

Integrated Pilot-Scale Biorefinery for Producing Ethanol from Hybrid Algae

Algenol Biofuels Inc., together with its partners, will construct an integrated pilot-scale biorefinery that will convert carbon dioxide into ethanol using Algenol’s proprietary DIRECT TO ETHANOL[®] algae technology.

The integrated pilot-scale biorefinery will be located in Freeport, Texas, and will consume 2 dry tons of carbon dioxide obtained from industrial emissions per day, and will produce more than 100,000 gallons of fuel ethanol per year. The project will also create or save more than 300 well-paying high-tech jobs in Texas and Florida, and validate the commercial viability of a new breakthrough green-energy technology that could eventually create billions of dollars of economic value and thousands of new jobs.

Project Description

DIRECT TO ETHANOL[®] technology is based on overexpressing in blue-green algae the genes for certain enzymes found widely in nature. The resulting metabolically enhanced hybrid algae actively carries out photosynthesis and utilizes carbon dioxide to make ethanol inside each algal cell. The ethanol diffuses through the cell wall into the culture medium and then evaporates, along with water, into the headspace of an enclosed, sealed photobioreactor. The ethanol-water vapor condenses on the



Algenol Biofuels’ Photobioreactors

inner surface of the photobioreactor and is collected as a liquid. The condensate is then further concentrated and distilled into fuel ethanol.

Algenol is targeting the development of hybrid algae that produce 6,000 gallons of ethanol per acre, per year. The productivity of these algae is currently being evaluated in 20-liter laboratory flexible-film bioreactors and in 100-liter outdoor flexible-film bioreactors under field conditions. The proposed pilot-scale biorefinery will consist of approximately 17 acres of plastic, fully enclosed 1200-gallon proprietary photobioreactors and supporting areas for testing, distillation, and storage.

Potential Impact

Once the Algenol process has been demonstrated to work at pilot scale, it can be expanded to produce ethanol in very large amounts sufficient enough to allow the United States to reduce its dependence on imported oil.

Other Participants

Algenol has collaborative agreements with The Dow Chemical Company, the National Renewable Energy Laboratory, Membrane Technology & Research Inc., The Georgia Institute of Technology, and The University of Colorado.

Prime	Algenol Biofuels Inc.
Location	Freeport, TX
Feedstock (s)	CO ₂ /Algae/Seawater
Size	2 dry tons of CO ₂ per day
Primary Products	Ethanol
Capacity	> 100,000 gallons of ethanol per year
Award Date	TBD
GHG Reduction	80% reduction versus gasoline
Anticipated Job Creation	300 or more high technology jobs in Texas and Florida.
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