

# BioMason Makes Bricks from Bacteria Without Heat or Clay

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by [Steve Hanley](#)

BioMason is a North Carolina startup company that manufactures bricks without heat or clay. About 8% of global carbon emissions come from making bricks, according to the company's co-founder, Ginger Krieg Dosier, citing information from the [EPA](#). The BioMason process not only creates no carbon emissions, it even re-uses the water needed to make its bricks.

Founded in 2012 by Dosier and her husband, Michael, the building-materials company grows bricks and masonry from scratch without the need for any heat. While traditional brick making requires heating clay in kilns at 2,000 degrees for several days — which releases massive amounts of carbon emissions into the atmosphere — BioMason injects sand with microorganisms to initiate a process like the one that creates coral. The technique takes four days. Once completed, the bricks are strong enough for use in houses, commercial buildings, and other structures.

If the whole thing sounds a little weird to you, Dosier understands. “I knocked on a lot of doors of scientists and microbiologists,” she says of her time spent researching BioMason’s brick-making method, “and they were kind enough to not tell me I was crazy.” Investors agreed. BioMason raised \$2.8 million in seed funding, grants, and awards, most of it during 2013. The money included more than \$500,000 from the Postcode Lottery Green Challenge, which featured a jury chaired by Richard Branson.

Dosier studied architecture at Auburn University then became a graduate student at the Cranbrook Academy of Art in Michigan. While working for an architectural firm in 2005, she

was asked to explore green alternatives for building materials. When it came to brick and masonry, her searches came up empty. “That kind of stuck with me for a little while,” she says.

She thought coral might hold the answer. “I looked at how coral was able to make these incredible structural formations that could withstand water and erosion and began really researching how it was able to grow.” She asked scientists at Research Triangle Park in North Carolina if the process could be used to make bricks. It could be done, they said. It’s just that no one had ever tried it before.

“This required a rare combination of talents and areas of intelligence,” says Patrick Rand, professor of architecture at N.C. State, who advised Dosier on the project. “She sparked the whole process by imagining that biochemistry could do in days what geological processes have taken millennia to accomplish.” Dosier then assembled a team of employees that includes biologists, architects, engineers, and experts in fermentation.



Every bricks starts with sand packed into rectangular molds. The molds are then inoculated with bacteria, which wrap themselves around the grains of sand. With each bacteria covered grain of sand acting as a nucleus, calcium carbonate crystals begin to form around it. An irrigation system feeds the bricks nutrient rich water over the course of several days to facilitate the process. The crystals grow larger and larger, filling in the gaps between the grains of sand. After three to five days, the bricks are ready for use.

Sustainable building materials currently amount to a \$36.1 billion industry. It is expected to grow by more than 10% annually until 2020, according to market researcher IBISWorld.

Finding customers is a daunting task. “The design and construction industry is a big dinosaur,” says Ihab Elzeyadi, a professor at the University of Oregon’s Ph.D. in architecture program. “It moves very slowly. It doesn’t embrace change very easily.” There are also building codes to be met and building inspectors to convince. While there are industry standards for traditional bricks and masonry, no such measures yet exist for biological products.

But Dosier says once potential customers see the results of durability testing performed by third-party labs, they’re convinced. The bricks have proved to be as durable as sandstone. They also can be made in many shapes and sizes. BioMason has licensing agreements with two US-based

manufacturers of construction materials and is in talks with several more, including two European companies. Her bio-bricks are expected to be competitive with standard bricks by the time they hit the market in 2017.

Dosier is committed to finding ways to reduce greenhouse gas emissions. “I really wanted to pursue a different approach to how materials were made,” she says. “It just didn’t seem right for us to essentially extract material from the ground and then fire it with quite a large amount of fossil fuel just to make a hard product.” She says, “Our goal is to impact. It’s a global goal,” says Dosier. “We wanted to do what had never been done before, to push the boundaries. And instead of being ‘less bad,’ we wanted to completely redo it—the hard way.” Elon Musk couldn’t have said it any better.

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