices of participants in the learning process:

"High quality of life and climate protection are not a contradiction in urban development."
Mike Schubert, Lord Mayor of Potsdam

"Buildings constructed from wood have proven to be very durable and stable."
Prof Dr Jürgen Kropp, Bauhaus Earth and PIK

"In Nepal, we still have a tradition of timber construction. We need to preserve this and merge it with modern construction methods."
Rabindra Puri, RP Foundation, Nepal

"It is often said how difficult it is to store material for reuse on a construction site. In Nepal, this has always been possible - and on very small areas in a mountainous landscape."
Moritz Bellers, City of Heidelberg

"Currently, only less than 10 per cent of the potential for recycling building materials is utilised."
Stefanie Weaver, IBA'27 Stuttgart

"In Bhutan, we want to adapt the construction sector to the vision of our country as a deeply sustainable society."
Karma Wangchuk, urban planner from Bhutan

Author: Connective Cities
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