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# A global thermostat?

DECEMBER 21, 2010

[Global Thermostat](#) sounds too good to be true: It's a startup company that aims to address the threat of climate change by capturing carbon dioxide from the air, and then making productive use of it.

The CO<sub>2</sub> could be used to help plants grow faster in greenhouses, as a feedstock for algae, for enhanced oil production, as an ingredient in bottling plants, as a natural refrigerant, or as a circulating fluid in a geothermal energy installation.



*Prof. Graciela Chichilnisky*

While Global Thermostat calls itself “a carbon negative solution,” its technology is in practice a form of [geoengineering](#). It would appear, however, to be less risky than better-known geoengineering techniques such as [solar radiation management](#) or [marine cloud whitening](#).

“We’ve faced skepticism about the solution because it’s so radical,” says Graciela Chichilnisky, a co-founder and managing director of Global Thermostat. But, she says, a carbon negative solution to the climate crisis will be needed “to contain rising levels of atmospheric carbon because we procrastinated too long and carbon emissions reductions do not suffice.”

There are several reasons to take Global Thermostat seriously. First, it’s more than an idea—to test the idea, the company opened a pilot plant in October at [SRI International](#) in Menlo Park, CA. SRI is a big research institute, which works for governments, FORTUNE 500 companies and startups.

Second, its founders—Chichilnisky and Peter Eisenberger—have impressive pedigrees. A Columbia University professor, [Chichilnisky](#) founded a pair of successful tech companies, helped design the carbon market under the Kyoto Protocol and has advanced degrees including a PhD. in math from MIT and a PhD. in economics from Berkeley. (She’s also been involved in a series of lawsuits against Columbia alleging gender bias, but that’s [another story](#).)

[Eisenberger](#), who founded the Columbia Earth Institute (before Jeffrey Sachs), has been an executive at Bell Laboratories and Exxon, a physics professor at Princeton and vice-provost at Columbia. He has a PhD. in physics from Harvard.

Third, prominent backers and partners lend heft to the venture. A team of Georgia Tech professors, working with SRI and Eisenberger, reported this summer that they will be able to

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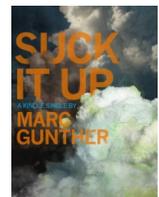


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use relatively low-temperature steam heat to separate CO<sub>2</sub> from solid materials known as amines—a key second step in the capture and separation process. (Here's a [press release](#) from Georgia Tech describing their work.) [Summit Power](#), a well-established developer of power plants, is assisting Global Thermostat's commercialization process, with an eye towards using GT in a "clean coal" project in Texas that has \$350 million in backing from the U.S. Department of Energy. [Carmagen Engineering](#) is providing consulting service, and Chemicals giant BASF and ceramics firm Corning are lending their technology as well.

Financial backing, meanwhile, comes from [Edgar Bronfman Jr.](#), the chairman and CEO of Warner Music Group, who is executive chairman of Global Thermostat. The company is a family affair, it turns out—Edgar's son Benjamin is a strategic advisor, as is Chichilnisky's daughter Natasha and Eisenberger's son Nicholas, a lawyer and entrepreneur who has built a career of his own as a sustainability consultant.

I spoke recently with Peter Eisenberger and Chichilnisky about the company. As best as I can understand it as a non-scientist, their technology uses molecules called amines which pull CO<sub>2</sub> out of the air and bind to them; then low-temperature steam heat is used to separate the amines from the CO<sub>2</sub>. This second step is crucial to the firm's business model, because lots of low-cost or no-cost steam heat is available as a waste product from power plants or industrial processes. This keeps costs down and permits GT's facilities to be located just about anywhere



*Peter Eisenberger*

near steam heat, or next to a new power plant, to make that plant carbon neutral or better. Combining a GT facility with a solar thermal power plant, for example, could create a "carbon negative" source of power because the sun's heat would be used create electricity and extract CO<sub>2</sub> from the air.

Eisenberger told me:

What we are really doing is closing the carbon cycle. We're taking CO<sub>2</sub> that we've used to make energy or chemicals, and taking it back, and making a product.

Chichilnisky, who has worked on a UN climate treaty for years and written a book called [Saving Kyoto](#), say the deadlock in the global climate negotiations won't be broken until the U.S., China and other nations find ways to decouple economic growth and carbon pollution. That's why a "carbon negative" approach is needed, she says:

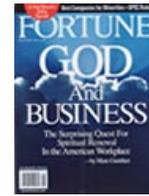
The only way we will be able to get China and the US to agree on limits is if they had a way to continue to running their economies without growing carbon emissions. It's the only solution.

Other scientists, including [David Keith](#) of the University of Calgary, are working on technologies to capture carbon from ambient air (as opposed to from the smokestacks of power plants). Keith's startup is called Carbon Engineering.



*Global Thermostat's pilot plant*

## Fortune



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Unlike other forms of geoengineering, direct air capture would not require directly intervening in the earth's biosphere or oceans

"This has, essentially, no side effects, no risks," Eisenberger says. "We simply clean up the CO2 that we put out."

Of course, Global Thermostat has a long way to go before commercialization becomes possible. Cost is, obviously, a big issue. It's not clear how much demand there is for CO2, and how much companies will pay for it.

The business prospects for the company would improve dramatically with a global carbon market because polluting companies would then pay Global Thermostat to offset their emissions. But Eisenberger says:

Our business model explicitly does not depend upon such carbon credits. Rather we have identified markets where our ability to locate near where the CO2 will be used [makes] our technology economic from day one.

We'll see. Given the dearth of practical solutions to the climate crisis, Global Thermostat certainly bears watching.

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**klem says:**  
December 21, 2010 at 10:04 am

And how many of my tax dollars are going into this scam? And let me guess, when the subsidies end so does the company. I can't wait for 2012 when we can get rid of the democrats.

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**Marc says:**  
December 21, 2010 at 11:46 am

I don't believe that Global Thermostat has received (or requested) any government money.

Nor, until 2009, was climate change a partisan issue. You may recall that an earlier bill to curb GHG emissions was sponsored by John McCain.

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January 4, 2012 at 2:49 am

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