The Biochar King of Minneapolis

Jim Doten will soon rule over one of the first municipally owned carbon removal programs.

EMILY PONTECORVO • JULY 05, 2024

Heatmap Illustration/Getty Images

Minneapolis may be the only city in the country with a carbon sequestration program manager on staff. Now, Jim Doten — who holds that title — is about to realize his dream of starting up one of the first municipally owned and operated carbon removal projects.

The Minnesota metropolis has just purchased its very own biomass pyrolyzer, a machine that heats up tree clippings in a low-oxygen environment and turns them into a form of charcoal called biochar. As the wood grew, it sucked carbon out of the air

Biochar can be mixed into soil, and has a wide range of demonstrated benefits, including increasing crop yields and enhancing the soil's capacity to hold water. Some studies suggest it can filter contaminants out of stormwater. The city plans to use the biochar in public works projects and donate it to community groups in "green zones," neighborhoods with high levels of pollution and marginalized populations. It's also in talks with other local governments that might be interested in buying some.

"One of the things we want to do is be a regional resource for other government agencies," Doten told me, "whether it be city, county, state agencies, making biochar available for projects addressing the effects of climate change, sequestering carbon, as well as providing environmental benefits throughout our infrastructure."

Studies say that we should be shoveling billions of tons of CO2 out of the skies each year by 2050 to keep climate change in check — and that's on top of cutting emissions to near-zero. Scholars have compared the vast responsibility of cleaning up the carbon in the atmosphere to municipal waste management: Since the task is more of a public good than a profitable enterprise, it may be best suited for the folks we already rely on to take out the trash.

Flagstaff, Arizona, and a number of other cities, to form the Four Corners Coalition, which is pooling resources to finance local carbon removal projects. But Minneapolis is the first, at least that I'm aware of, to essentially start its own carbon removal department.

Doten became a biochar evangelist more than a decade ago. He first learned of the substance's various benefits while working in southern Afghanistan with the Minnesota National Guard in 2012. He was serving as a hydrologist on an agribusiness development team and helping village farmers rebuild soil health to improve crop yields. When he returned to Minneapolis the following year, he was eager to test out biochar's benefits at home.

Over the decade that followed, Doten worked days as the supervisor of environmental services for the city's health department. But on the side, he led a number of biochar passion project. He convinced the public works department to use biochar in landscaping projects along street medians. He started a partnership with the Shakopee Mdewakanton Sioux, a tribe that runs a compost facility, to provide a mix of compost and biochar to urban gardens around the city. He got the health department to sponsor a research trial at the community farm at Little Earth, a federally-subsidized housing complex primarily occupied by indigenous families. Though the study was disrupted by vandalism, the city gathered enough data to show that the plots with biochar-amended compost saw superior plant health, food production and water retention during August drought conditions.

Doten told me the limiting factor for expanding these programs was the availability of biochar. The city was buying it and shipping it in from elsewhere, which Doten was also not happy about because the emissions from shipping cuts into any climate benefits. Then, in 2019, he had the opportunity to see what the city could do if finding biochar wasn't an issue. Bloomberg Philanthropies flew Doten and his colleagues to Stockholm, Sweden, where five years earlier, the charity had helped the city finance its own biochar production facility.

"So I went to Stockholm along with one of our city council members and the head of public works, and 'I'll be darned, oh my gosh, Jim, you weren't lying, this is a real program and it does really great things in Stockholm!" Doten recalled. He waxed on about the "Stockholm method" for planting urban trees that involves using biochar and which can help manage the flow of stormwater. Stockholm is also sending waste heat from its pyrolysis facility into a district heating system used to warm apartments.

A few years later, Bloomberg Philanthropies invited other cities to apply for funding to build similar programs. Minneapolis was one of three U.S. cities, along with Lincoln, Nebraska, and Cincinnati, Ohio, to win $400,000 in 2022 to develop city-wide biochar projects. All three are expected to begin construction on their production facilities this year; Doten hopes the Minneapolis facility will be operational this fall.

The city has made an agreement with Xcel Energy, the local utility, to collect the tree clippings from the company's electrical line maintenance work — previously that material was getting burned in a power plant. Doten has also found a site for the facility — a somewhat isolated industrial property near railroad tracks — which was no easy feat in an urban environment. "It's very difficult to site a place like this within the city that's not near residences, properly zoned, get the neighborhood approvals, council approvals, and make sure everybody's happy — well I shouldn't say happy, but at least satisfied with the result."

The other big piece was sourcing the equipment. As my colleague Katie Brigham has reported, there are *a lot* of biochar companies. According to one carbon removal database, there are more than 240 such companies around the world — more than any other type of carbon removal company. But most of them have developed fancy pyrolysis machines for their own use, to develop their own carbon removal projects. There aren't that many offering the technology for sale. Doten said he talked to most of the ones that did, and there was one company whose bid came in far below the rest — BluSky, a small startup based in Connecticut. Minneapolis purchased the company's equipment, nicknamed the "Vulcan" system, for $585,000.

"We really believe in what Jim is doing and what the city is doing," Will Hessert, the company's CEO, told me. "We want to see more cities doing this."

Writing in *The New Republic* in 2022, four scholars made a case for a public model for carbon removal. They argued that if the responsibility is left to private companies, it could end up like plastic recycling, which is basically a big lie and "distracts from underlying causes while pollution continues." Or it could end up like privately owned electric utilities who take shortcuts that end up costing lives, like how PG&E's inadequate maintenance led to the 2018 Camp Fire in California.

"Imagine a regional, community-run carbon removal authority," they wrote, "that simultaneously pursues wetland restoration and forest management, safely operates an industrial removal facility and associated mining and geological sequestration

That's not what's happening in Minneapolis. The climate benefits are likely to be minimal. The city couldn't provide me with an estimate, but a story about the project from last year noted that the city anticipated having a system that could handle 3,600 tons of wood waste per year, resulting in an estimated 1,500 tons of CO2 removed. That's about 0.04% of the city's current annual emissions.

There is a real opportunity for cities to play a role in carbon removal. A study from 2022 found that cities might be able to play a significant role in carbon removal — potentially removing up to 1 billion tons per year, though the numbers are "plagued by uncertainties" — by sequestering carbon in vegetation, soils, and the built environment. In that sense, Minneapolis' biochar program could be one component of this larger vision.

Emily is a founding staff writer at Heatmap. Previously she was a staff writer at the nonprofit climate journalism outlet Grist, where she covered all aspects of decarbonization, from clean energy to electrified buildings to carbon dioxide removal.

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ROBINSON MEYER
JULY 08, 2024

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There are some things money can't buy, and it seems a clean power grid is one of them. Despite authorizing billions of dollars to subsidize renewable energy development through the Inflation Reduction Act and the Bipartisan Infrastructure Law, the Biden administration remains off track to reach its target of 100% clean electricity by 2035. Even after a banner year in which domestic investment hit $303 billion and the US added 32.3 gigawatts of new clean electricity capacity, the country is still building renewable energy at only half the rate that is needed.

Among the barriers holding up clean energy deployment, local opposition looms large. As developers seek out new sites on which to build wind and solar, they are

aesthetic, economic, or political grounds. Whether through formal laws or protracted permitting processes, these objections have begun to have a noticeable effect on the pace of renewable energy adoption. In a recent survey by the Lawrence Berkeley National Laboratory, wind and solar developers reported seeing roughly a third of their siting applications canceled over the five years prior, with two of the most common reasons being "community opposition" and "local ordinances or zoning."

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