

Insulation from old jeans, walls from waste concrete: Less guilt and more solutions are needed for construction

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Construction material prices are uncommonly high. Material shortages are affecting the construction industry, which uses up to 50% of the

world's raw materials. The pressure to move to a circular economy is substantial.

Post-doctoral researcher at Aalto University, Juudit Ottelin, and Senior Advisor at the Ministry of the Environment of Finland, Adjunct Professor at Aalto University Matti Kuittinen explain how a circular [economy](#) can become reality in [construction](#), not just an empty phrase.

"You hear people saying that if concrete were a country, it would be the world's biggest polluter right after China and the United States. The most important thing in this situation is to strive for solutions, not guilt-tripping. Very few industries can contribute to [climate change mitigation](#) as much as the construction industry," says Kuittinen.

Ottelin points out that when speaking of the environmental impacts of construction, often times doing something is compared to doing nothing. This creates an unfair set-up.

"Building with wood should not be compared to leaving forests untouched—wood construction should be compared for example with concrete construction," Ottelin remarks.

More from less

Finland aspires to be [carbon-neutral](#) by 2035 and carbon negative soon after.

"Construction has a heavy material footprint. Reaching Finland's ambitious climate goals requires big changes in the way that we produce the built environment. A circular economy creates immense opportunities for the construction industry to mitigate climate change," Ottelin highlights.

From a circular economy viewpoint, the existing building stock is seen as a resource that can be converted, developed, and improved.

New buildings can be made versatile and adaptable, easily maintainable, and repairable—and they can be designed so that building parts and materials can be reused or recycled at the end of the building's life cycle. Ideally, recycled materials will also be utilized as much as possible during the construction phase.

There are many inspiring examples of circular economy solutions in construction from around the world. Architecture studio Lendager Group has built a three-storey town row house in Copenhagen utilizing recycled waste concrete, disused floorboards, and reused double windows. In Amsterdam, ABN AMRO bank built a negotiating center, Circl, from recycled materials. Even the roof insulation of the building is made of old jeans donated by the bank's employees.

"A circular economy is first and foremost material efficiency: it is about achieving more with less. Upcycling materials to create higher quality or value is also an important part of a circular economy," Ottelin says.

Kuittinen and Ottelin emphasize that no construction phase is carbon-neutral, regardless of what material is used: wood, steel, concrete, or recycled material.

The biggest environmental act would be not building at all. If this is not an option, renovating existing spaces is the next best choice. Only after these alternatives have been explored is it worth considering new construction.

Circular economy is not a new idea. It has merely been replaced by the current linear economic model, in which products are manufactured, consumed, and thrown away.

"For me, circular economy means returning to old building methods that were used before linear economy—a good example from Finland is recycling old usable logs into new log buildings. A circular economy means smart thriftiness in resource use," Kuittinen says.

Legislation is fast-tracking a circular economy

Carbon footprint is a familiar term for many: it refers to the climate load of a product or service. Carbon handprint is a more positive indicator. It describes the benefits of a product or service in reducing CO₂ emissions. During upcoming years, both of these terms will be on everyone's lips in the [construction industry](#), as significant changes are taking place in construction legislation.

Already in the next few years, a climate study that maps the carbon footprint and handprint of a building will be a prerequisite for obtaining a building permit. By 2025, legislation will require all new construction to be low carbon.

"The new legislation aims to get builders to take into account the climate emissions of buildings throughout their life cycle, and especially in material choices," Ottelin says.

Planning is at the heart of a circular economy. In spring 2021, an open, free-of-charge construction emissions database ([co2data.fi](#)), was published in Finland, providing objective data on the carbon footprint and handprint, material efficiency, and recyclability of construction products used in Finland.

"The database will enable architects not only to decrease the negative environmental impacts of buildings, but also to leave a positive material reserve from the building as a legacy for future generations," Kuittinen envisions.

Put together, the legislative reform and the emissions database significantly advance a circular economy. In addition, new solutions are needed for example for circular economy logistics.

"If I as an architect want to utilize materials from demolished buildings, how will the [digital information](#) appear on my laptop telling me that there are bricks available in Pieksämäki, and doors in Vaasa? And if I get the information, who will keep the bricks and doors stored for me until my client builds the house two years from now?" Kuittinen ponders.

Do we pride ourselves on consumption or eco-friendliness?

The transition to a circular economy is a significant opportunity for the construction sector as a whole. There is great demand for expertise in the field both in Finland and abroad.

"Just 10 years ago, when I was lecturing on resource-efficient construction, the subject was considered almost a curiosity. Now circular economy is taught at several universities, polytechnics, and vocational postgraduate courses. This is very positive," Kuittinen affirms.

"In legislation, Finnish expertise in promoting a circular economy in construction is already an export product. Enthusiastic inquiries keep pouring in from abroad about the emissions database for construction and the reform of the Land Use and Building Act," he continues.

Can Finland achieve a circular economy in construction with these measures? Not quite. As a final point, Kuittinen and Ottelin raise an essential issue: consumer attitudes and behavior.

"What we as consumers feel proud of has a significant impact on the progress of a [circular economy](#) in construction. Do we take pride in building a new house and buying a new car—or for using public transportation and choosing to renovate instead of [building](#)?" Kuittinen describes.

"Total consumption is key. Thriftiness in construction is not an environmental act if you use all the money you saved on air travel. Environmentally conscious consumers are very well aware of the consequences of their consumption decisions. It will be interesting to see what average consumers do in upcoming years. Hopefully, ecological choices will soon become a matter of honor in construction," Ottelin says.

Provided by Aalto University

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