

Microalgae biofuel project aims to provide cheaper, cleaner energy in 2010

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Edition: November 12, 2009 | Volume: 37 | No: 45

Bio-Lipidos wins government support and international accolades as it hunts for public, private capital



Bio-Lipidos de Puerto Rico chief Jorge Gaskins Alcott, center, is shown here with environmentalist Rosa Hilda Ramos, left, and University of Georgia professor Brian Kiepper.

Start-up firm Bio-Lipidos de Puerto Rico aims to create a profitable business harvesting microalgae while at the same time helping to lower the cost of island power and reduce air pollution.

The main thrust of its business will be the production of biofuel from the algae it raises, which can be sold to the Puerto Rico Electric Power Authority (Prepa) to burn in its oil-generated plants and several other businesses. Yet, the business will also produce organically grown shrimp

and tilapia fish as part of the biofuel production process, and there are a host of other potential byproducts such as animal feed, cooking oil and Omega 3 fatty acids that can be used in everything from yogurt to orange juice.

“Of all the alternative-energy alternatives, we feel we are the closest to becoming a reality,” said Jorge Gaskins Alcott, the head of Bio-Lipidos de Puerto Rico Inc., the local start-up corporation behind the project.

Backers say the project is particularly well-suited to Puerto Rico because the natural conditions for growing microalgae are perfect and the island’s dependence on imported oil for power generation provides a pressing need for cheaper and cleaner alternative-energy sources. If the performance in the lab translates into reality, the fuel produced via microalgae can be burned in Prepa generators directly or mixed with bunker or high-priced diesel.

“You can start right away, and you don’t throw the baby out with the bathwater,” Gaskins said. “All the existing facilities and capital investments of Prepa can be used directly.”

Prepa Executive Director Miguel Cordero has backed the project and believes it is one of a number of alternatives to lower energy costs.

“At Prepa, we are evaluating all available technologies to lower energy bills and this is why we are considering the use of biodiesel produced through microalgae as a way to lower the cost of fuel,” Cordero said. “This will allow us to lower our clients’ electric bills.”



The company, which has a technical alliance with researchers from University of Georgia, one of the top universities studying this fast-growing field, has already located a site on government land in Dorado where the old Eureka shrimp farm sits and hopes to be operational before next summer. Once that happens, it will be just four months before its first fuel gets produced, Gaskins said.

In a special report last month on “five technologies that could change everything,” the Wall Street Journal hailed algae as the “most promising” next-generation biofuel. “Algae grow fast, consume carbon dioxide and can generate more than 5,000 gallons a year per acre of biofuel compared with 350 gallons a year for corn-based ethanol,” the Wall Street Journal reported. “Algae-



The start-up firm will begin raising microalgae on 200 acres in Dorado that was the site of a former shrimp-farm operation.

based fuel can be added directly into existing refining and distribution systems; in theory, the U.S. could produce enough of it to meet all the nation’s transportation needs.”

The Bio-Lipidos fuel project, which will operate under the Replenish Energy name, was also selected as a finalist by Economist magazine, from more than 1,000 applicants, and will be showcased at the renowned publication’s upcoming Carbon Economy summit this month in Washington, D.C.

Investors, grants and incentives

Besides Cordero, Gov. Luis Fortuño and Energy Affairs Administrator Luis Bernal have endorsed the project for a \$25 million funding-grant proposal under the American Recovery & Reinvestment Act. If it wins approval, which the company should know by the end of this month, its production plans would be drastically accelerated. Currently, the company expects to be operational before next summer, and Gaskins said the first fuel would be produced within four months of startup. The company is a prefinalist, and Gaskins is optimistic, especially with the government’s support.

“It helps a great deal that Prepa is the largest utility company in the U.S., and our dependence on oil is as great as it is,” Gaskins said. “As far as the U.S. Department of Energy is concerned, we are the poster child for this type of technology.”

The company needs to raise \$3 million in private capital and is also requesting a \$3 million loan from the island’s Economic Development Bank with U.S. Department of Agriculture backing. The remaining \$2.5 million it needs



to become operational will come from government-land and infrastructure-investment grants and other financing backed by

fuel-purchase agreements.

The company's first stage of operations will be an \$8.5 million pilot project using 200 acres of the old Dorado shrimp farm. The bulk of the money will go to the construction of a biofuel laboratory, nursery, garage and other necessary buildings and pond rehabilitation. In this first phase of the project, the company will supply test fuel to Prepa for its Palo Seco and San Juan plants. Initially, the cost will be \$50 a barrel, but is slated to be used to substitute costly diesel fuel that currently costs Prepa \$80 a barrel.

Gaskins said the firm could eventually expand over 2,700 acres of adjacent public land currently not in use in the Dorado-Levittown area, which would lower production costs to about \$24 a barrel. At full capacity, the project could produce some 37 million gallons of fuel, or 881,000 barrels annually. With Prepa spending \$1.7 billion annually to import 31 million barrels of oil, there is a huge potential market for the start-up operation, one reason Gaskins believes the project can be "wildly" profitable.



"It will be much more profitable once we get off the 200-acre farm into something larger," he added.

If it takes off, the project will also help Prepa lower its carbon output and its costs from its two San Juan metro-area plants. That is important because some plant turbines need the higher priced diesel to burn. Also, the plants have recently been upgraded and that investment means they will be online for years to come, Cordero recently told CARIBBEAN BUSINESS. Other plants will be retrofitted to burn cheaper natural gas and coal.

The Bio-Lipidos project should derive one-third of its income from biofuel production and another 25% of its income from the raising of organic tilapia and shrimp, which will feed off the leftover algae and other waste it produces. The remaining income will come from other products created from the algae, such as animal feed.

Dr. Brian Kiepper, a University of Georgia technical consultant on the project, said microalgae research currently centers on finding and manipulating different algae strains for different purposes and on bringing down production costs to make wide-scale commercial use more viable.

"It is the economics that we have to make work right now. In simple, open-pond systems, 30% to 40% of the costs of this process are tied up in the harvesting processes," Kiepper said. "The key to ramping up this technology to full scale is to control those costs. That is the area we are researching now."

Puerto Rico: A microalgae research center

Rosa Hilda Ramos, an environmental activist from Cataño, said the possible benefits of microalgae go way beyond the production of biofuel and she is calling on Gov. Fortuño to make the island into a global microalgae research center.

“Microalgae are God’s smallest creatures that we can hardly see, but they can make us all big again,” Ramos said. “This can bring opportunities for more prosperity with cleaner and cheaper energy and more jobs.”

Microalgae can also be used to produce antibiotics and biodegradable plastics, among many other applications, Ramos said.

One of microalgae’s other major applications is that it can be used as a cheap, effective alternative for wastewater treatment, or even cleaning up polluted bodies of water. The use of waste-stabilization ponds, through which water is cleaned by algae, is a popular alternative in areas where there is plenty of land and sunlight.

Carl Soderberg, the director of the federal Environmental Protection Agency’s Caribbean Division, also backs increased microalgae use.

“This is an effective and cheap way to achieve these goals. There are opportunities here that I believe Puerto Rico should explore,” he said.