WHO KNEW?*

BYU technology tackles climate change by freezing carbon

Cryogenic carbon capture aimed at reducing emissions

Brigham Young University chemical engineering professor Larry Baxter is developing a technology that separates carbon dioxide (CO_2) from other gases (and prevents it from escaping into the air) by freezing it. Baxter's cryogenic carbon-capture system is said to gobble up 99% of the CO_2 from emissions and cost half as much as conventional methods.

"We took a completely different approach," says Baxter, who spun the research into a startup that is predominantly funded by government grants and employs BYU grads and interns among others. "What if we cooled down the gas to the point that the CO_2 condenses out of the air?"

After his system freezes the CO_2 with -130 degree Celsius temperatures, it separates the dry ice from the gas and heats everything back up. The CO_2 is pressurized to become a liquid so it can be stored safely in underground aquifers or storage facilities for later use, such as enhanced oil recovery. Industry expert Carl Bauer said Baxter's technology is a "technological game changer for CO_2 capture."

"Cryogenic separation of gases is not a newly discovered area of science, but what Dr. Baxter has done is develop a new approach to the process that significantly improves the energy and economic performance of cryogenic gas separation," said Bauer, the former director of the National Energy Technology Laboratory (NETL).

In the latest of a series of publications on the process, Baxter provides a broad overview of the cryogenic carbon capture technology in a paper recently published in the International Journal of Greenhouse Gas Control.

While Baxter is confident in his technology, he hopes efforts to reduce carbon emissions in the U.S. will spur other nations to follow suit.

"Any real solution to this problem needs to be a global solution," Baxter said. "Even if the U.S. fully complies with this new regulation (EPA's Clean Power Plan), you won't notice a change if we're the only country doing it."

Baxter's team is working on getting his technology to the pilot stage, which is five times the current size of his working unit and 100 times the capacity. He estimates having his tech in a full-scale commercial facility within five years and operating within seven years.

"This technology allows coal to continue to supply reliable energy while storing energy from intermittent sources and delivering it back to the grid at peak demand when it is the most valuable," Baxter said. "The EPA doesn't think it's conceivable the U.S. is going to stop using fossil fuels, including coal and natural gas. It's even less conceivable that the rest of the world will do so. If fossil fuels are to continue their roles in providing reliable, low-cost energy and if we are serious about addressing climate change, these technologies are going to play major roles in the future."

http://news.byu.edu/archive15-sep-cryogeniccarbon.aspx

***A regularly featured column on industry, university and government initiatives in support of clean coal technology development & commercialization.**