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Ancient Farming Practice Draws Cash From Carbon Credits

Biochar, which pulls carbon from the atmosphere, is embraced by companies to offset emissions

By Amrith Ramkumar Follow | *Photographs by Alexandra Hootnick for The Wall Street Journal*

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Forget whiz-bang technologies that are supposed to solve climate change. An ancient agricultural practice that removes carbon from the atmosphere is getting fresh attention and game-changing cash from big companies.

Biochar is a black substance similar to charcoal that when buried underground sequesters carbon dioxide, the primary greenhouse gas that causes climate change. It has long been used to improve soil. Now it has suddenly become a lucrative business thanks to carbon credits that companies use to offset their own emissions.

Among the buyers are JPMorgan Chase JPM **-1.91%** ▼ & Co. and Microsoft Corp. MSFT **0.50%** ▲ They are attracted to a process that actually removes carbon from the atmosphere and buries it underground, rather than many credits whose impact on emissions isn't clear.

Nearly all of the roughly 65,000 metric tons of carbon dioxide that have been removed from the atmosphere to date have been sequestered using biochar, according to estimates from data provider CDR.fyi.

There isn't much money to be made selling biochar to improve soil. Carbon credits changed that. "When the only potential revenue was through biochar sales, there just really wasn't much there," said Josiah Hunt, chief executive of Pacific Biochar Benefit Corp., a California startup that works with biomass power plants to produce biochar, then sells it to farmers.

Biochar was used by farmers in South America thousands of years ago because they found that it helped soil retain water and nutrients.

Carbon-credit sales now generate millions of dollars for some biochar businesses. “The carbon credits and society’s decision to act on climate change make this a real business,” Mr. Hunt said.

He was working as a landscaper in 2008 when he read an article in National Geographic about biochar's potential to boost soil health and address climate change. After making his own biochar and testing it in soils, he launched the company that became Pacific Biochar a few years later.

The business struggled because the price was too high, roughly $600 a ton. That changed in late 2020 when the company started selling carbon credits for roughly $150 per ton of carbon dioxide removed to Microsoft and others through a platform called Carbonfuture.

The extra revenue let Mr. Hunt cut prices and sales grew. He now delivers biochar to vineyards and other businesses. Pacific Biochar's sales are expected to hit a few million dollars this year, the majority of which is money from carbon credits.

Josiah Hunt, CEO of Pacific Biochar Benefit Corp., struggled to grow sales before carbon credits let him bring in extra revenue and cut prices.

Companies are willing to pay many times more for removal credits like these than traditional offsets because there is more certainty they are removing carbon. Many offsets linked to projects such as keeping trees standing have been shown to have limited environmental benefits. The potential to remove large amounts of carbon and additional soil benefits make biochar credits attractive, said Brian DiMarino, JPMorgan's head of operational sustainability.

Biochar was used by farmers in South America thousands of years ago. They found that it helped soil retain water and nutrients. It can be particularly effective when mixed with compost and help poor-quality soil that has been hurt by erosion, pollution or agricultural activity, farmers say.

Most biochar is made using a process called pyrolysis that heats up organic matter while restricting levels of oxygen so the material smolders rather than burns and produces the charcoal-like material. Unlike combustion, where a fuel source reacts with oxygen and releases greenhouse gases into the atmosphere, pyrolysis keeps most of the carbon trapped.

The plants used to make biochar—often agricultural waste like corn stalks—absorb carbon as they grow. The amount of carbon emitted by the production of biochar can be a small fraction of what is absorbed. Burying the biochar effectively sequesters the difference.

Unlike other techniques such as direct-air capture and storage that require building high-tech machines to suck in carbon and finding ways to bury it underground, biochar sequestration typically entails mixing the carbon-rich material with the soil. It has received a fraction of the funding and attention of other carbon-removal techniques.

Analysts estimate the U.S. currently produces roughly 100,000 tons of biochar a year, a fraction of what would be needed to make a dent against climate change. The U.S. emits about 6 billion tons of greenhouse gases a year.

One of the sector's biggest obstacles is making sure the carbon stays sequestered for hundreds or thousands of years. The length of time carbon stays sequestered through biochar can vary based on soil and microbial conditions.

That uncertainty and some studies showing that the time could be shorter than expected have prompted calls for the creation of an independent standards body to oversee the new market. That is also the case for other methods of carbon removal such as direct-air capture.

"We need some guardrails and good-quality standards," said Steve McIntyre, president of vineyard-management company Monterey Pacific Inc., which farms wine grapes on about 16,000 acres in central California and has been testing biochar for several years. Among those trying to create standards and boost the market are Carbonfuture and carbon-removal marketplace Puro.earth—majority owned by exchange operator Nasdaq Inc. They audit removal processes before letting companies sell credits through their platforms.

The mix of biochar and compost has increased grape yields and allowed Monterey to use less potassium and phosphorus fertilizer. It has gone so well that Monterey recently helped launch a new company that aims to start producing biochar and generating carbon credits this year.

Some vineyards say applying biochar has increased grape yields and that the substance is particularly helpful in improving low-quality soil.

Governments and nonprofits are attempting to grow the nascent industry. The U.S. Agriculture Department recently said funding is available for farmers who apply biochar and meet certain conditions. The International Biochar Initiative is spreading the word to farmers and project developers in poor countries.

Tom and Tony Marrero, 50-year-old twin brothers, started Wakefield Biochar in 2014 with their father, a University of Missouri chemical-engineering professor. Sales took off recently when the company signed contracts with big companies such as Koch Industries Inc.'s Georgia-Pacific LLC to dispose of their wood waste by turning it into biochar.

Wakefield Biochar has removed roughly 15,000 tons of carbon, the most in the industry, according to CDR.fyi, and generated a few million dollars in sales last year. Selling carbon credits to companies including JPMorgan and reinsurance firm Swiss Re AG has allowed the company to continue expanding its operations.

"All these things are happening partly because of our ability to be in the carbon market," said Tom Marrero, the company's president and a former agent with the Federal Bureau of Investigation.

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