



As governments, companies and consumers push cement producers to decarbonize, CIO expects the production of low-carbon cement to grow, although the change will not happen overnight. (UBS)

# What does decarbonizing cement actually mean?

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**Cement is the backbone of our buildings, roads, dams, and bridges. It is the second-most used material behind water and accounts for approximately 7% of the yearly global human-made CO<sub>2</sub> emissions (International Energy Agency). If cement was a country, in 2022 it would be the third-largest emitter behind China and the US, and ahead of India.**

Despite a recent slowdown in cement demand as a result of inflation and the China real-estate market, cement demand is still expected to increase 12 to 23% by 2050.

Cement production involves the creation of clinker, which serves as the binding component, produced by the heating of limestone. Clinker production contributes to approximately 60% of CO<sub>2</sub> emissions while the remaining 40% arises from heating the kiln at 1,400°C, mainly fueled by coal and gas.

In the Net-Zero Scenario of the International Energy Agency, the CO<sub>2</sub> intensity of cement production should arrive at 0.09 tonne of CO<sub>2</sub> per tonne of cement produced by 2050. Currently, the industry averages at 0.58 tCO<sub>2</sub>. Numerous cement producers have pledged to reach Net Zero by 2050, but can they hold their promises?

Corporate strategies are aimed at reducing the clinker-to-cement ratio and enhancing energy efficiency through the adoption of alternative fuels to mitigate carbon emissions in the industry. Additionally, efforts to optimize building design and minimize cement usage in construction projects offer potential for emissions reduction. While electrified kilns (cylinder rotating about its axis, used to heat up the limestone) have shown promising results, their development is still in the early stages. Furthermore, the recyclability of concrete presents another key aspect as demolished concrete can be repurposed as aggregate in new construction projects.

As a hard-to-abate sector where CO<sub>2</sub> is emitted as part of the chemical conversion process, carbon capture, utilization, and storage (CCUS) will be a key pillar in the decarbonization process of the cement industry. In Europe, a major cement producer inaugurated its carbon capture and storage facility in 2024 capable of capturing half of the emissions during the clinker process, a step in the right direction. However, according to the WEF, less than 1% of CCUS technologies are currently deployed in cement plants and further infrastructure investment of USD 110-240 billion will be needed by 2050, while the Global Cement and Concrete Association estimates that CCUS will contribute 36% of the emission reduction required to achieve Net-Zero Cement, making it the most important lever.

Finally, cement producers as well as emerging start-ups in the field are testing the viability of switching limestone to calcium silicate. Unlike limestone, calcium silicate does not contain any CO<sub>2</sub> and is even more abundant than limestone. This breakthrough technology is also at an early stage and not yet deployed at scale.

Research conducted by the Climate Portal from MIT showed that European carbon pricing needs to reach at least 150 euros per tonne to create sufficient incentives for cement producers to fully decarbonize their operations by 2050. Yet, low-carbon cement production represents less than 1% of the global supply. Cost to decarbonize cement could add 40 to 120% of green premium, but this increase translates into a 1.5% to 3% increase in the cost building a house (Mission Possible Partnership).

The eventual route for cement decarbonization remains uncertain, and while we see opportunities to decarbonize cement in the long run, we see challenges in the short and medium term, as most solutions are not at a sufficient commercial scale yet.

### Investor takeaways

- As governments, companies and consumers push cement producers to decarbonize, we expect the production of low-carbon cement to grow, although the change will not happen overnight.
- Builders in the near term will need to trim emissions where feasible, with cement as a fixed contribution. As such, energy efficiency solutions are more likely to benefit while innovation in the cement sector continues.
- We recommend investors focus on long-term investment themes related to decarbonization such as *Clean Air and Carbon Reduction*, and consider fixed income opportunities such as green bonds. For those interested in low-carbon cement, bonds issues by cement-producing companies may offer another way to gain exposure.

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Original report - [Perspectives Investing in water, cement and cocoa price surge, 5 April 2024.](#)

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