First Successful Demonstration of Carbon Dioxide Air Capture Technology Achieved

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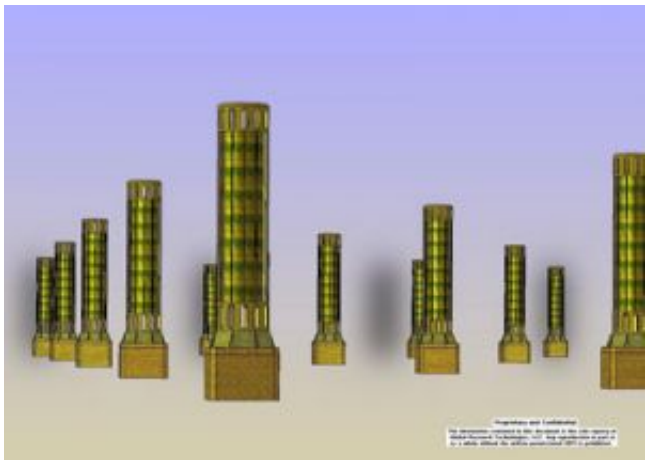

An artist's rendering of an "air extraction" prototype being developed by Global Research Technologies and Klaus Lackner from Columbia University. © Global Research Technologies, LLC

Global Research Technologies, LLC (GRT), a technology research and development company, and Klaus Lackner from Columbia University have achieved the successful demonstration of a bold new technology to capture carbon from the air. The "air extraction" prototype has successfully demonstrated that indeed carbon dioxide (CO_2) can be captured from the atmosphere. This is GRT's first step toward a commercially viable air capture device.

This technology debuts at a critical juncture where recent findings of an esteemed array of global experts — including former Vice President Al Gore, Sir Nicholas Stern, and the eminent scientists and practitioners serving on the Intergovernmental Panel on Climate Change — have concluded that man-made climate change is indeed upon us. One of the most critical challenges we face is the dramatically increasing and completely unprecedented level of carbon dioxide in the earth's atmosphere. The air extraction device is one critical solution to help the world reduce dangerous amounts of CO_2 in the air.

The carbon capture technology was developed by GRT and Klaus S. Lackner, a professor at Columbia University's Earth Institute and the School of Engineering and Applied Sciences. The Tucson-based technology company began development of the device in 2004 and has recently successfully demonstrated its efficacy. The air extraction device, in which sorbents capture carbon dioxide molecules from free-flowing air and release those molecules as a pure stream of carbon dioxide for sequestration, has met a wide range of performance standards in the GRT research facility.

"This is an exciting step toward making carbon capture and sequestration a viable technology," said Lackner. "I have long believed science and industry have the technological capability to design systems that will capture greenhouse gases and allow us to transition to energies of the future over the long term."

The GRT's demonstration could have far-reaching consequences for the battle to reduce greenhouse gas levels. Unlike other techniques, such as carbon capture and storage from power plants, air extraction would allow reductions to take place irrespective of where carbon emissions occur, enabling active management of global atmospheric carbon dioxide levels. The technology shows, for the first time, that carbon dioxide emissions from vehicles on the streets of Bangkok could be removed from the atmosphere by devices located in Iceland. This could present a solution to three problems that until now have posed intractable obstacles for advocates of greenhouse gas reduction: how to deal with the millions of vehicles that together represent over 20 percent of global CO_2 emissions, how to manage the emissions from existing infrastructure, and how to connect the sources of carbon to the sites of carbon disposal.

"This significant achievement holds incredible promise in the fight against climate change," said Jeffrey D. Sachs, director of The Earth Institute, "and thanks to the ingenuity of GRT and Klaus Lackner, the world may, sooner rather than later, have an important tool in this fight."

A device with an opening of one square meter can extract about 10 tons of carbon dioxide from the atmosphere each year. If a single device were to measure 10 meters by 10 meters it could extract 1,000 tons each year. On this scale, one million devices would be required to remove one billion tons of carbon dioxide from the atmosphere. According to the U.K. Treasury's Stern Review on climate change, the world will need to reduce carbon emissions by 11 billion tons by 2025 in order to maintain a concentration of carbon dioxide at twice pre-industrial levels.

Experts have long highlighted the potential of air extraction, arguing that it could have a vastly greater impact than the renewable energy sources that currently operate on a small scale. To date, however, the transport sector has resisted many carbon-reducing technologies. Although carbon capture is possible at power plants through flue-gas scrubbing, designing millions of cars, trucks, and trains to capture CO_2 from their exhaust streams is simply not practical. Hauling a "trailer" behind every passenger car to collect exhaust emissions would exacerbate traffic congestion, reduce gasoline mileage and increase fuel consumption. Simply put, CO_2 emissions from the transportation sector are going to end up in the atmosphere and can only be removed from the atmosphere with a device like the one GRT has developed.

Air capture devices are small and require much less land area than the wind mills that would be needed to offset an equal amount of CO_2 emission. Indeed, if the CO_2 carried by the air streams used to drive wind mills were to be captured, then on an energy equivalent basis, the CO_2 capture would reduce emissions hundred times more than a wind mill of equal sweep area. Like wind turbines, the GRT devices would be deployed in coordinated formations, but would extract the air's carbon dioxide, not its kinetic energy.

A major challenge facing scientists working to extract and sequester carbon from the atmosphere has been the fact that it is too expensive to re-outfit many of the world's existing power plants to make them more eco-friendly. In general, building new technologies is easier and cheaper than adding retrofits to existing infrastructure. Another exciting benefit of the GRT device is that it faces down this challenge by capturing the emissions from existing power plants without imposing retrofit costs.

Air capture offers a third important benefit. The CO_2 capture device can be located at the point of CO_2 end-use or sequestration, eliminating the current need to match CO_2 sources with sinks. For example, the CO_2 originating from all those vehicles in Bangkok can be captured in an oil field in Alberta, Canada, where it could be used on-site for enhanced oil recovery (EOR) operations or it could be captured in South Africa to feed a growing demand in that country for feed stocks for petrochemical production. If the goal is to sequester a given quantity of CO_2 in a specific geological formation, the air capture system could be located at that physical location. Within the United States, formations in Ohio, Oklahoma and Michigan, among other sites, appear to hold promise for long-term CO_2 storage underground. Air extraction could also offer a new window in negotiations between developed and developing countries over how to deploy carbon reducing technologies.

Going forward, GRT plans to begin demonstrating its air capture system on a larger scale. Extensive deployment of the GRT air capture system makes it possible to envision an actual reduction of CO2 levels in the atmosphere, perhaps even to pre-industrial levels. That is the exciting promise of air capture and precisely what has just been demonstrated by GRT.

Source: Earth Institute at Columbia University