

Concrete: the world's 3rd largest CO₂ emitter

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How can this material, essential for global housing, construction and infrastructure, be made less damaging to the planet?

How bad can it be?

Cement is the most utilised material on Earth, consumed to make concrete at a rate of some 150 tonnes each second.

According to the Global Cement and Concrete Association (GCCA), around 14 billion cubic metres of concrete are cast each year.

Cement production alone accounts for as much as seven percent of global CO₂ emissions—three times the emissions produced by aviation.

"That's more than all the emissions from the European Union or India, just behind those of China and the US," Valerie Masson-Delmotte, a key contributor to the UN's Intergovernmental Panel on Climate Change, told AFP.

And with ever-growing urbanisation rates in Africa and Asia, the planetary impact of this elementary building material is only likely to grow.

How does cement emit CO₂?

Cement is the main binder that holds together the pebbles and stones in concrete. It is primarily made of clinker, a residue produced by firing clay and limestone in a furnace.

When it is heated, CO₂ is produced.

In order to manufacture one tonne of [cement](#), the process of firing to 1,400 degrees Celsius produces roughly one tonne of CO₂.

This chemical reaction, which has stayed unaltered since cement was first manufactured over 200 years ago, is responsible for 70 percent of the sector's emissions.

The remaining 30 percent comes from the energy used to fire the furnaces themselves.

How to reduce emissions?

The concrete industry has said it wants to be carbon neutral by 2050. In October it set the objective of reducing its emissions "an additional 25 percent" by 2030.

This would save some five billion tonnes of CO₂ over the course of the decade.

Purging the sector of CO₂ emissions is heavily reliant on technologies such as carbon capture and storage (CCUS) which have yet to be deployed at any meaningful scale.

But it also proposes changes such as recycling old concrete and replacing hydrocarbons in its blast furnaces with biofuels.

State-run behemoths such as the China National Building Material Company have promised to "play their part" in the industry's decarbonisation.

At the other end of the scale, several [start-ups](#) are coming up with new ways to save emissions.

US-based Solidia plans to capture CO₂ and use it to dry out the concrete mix, minimising the amount of water needed in production.

In Canada, CarbonCure is exploring how to inject liquified CO₂ into concrete and store it there.

Perhaps most importantly, the industry is banking on developing new "green" cements, made from recycled materials.

In Britain, 26 percent of concrete is already manufactured in this way, according to the GCCA.

In May France, which is home to several major concrete firms, issued new cement production regulations.

Starting next year, all new buildings will be subject to carbon restrictions for the duration of their lives, from construction to demolition.

Is 'green' cement the future?

As things stand most green cements are being made by new producers; traditional manufacturers say it will take time for them to modernise their existing machinery.

One such start up, Hoffman Green Cement, makes cement in France from industrial waste: clay sludge, blast furnace slag and fly ash, which is a by-product from coal burning.

Even with a price tag 25 euros (29 dollars) more expensive per square metre, demand is high, says founder Julien Blanchard.

"The cement industry plans to eliminate its emissions in 2050," he told AFP.

"With our breakthrough solutions, we can get them starting now."

The stakes for the planet are high: the UN estimates that three quarters of the world's infrastructure by 2050 has yet to be built.

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