

CITY OF CORAL GABLES

--MEMORANDUM--



The City Beautiful

TO: Mayor Lago, Commissioners Castro, Fernandez and Menendez, Staff and Residents
FROM: Vice Mayor Anderson
DATE: October 9, 2023
SUBJECT: Carbon Sequestered Cement

In August 2019, I read the attached article, CarbonCure process makes concrete stronger, sequesters carbon, <https://energi.media/innovation/carboncure-concrete-system-can-trap-co2-emissions-forever/> and began to research the benefits and use of carbon sequestered concrete.

Cement is an essential ingredient in concrete. However, cement releases a tremendous amount of carbon dioxide into the atmosphere during the manufacturing process. Cement is the second-largest source of carbon-dioxide emissions in the world.

Injecting CO₂ into concrete during the curing process reduces the amount of cement needed and sequesters the CO₂ into the concrete forever. CO₂ also makes concrete stronger. In addition, use of a carbon injection process provides LEED certification points for a building. See <https://ozinga.com/product/carboncure/>.

For the past two years City staff and I have obtained and reviewed technical materials on carbon cured concrete. In addition, we have researched the availability and cost of using carbon cured concrete in Miami-Dade County. The cost of using carbon cured concrete in construction from local suppliers is currently the same as using traditionally cured concrete. Therefore, where use of carbon cured concrete is technically feasible, the construction industry and our City can significantly reduce the CO₂ emissions for new construction.

CarbonCure concrete system can trap CO2 emissions forever



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CarbonCure process makes concrete stronger, sequesters carbon

CarbonCure, a Canadian startup company, has devised a way to make concrete that also traps harmful CO2 emissions forever and makes the concrete stronger than traditional methods.

The process of making concrete requires superheating of calcium carbonate, or limestone, and releases tremendous amounts of carbon dioxide into the atmosphere.

The International Energy Agency says cement is the world's second-largest source of carbon dioxide and is responsible for 7 per cent of all global man-made greenhouse emissions. The US Geological Survey reported that in 2017, cement production was responsible for about 4 billion pounds of CO2.

CarbonCure's system takes captured CO2, injects it into concrete as its being mixed, and then once it hardens, the carbon is sequestered forever. **The CO2 is turned into a mineral as it reacts with the concrete during the process.**

"The best thing about it is **the mineral itself improves the compressive strength of the concrete,**" Christie Gamble, director of sustainability at CarbonCure, told CNNMoney.

"Because the CO2 actually helps to make the concrete stronger, concrete producers can still make concrete as strong as they need to but use less cement in the process."

By using less cement, producers can drastically cut their emissions.

Thomas Concrete of Atlanta has been using the CarbonCure system since 2016. The company says since it adopted the process, it has prevented 10 million pounds of CO2 emissions.

Justin Lazenby, manager of technical operations at Thomas Concrete, told CNNMoney that the move toward greener tech is a long-term decision that should be embraced by the concrete industry.

"The industry as a whole has always kind of looked at trying to solve today's problems with yesterday's technology, which doesn't really work," he said.

Thomas Concrete has an agreement where it pays to use the CarbonCure system and buys captured CO2 from a fertilizer plant. **The company says the savings they see by using less cement equal the costs involved with the system.**

"We understand that to make environment impact, you have to make business sense," CarbonCure's Gamble said.

725 Ponce, a new mixed-use development in Atlanta will become one of the largest structures ever made with CarbonCure concrete when it opens next year.

According to CNN, **the 360,000 square foot office building will save 1.5 million pounds in CO2 from being released into the air.** Gamble says **that is the same amount that 800 acres of forest would sequester in a year.**

Despite the success, only 90 concrete plants in the US and Canada are using the CarbonCure system, a small fraction of the 5,500 plants in the US alone.

While companies have been slow to adapt to the new system, Gregg Lewis, executive vice president of strategy for the National Ready-Mix Concrete Association, told CNNMoney that technologies like CarbonCure will help push the industry toward a more sustainable future.

"[It will] offer a huge advantage to how we build as an industry," he said.

Christie Gamble says that if the industry could cut even just 5 per cent of its carbon footprint, that would be a significant change from its current output.

On a larger scale, "If this technology is deployed across the globe, we could reduce about 700 megatons of CO2 each year. That's the same as taking 150 million cars off the road every year," Gamble said.

She added "Maybe it will take 20 years; maybe it will take 50 years. Maybe something crazy will happen and it will happen in five years. But we're starting to see that process."

The money making potential of systems that use captured CO2, like CarbonCure is impressive. Gamble says **"This concept of beneficial reuse of CO2 is expected to be a one trillion dollar industry by the year 2030."**

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