

An audacious new theory to compete with "Peak Oil": Hydrocarbons forever.

Posted by [Scott Woolley](#)
April 6, 2011 2:13 PM



New companies say pulling carbon dioxide straight from the air could solve global warming and provide an infinite source of gasoline. Really?

FORTUNE -- What if scientists could transform coal-fired power plants from giant carbon dioxide emitters into giant carbon sinks? Some say that they can, and will. Graciela Chichilnisky, a founder of Global Thermostat, admits it's hard to believe: "The more energy the less the emissions—it's mind boggling."

Global Thermostat and at least two competitors say they can pull carbon dioxide straight from the air, potentially at costs

low enough to solve global warming and provide an infinite source of gas by using the CO₂ to feed algae.

Chichilnisky summarizes her company's business model this way: "Take CO₂ from the air and turn it into cash."

As a technical matter the idea is clearly possible. Expensive machines used in submarines and space craft have been pulling CO₂ out of the air for generations. The trick is making sucking CO₂ out of the air economically feasible. In practice that means beating the cost of carbon capture and sequestration, which typically run \$50 per ton.

Traditional chemical engineering thinking says: good luck with that. The difficulty of separating out one type of gas gets exponentially greater the lower its starting concentration. The concentration of CO₂ in the air is growing but still thin on a relative basis, roughly 400 parts per million. By contrast, the CO₂ that's possible to capture as its emitted from power plants, which today is often captured and sequestered, is often 300 times more concentrated.

But the companies all say they have cracked that problem by building low-cost systems for grabbing and concentrating atmospheric CO₂. One trick is to use the waste heat from a coal plant or other industrial sources to power the carbon capture.

What good is a tank full of CO₂? Quite a lot, as Nathaniel David, realized when he was seeking sources to help him grow his fuel-producing algae. David decided to solve the problem himself by founding Kilimanjaro Energy, another carbon capture company. David hopes to build a "closed loop system" in which captured carbon is used to produce regular fuel, probably with the help of algae, which is then burned in engines, sending the carbon dioxide back up into the atmosphere where it can be recaptured.

The result: "Hydrocarbons forever," to use the phrase of Peter Eisenberger, Global Thermostat's cofounder and a Columbia University physicist.

The other big business opportunity for the new carbon capture technology is to use it to enhance the productivity of existing oil fields. Pumping CO₂ into wells can dramatically boost production, potentially yielding hundred of billions

of dollars in extra oil. That's not a closed loop, and would still raise CO2 levels. But the companies say that in the short-term using carbon capture to pump more oil would allow them to fund major improvements in their technology.

David says that the technology already works so well as a source of CO2 for his fuel-making algae that the reduction in atmospheric carbon comes as a bonus -- a big bonus. "Everything we're doing at the company we'd be doing even if a CO2 emission wasn't a problem at all."