

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 Fort Myers, Florida, and will consume two dry tons of carbon dioxide per day. This biorefinery will have the capacity to 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 Florida, and validate the commercial viability of a 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 the genes in blue-green algae for certain enzymes found widely in nature. The resulting metabolically-enhanced hybrid algae actively carry out photosynthesis and utilize 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 a patented photobioreactor. The ethanol-water vapor condenses on the inner surface of the photobioreactor and is collected as a liquid. The condensate is then further concentrated into fuel ethanol.

Algenol is targeting the development of hybrid algae that produce 6,000 gallons of ethanol per acre per year. The



Sunrise at Algenol's integrated biorefinery.

productivity of these algae is currently being evaluated in 1000-liter laboratory flexible-film bioreactors and in 4500-liter outdoor flexible-film bioreactors under field conditions. The proposed pilot-scale biorefinery will consist of approximately 17 acres of plastic, fully-enclosed 4500-liter proprietary photobioreactors, and supporting areas for office space, testing, distillation, and storage.

Potential Impacts

Once the Algenol process has been demonstrated at the pilot scale, it can be expanded to produce enough ethanol to allow the United States to

reduce its dependence on imported oil. The process is scalable and does not require farmland or freshwater.

Other Participants

Algenol has collaborative agreements with the National Renewable Energy Laboratory; Membrane Technology & Research, Inc.; The Georgia Institute of Technology; and The University of Colorado. Algenol has also received financial support from Lee County, Florida.

Prime	Algenol Biofuels, Inc.
Location	Fort Myers, Florida
Feedstock (s)	Carbon dioxide, algae, seawater
Size	Two dry tons of carbon dioxide per day
Primary Products	Ethanol
Capacity	Greater than 100,000 gallons of ethanol per year
Award Date	January 29, 2010
GHG Reduction	80% reduction versus gasoline
Anticipated Job Creation	300 or more high-technology jobs in Florida
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