

## **Organic Fuels Algae Technologies, LLC**

### **Introduction**

Organic Fuels Algae Technologies, LLC (“OFAT” or “the Company”) is developing a system for the production of oil from algae that promises to make algae a cost-effective renewable fuel source. The Company’s system employs a unique proprietary oil extraction technology that removes the oil from the algae by destroying the cell wall using electromechanical means. The Company is also developing complementary technologies to provide a complete solution from growth of the algae through the final oil output. The Company is currently raising financing from qualified strategic or financial investors in order to develop a commercial prototype system, and is in the process of recruiting a management team.

### **The Problem**

Algae are among the most promising sources for biofuel production because of their growth characteristics (for example, efficient use of solar energy, rapid growth cycles) and because their use for fuel production does not compete with the human food supply. However, technical and economical barriers have kept it thus far from becoming a scalable fuel source. A key challenge is cost-effectively removing the oil from the algae. At the nanometer scale of microscopic algae, traditional oil extraction methods used for oil seeds, such as expeller presses, extruders, and centrifuges, are generally ineffective. Methods currently practiced for the extraction of oil and other valuable components of algal biomass commonly involve drying, followed by use of a disruptive solvent, with distillative solvent recovery and physical separation of the oil, protein, and meal. These methods are costly and environmentally unsound, and will not be cost effective at the scales required for fuel production. In addition, algae are typically grown in dilute concentrations, i.e., on the order of 1 to 3 grams of dry matter per liter (approximately 0.1 to 0.3% by weight). Handling large quantities of water requires capital and energy efficient processes for harvesting, dewatering, and concentration of the algae.

### **The Solution**

The Company is developing technologies that overcome these problems. At the core of the system is an oil extraction process that removes the oil from the algae by destroying the algae cell membrane and cell wall using electromagnetic forces while minimizing energy usage. The method works in dilute concentrations, but the most capital-efficient solution may involve dewatering the algae to a 10% concentration in water by dry weight. Accordingly, the Company is employing technology that solves the problem of pre-concentrating the algae after harvesting and conditioning of the algae using arrays of Photo-Bioreactors (PBRs) in series as well as parallel. By concentrating the algae between reactors in series, effluent dosage between reaction stages can be adjusted to create

the optimum effect for the life cycle of the algae. Patents are being pursued for the key technical innovations in this system.

The currently installed global biodiesel capacity, which is on the order of 5 billion gallons per year, would require 250,000 acres of algae, even with yields as high as 20,000 gallons per acre per year, creating a \$25 billion opportunity. Preliminary cost estimates would place algae oil in the market using the Company's system at \$1.50/gallon (inclusive of development, operating, and distribution costs) without taking any credit for the value of the co-produced protein and meal. Assuming a \$100/ton credit for the co-produced protein and meal will reduce the net cost of the oil to \$0.60 to \$0.65 per gallon.

## **The Company – Development Stage**

The Company was formed in December 2008 by a subsidiary of Organic Fuels Holdings, Inc. ("Organic Fuels") and the University of Texas ("UT") to spinout the oil production system that was developed at UT's Center for Electromechanics under a research program funded by Organic Fuels.

The Company believes that first commercial deployment of the system can be achieved within 2 to 3 years. The Company is currently raising \$4 million from strategic or financial investors to build a commercial prototype system, as well as build out the business capabilities of the company. Additional funding will be required to staff up OFAT and create a fully operational commercial entity.

The Company is currently developing a skid-mounted oil extraction unit that can be transported to other sites. It is targeting completion by the end of 2009. The Company is also involved in development activities related to photo bio-reactor design, algae species selection, carbide dioxide management and yields, and oil refining processes.

The Company is pursuing patent protection on key aspects of its system.

The Company believes that it is uniquely placed to become one of the first to offer a complete solution for algae cultivation, harvesting, and oil extraction at commercial scale.

## **About Organic Fuels**

Organic Fuels is a leading producer of renewable fuels. It is currently producing biodiesel from animal fats and vegetable oils, and is developing a portfolio of technologies for next-generation biofuels, including ethanol from biomass. Organic Fuels is also developing complementary technologies for the algae oil extraction process, including the cultivation of algae through a proprietary photo-bioreactor process that creates a controlled environment for cultivation of algae under carbon dioxide enriched air. To this end, Organic Fuels intends to make available for exclusive licensing to OFAT any proprietary intellectual property needed by OFAT to complement the technologies already residing in the Company in order to allow it to offer a complete, integrated solution. The primary interest of

Organic Fuels will continue to be on the realization of projects that deploy these technologies for the production of sustainable, cost-effective renewable fuels.

## **About UT's Center for Electromechanics**

The Center for Electromechanics is a research center at the University of Texas at Austin. It conducts significant research and development in such energy fields as plug-in and other hybrid vehicles, hydrogen as a fuel, efficient motors and generators, algae biofuels production, wind power, flywheel energy storage and advanced power system controls. The Center's algae program focuses on applying new technology to drive down the cost of producing biodiesel from algae. The intellectual property describing this technology is included in the OFAT technology portfolio.

### **Contact Information:**

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