Circular buildings: Paving the way to a net-zero industry

POLICY BRIEF FINDINGS

5 key messages

- A circular economy can contribute significantly to reduce carbon emissions and achieve the climate targets in the hard-to-abate sectors.
- Buildings are a key value chain related to a high demand for energy-intensive materials and characterised by high circularity potentials.
- Within the EU-funded project newTRENDS, a modelling approach and data basis were developed and applied, that quantify the contribution of circular buildings to the industry decarbonisation.
- Besides the cycling of materials, actions addressing building design and use can reduce steel and cement demand for buildings by up to 38% respectively 26% in 2050.
- The current EU policy mix is not sufficient to exploit these material demand emissions reduction potentials.

5 points for improving the policy mix for circular buildings

- A life cycle perspective: The policy mix should address all stages of a building’s lifecycle well-balanced and without contradictions.
- Broaden the scope: An understanding of the circular economy beyond the cycling of materials is necessary to fully exploit its potentials.
- Push and pull: The instruments should support both - a market push and a market pull, to equip the EU market for a circular economy.
- From voluntary to obligatory: Instruments such as green public procurement can be used to roll out obligatory requirements to all consumers.
- Stay focused: Product-specific requirements are necessary to meet the special requirements for buildings (affordability, liveability and sustainability).

The circular economy and the 9Rs

While the initial idea of the transformation from a linear to a circular economy was based on the recycling of materials (Boulding 1966), more recent studies also consider strategies addressing consumption patterns. For instance, Kirchherr et al. define the circular economy “as an economic system that replaces the ‘end-of-life’ concept with reducing, alternatively reusing, recycling and recovering materials in production/ distribution and consumption processes” (2017). A well-known framework to categorise and prioritize these strategies are the 9Rs:

- Smart manufacturing
- Increase circularity
- Extend lifespan of product & its parts
- Useful application of materials

The relevance of circular buildings for the industry decarbonisation

Buildings are one of the main demanders for energy-intensive materials such as steel and concrete (including the precursors cement and clinker), responsible for a large share of carbon emissions in the industry sector (Luo et al. 2022a). Furthermore, several studies showed that a circular economy can contribute significantly to reduce the demand for building materials (Circle Economy 2022; Hertwich et al. 2020; Le Den et al. 2020; Material Economics 2018).

Using the modelling approach and the data basis developed within the newTRENDS project (see info box: Modeling approach and data basis developed within the newTRENDS project), a reference case for the steel and concrete demand in buildings until 2050 were modelled.

If building use and construction method do not change, the material demand will increase and drive industry emissions (see figures). It is therefore crucial to reduce the prospective demand for building materials to achieve the European climate goals.

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