

Lancaster research facility testing Lehigh University carbon capture technology

By: *Cris Collingwood*

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Illustration of CO2 capture system being tested by Advanced Cooling Technologies – illustration by Josh Charles –

Advanced Cooling Technologies is working with Lehigh University to test a process to capture carbon dioxide (CO2) from the air.

Josh Charles, lead research and design engineer for the Lancaster-based company, said with a grant from the U.S. Department of Energy, his team is testing a direct air CO2 capture mechanism developed by Arup Sen Gupta, PC Rossin professor, Department of Civil and Environmental Engineering at Lehigh University.

While in the concept phase, Charles said his team is testing the system to see if it can pull carbon out of the air and store it to improve the environment and fight climate change. So far it is working.

“The removal of CO2 is crucial to curbing carbon emissions, one of the contributing greenhouse gases,” he said.

The Small Business Innovative Research funding has allowed Charles and his team to develop the project. The test set up was designed to scale up and use low-voltage renewable energy sources such as wind or solar power to capture the air.

The system, he said, pulls air through small spherical balls made of a resin. The carbon is captured by running an alkaline solution through the balls. It can then be stored in containers in old oil or gas wells underground.

“The typical method to capture carbon uses heat which takes energy,” he said. “We are doing it without heat.”

The process uses solar or wind power instead, which makes the process more flexible and can be used in more places.

Sen Gupta said the use of electricity results in minimal energy use. The process uses absorbent material that air passes through, but the CO2 doesn’t. “The filter capacity is important,” he said.

Most CO2 comes from industrial stacks, Sen Gupta said. There are systems that can capture 15% at that point. What he was looking for was a way to capture as much as possible from air anywhere.

“If we can establish something where we can capture as much as 15% from anywhere, we can transform change,” he said.

“This is a small scale right now,” Charles said. “Once we get reimbursement for phase 2, we will ramp up the testing on a larger scale.” The proposals are being written and Advanced Cooling Technologies hopes to have funding by this summer.

The system is set up in a shipping container-sized contraption. “It’s meant to be capable of being placed anywhere,” he said.

The project is scalable, Charles said. The unit will capture a minimum of 500 tons of CO2 per year. “It could potentially scale to thousands,” he said.

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1/10/23, 10:34 AMLancaster research facility testing Lehigh University carbon capture technology - LVB

Domestically, Charles said large companies will be able to use this on a large scale to reduce emissions, but anyone can use it on a smaller scale.

“The challenge,” Sen Gupta said, “is when we remove it {from the air}, where does it go. Right now, we are looking at underground.”

Charles said storing the carbon underground shouldn’t hurt the environment. “Look at natural gas. We pull it out for use so then we could fill that space with CO2.”

He added that there is a concern that CO2 could leak out which would undo what the system has done by removing it. However, “there is no contamination risk because we are putting it back where it came from, just more concentrated.”



Cris Collingwood

Cris Collingwood writes about all things health related in Central Pennsylvania and Lehigh Valley. She has a pulse on new trends in business and what new technologies are emerging. Cris is curious about what business leaders want to know. And if it is being grown, manufactured or marketed here, she's interested in sharing the news with readers. She can be reached at cfoehlinger@bridgetowermedia.com

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