



Aerial view of the Cedar Lane Farms project site

Advanced Energy Job Stimulus Program

A key component of Ohio's program to create new jobs and encourage economic development, the \$150 million Advanced Energy Job Stimulus Program is designed to support new technology projects on a fast track toward commercialization. As part of the \$1.57 billion job stimulus package signed into law by Governor Ted Strickland in June 2008, the goal of the program is to employ Ohio workers in the advanced energy jobs of the future.

TOUCHSTONE

RESEARCH LABORATORY, LTD.

Project Name:

Touchstone Research Laboratory – Re-utilization of Industrial CO₂ for Algae Production Using a Phase Change Material

Project Location:

Cedar Lane Farms – Wooster, Ohio (Wayne County)

Applicant Information:

Touchstone Research Laboratory, Ltd. of Triadelphia, W. Va. is the developer of the "phase change material" (PCM)* that will be utilized during the phase one portion of this project to be co-funded by the Ohio Coal Development Office (OCDO) and the U. S. Department of Energy National Energy Technology Laboratory (DOE-NETL). Touchstone, which was founded in 1980, will be responsible for overall project management at the Cedar Lane Farms host site. During its first 15 years, it primarily provided failure analysis and testing services. Today, Touchstone is a broad-based product development research company which focuses on "the development of next-generation, over-the-horizon materials and products." Its areas of expertise include advanced carbons, biofuels, coal and coal gasification.

Project Description:

This project is a phase one study on the capture of flue gas carbon dioxide by passing the gas through an algae pond. It will demonstrate an open-pond algae-based technology using a phase change material that can capture a portion of the CO₂ from the flue gas of an existing fluidized bed combustor at Cedar Lane Farms using 100 percent Ohio coal. The combustor, which received previous OCDO funding, has been in operation for seven years.

The transparent PCM will cover a significant portion of the test pond and will address three significant challenges faced by the algae biofuels industry: the regulation of daily temperature fluctuations, the reduction of water loss through evaporation and control of invasive species introduction. The project will demonstrate, at pilot-scale, that the combination of waste heat (for additional temperature control) and CO₂ from the flue gas of a coal-based boiler can be utilized in a year-round algae production process to produce a transportation fuel and electricity. Successful completion of phase one will make the project eligible for a follow-on USDOE grant in the amount of \$5 million.



Ohio Agricultural Research and Development Center's anaerobic digestion laboratory in Wooster – site of methane production study of algae following oil extraction

* A phase change material is a substance with a high heat of fusion which is capable of storing and releasing large amounts of energy. The PCM to be used in this project absorbs infrared solar radiation during the day as latent heat and releases it at night to the culture when the temperature drops.

Funding Request: \$500,000

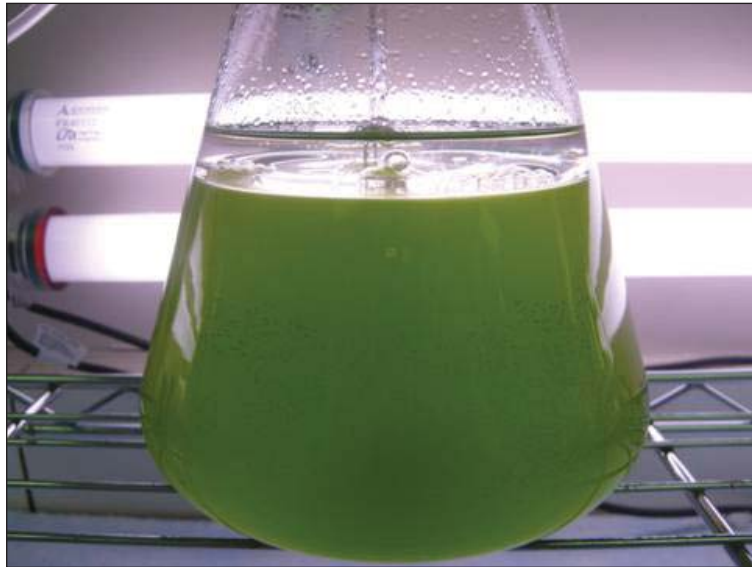
Approved Funding: \$108,698

Total Project Investment: \$647,272

Jobs Created: Up to 3 new full-time jobs; later phase two project will create an additional 12 full-time jobs

Types of Jobs Created: Engineering, management/operations

Primary Application of Technology: To demonstrate the capture of flue gas carbon dioxide by using a phase change material in a test algae pond to control water evaporation, temperature fluctuations and invasive species introduction



Beaker of algae growing under the clear phase change material, which floats on top in a thick layer



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