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Research Reports November 2019

In Focus: Building and infrastructure consumption emissions

[Climate Action Planning](#)

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By 2050, the global urban population will have increased by 2.5 billion people. The world will build the equivalent of a city of more than 1.5 million people every week until 2050 to accommodate them.

This report builds on *The Future of Urban Consumption in a 1.5°C World* to give more details about emissions from building and infrastructure construction, and what cities can do to reduce these emissions by 2030. Consumption-based emissions from building and infrastructure construction means the emissions associated with the sourcing, production, transport, use and disposal of materials, and the emissions on construction sites themselves. The report focuses on C40 cities but the findings are relevant to cities more broadly.

The report's headlines are:

- While food is currently the biggest source of consumption-based emissions for C40 cities, food is expected to be overtaken by emissions from building and infrastructure construction between 2017 and 2050, producing 21% of consumption emissions.
- Emission sources: 60% of construction emissions are associated with the production and delivery of building materials, mainly cement and steel.

The report identifies interventions to reduce consumption emissions from buildings and infrastructure, which are listed below. If cities meet the most ambitious targets for these consumption-related interventions, they can achieve a huge 44% reduction in buildings- and infrastructure-related emissions between 2017 and 2050. The remainder will require other interventions by cities as well as national governments, developers and other parties, including the development of new technologies.

The priority interventions are:

- **Implementing efficiency in material design.** Designers and building codes often require more material than is structurally necessary, creating material redundancy. Eliminating this waste at the design stage has the largest savings potential and could cut buildings- and infrastructure-related greenhouse gas emissions by 18% between 2017 and 2050.
- **Enhancing existing building utilization.** Buildings are under-utilised and often discarded far before they have reached the end of their useful life. If cities optimise the use of existing structures, reducing the need for new buildings, they could cut emissions by 11% between 2017 and 2050.
- **Switching high-emission materials to sustainable timber, where appropriate.** Timber construction is a viable solution where there is availability of local, sustainably-managed forests that follow internationally-recognised standards. Switching to timber usage could cut emissions by 6% between 2017 and 2050.
- **Using lower-carbon cement.** Concrete is one of the most carbon-intensive construction materials, as the production of its cement component requires extreme heat and releases a great deal of CO₂. Reducing the need for cement in concrete by using lower-carbon alternatives could potentially cut emissions by 6% between 2017 and 2050.
- **Reusing building materials and components.** Recycling and reusing building components has immense potential in the long term, and reducing virgin steel use now could potentially cut emissions by 3% between 2017 and 2050.

On-site emissions also need to be addressed to realise net-zero emissions targets, particularly addressing emissions from construction vehicles. However, the report doesn't give quantified potential emission reductions in this area due to a lack of data available.



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