

Industrial GHG Solutions

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Canadian company uses algae to capture CO2

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Pond Biofuels Inc. is utilizing flue gas emitted from a cement plant in southern Ontario to cultivate algae, effectively capturing the carbon dioxide (CO₂) present in the emissions. According to Pond Biofuels CEO Steven Martin, the project has been under development for approximately three years.

Martin said the project is unique because development did not begin with lab-scale work to optimize an algae strain. In addition, Pond Biofuels has elected to employ a locally sourced strain of algae that has not been genetically engineered. "We have actually started at the top end, at the industrial-scale implementation and worked backwards to build the smallest possible facility that we can based on industrial implementation," he said. "To that end, we are using a local strain of algae. It provides a little bit more security and lowers the risk threshold when you are working with an industrial partner... We are looking to improve the process of growing algae. This doesn't deny us the ability to use a genetically engineered algae, it just means that in the current implementation, we're [using a local strain] that came from within 100 meters of the plant."

Currently, Pond Biofuels is operating a process validation facility located adjacent to a cement plant owned by St. Marys Cement Group. "It's not meant to be a large production [facility], and it's not a demonstration plant," Martin said. "It's actually part of a large-scale plant. To build a large-scale algae facility, you need seed material – seed algae – just as you would if you were seeding a field of corn ... The process validation facility validates the process conditions that will allow us to grow seed material so that we can actually seed a much larger plant." According to Marin, Pond Biofuels is currently producing between 10 and 90 kilograms (22 and 198 pounds) of algae per day.

Marin also said the process validation facility is able to capture all of the CO₂ it takes in. "We don't take very much because we are currently operating a process validation facility in order to prove and allow us to size out a full-scale implementation," he said. "Another thing is, we are taking in fairly insignificant quantity in that we are trying not to impact the existing process of making cement. When you are implementing a new technology and you are working with a well-established industrial partner, you want to make sure that you don't do anything bad to their process stream, so we are trying to make as little impact as we can."

Another unique aspect of the project is that flue gas sourced from the cement plant is not purified before it enters Pond Biofuels' algae-containing tank bioreactors. "We don't treat [the flue gas] in any way beyond what is already done by the plant," Martin said. "We just take what comes out of the top of the smokestack and put it directly into our algae tanks."

While Martin was unable to offer any specific details on a timeline for commercial development, he noted that specifying timeline for any new technology can be challenging. "It's when people begin to become comfortable with the technology," he said. "Our industrial partner has been very supportive and very positive, so I believe that we're on a fast track to get this implemented on a grander scale than what we are currently doing."

In addition to operating the process validation facility, Pond Biofuels is also exploring possible market opportunities for the algae it plans to produce. According to Martin, possible markets include biodiesel production, the production of a coal replacement for use in power plants, and animal feed. "We have capabilities to do it all," he said. "Our business guys are exploring the various markets and what makes the most financial sense. Because of how our implementation works, we have flexibility in that we can simply move the output stream to whatever makes the most financial sense. We are not married to any one concept."