

Taking Advantage of Energy Alternatives

By Matt L. Ottinger

Algae Oil Producer Hopes Green is the New Black

Indianapolis-based Stellarwind Bio Energy, LLC believes its algae oil can play a major role in helping the United States become energy independent. Keith Masavage, executive vice president of marketing and business development, explains that harvesting algae is much more complex, however, than cleaning your pool.

“About 28 or 29 years ago, the (National Renewable Energy Laboratory) conducted a study on aquatic species that discovered the possibilities of making oil from algae,” he says. “But to make it viable and produce large volumes, you must build a bioreactor to deploy it on a massive scale.”

He asserts that Stellarwind is now prepared to do this. The company grows the algae by using specific mixtures in thousands of tubes, although Masavage explains the key is to extract it in a timely manner.

“Our algae grows to density in eight days, then one-third of it must be harvested every day because it grows at such a prolific rate,” he notes.

According to Masavage, the United States consumed 7.55 billion barrels of crude oil in 2006 – and imported 65% of that oil. Stellarwind contends that if America dedicated 20 million acres to algae production, 100% of the nation’s crude oil import needs would be met. And while 20 million acres may sound astounding, Masavage reveals 29 million acres are currently dedicated to corn ethanol and soy biodiesel, which combine to meet just 1.26% of American fuel needs. He adds that while corn produces between 150 and 330 gallons of ethanol (per acre per year) and soy produces between 70 and 100 gallons of biodiesel,

algae can produce in excess of 10,000 gallons of fuel oil per acre annually.

Masavage claims algae oil requires much less refining than crude oil, thus earning the nickname “extra virgin crude oil.” Because of its purity, he says refineries pay \$80 to \$100 for a barrel of algae oil, compared to \$50 per barrel for crude oil.

He concludes by explaining that Stellarwind’s algae oil is more eco-friendly than other oils, namely because of the holistic process involved. Residual biomass from the oil production can be converted into several valuable resources like methane, charcoal and fertilizer. Additionally, in Indiana, algae harvesting sites can be co-located with coal plants, so the algae can consume a portion of the carbon dioxide created by the coal.

The company is finishing its research and development phase this year and was slated to complete a one-tenth acre project in June. Stellarwind plans to erect a 100-acre small scale pilot facility and begin producing oil next year.



Dr. John A. Kassebaum, co-founder and chief technical officer of Stellarwind Bio Energy, LLC, prepares algae oil in the company laboratory.

INFORMATION LINK

Resource: Keith Masavage, Stellarwind Bio Energy, at www.stellarwindbioenergy.com

Kokomo Energy Source Fueling International Recognition

Kokomo is receiving attention from regional legislators, environmental experts and even media from as far away as Europe over the way the city is powering its public vehicles.

K-Fuel, a biofuel the city processes through a reactor with used vegetable oil from local restaurants, is used to supply 7% of the city’s vehicle fueling needs (the goal is to

reach 25%). David Galvin, city of Kokomo sustainability manager, hopes the city can produce over 30,000 gallons of biofuel annually with an increase to as much as 45,000 gallons in 2011.

"We're currently collecting from 22 restaurants and now residents can donate as well," Galvin shares.

He says that beginning in April, residents could drop off their own vegetable oil at specified locations in the city. The hope is to garner 800 to 1,000 gallons monthly in donations. Galvin adds that this will also ease the burden on city drains, as less oil will reduce clogging.

Kokomo, he adds, is in talks with soap and candle companies, with both interested in purchasing the vegetable glycerin that is created during the process. The city also uses that glycerin to line its garbage trucks so trash doesn't stick to the walls.

"We're looking for ways to reuse what we waste; that's what this project is about," Galvin asserts, adding that K-Fuel helps to reduce Kokomo's carbon footprint.

Sometimes he is asked, "What will you do when the cars no longer use diesel?" He states that K-Fuel can be used in kerosene heaters, and he ultimately hopes the city can use it to help low-income residents reduce heating costs.

The project has many economic ramifications, according to Galvin. He says that on a small scale, businesses that participate save money by not having to pay to dispose of waste (and may be eligible for renewable energy tax incentives from the city). Yet on a macro level, the fuel also provides one part of the city's grander plan to attract many environmental jobs.

"I've seen 200 jobs created from a similar project in Ohio," he says, adding that K-Fuel is just part of a larger push for more renewable energy in the city. "We've piqued the interest of many entrepreneurs in town. There are many engineers in Kokomo, and many have the skill sets for green jobs that will be coming."

The city is also working with Indiana and Purdue universities on various aspects of the K-Fuel project.



K-Fuel, Kokomo's new energy source, is derived from used vegetable oil that is donated to the city by businesses and citizens.

INFORMATION LINK

Resource: David Galvin, city of Kokomo, at www.cityofkokomo.org

Ball State Goes Geothermal

Ball State University recently began the process of transferring all of its heating and cooling needs to a geothermal system. Sen. Richard Lugar was on hand in May to kick off the project and help drill the first of potentially 4,000 boreholes required for the transition. Ultimately, Ball State's will be the country's largest geothermal project.

"We currently have four coal-fired boilers and three natural gas-fired boilers," says Jim Lowe, Ball State's director of engineering and operations. "The installation of the geothermal energy centers, when complete, will allow BSU to shut off all four coal boilers."

Lowe explains the plan has been in place for several years.

"Several years ago, funds were allocated for the replacement of the four coal-fired boilers with a circulating fluidized bed boiler," he offers. "After cost estimate increases and environmental considerations, the university turned its focus to other alternatives. A geothermal-based system was studied and ultimately selected as our plan for replacing the coal burning boilers."

According to Lowe, geothermal energy works via "a basic principle of moving energy" – by storing heated and chilled water in loops that can provide heat and air conditioning for all buildings on campus.

"Heat pump chillers can produce simultaneously hot water to be used for heating purposes and chilled water to be used for cooling purposes," he explains, adding that the water will be stored in 400-foot deep vertical closed loop wells, which will be connected to energy centers.

Layne Cameron, associate director of university communications at Ball State,

Senator Richard Lugar joined Ball State University President Jo Ann Gora on May 9 for the groundbreaking of the school's new geothermal energy project.



says that nearly 50 universities have introduced geothermal systems for a handful of buildings, but none have pursued it on this scale. In Ball State's case, that encompasses a 660-acre campus with more than 40 buildings.

The process, however, will hardly be an overnight undertaking.

"The first phase of the conversion will be complete in three to five years," Lowe says. "This phase will allow the university to shut down two coal fired boilers. The second phase of the project will extend out to about eight years." The overall cost is estimated at \$70 million.

Ball State ultimately hopes to substantially reduce its carbon footprint – and shrink its energy costs by \$2 million annually.

"When both phases are complete, the university will lower its carbon footprint by approximately 80,000 tons per year," Lowe asserts. "The university will also reduce sulfur dioxide emissions by approximately 1,400 tons per year, nitrous oxide emissions by approximately 240 tons per year and particulate matter emissions by approximately 200 tons per year."

INFORMATION LINK

Resource: Jim Lowe, Ball State University, at www.bsu.edu

Nappanee Car Dealer Gets in Gear with Solar Panel

McCormick Motors, a Chevrolet dealership in Nappanee, has taken a very progressive approach toward conservation and providing energy for its facility. Among other efforts, the company uses new technologies to reduce its energy consumption (with changes in insulation, lighting, furnaces, etc.) and initiated a recycling program that has greatly reduced its waste.

The company was recognized in 2007 with a *USA Today* Dealer Innovation Award for its energy conservation efforts – an award presented to only four car dealers in the country.

In February of this year, the business introduced a new solar panel to produce electricity and it has already exceeded expectations, according to McCormick Motors Vice President Gordon Moore.

"We initially wanted to get 500 kilowatt hours per month, but we're now getting 800 – and that's coming out of winter, which typically has less sun," he says.

Moore explains the solar panel now provides 3% to 4% of the company's electrical requirements, with goals in place for the company's entire diversified energy plan to provide 20% by 2010 and 50% by 2020.

Although the total cost of the solar panel project is \$80,000, the company obtained an alternative power and energy grant from the Indiana Office of Energy Development that will offset 30% of the investment. It expects the project to pay for itself in 20 years.

Part of the grant process required that the company embark upon an educational partnership. Moore explains that working with Goshen College students has been beneficial for his company.

"I've worked with three senior classes at Goshen now, and they've put together tools to help us determine which types of alternative energy we should pursue," he says. "It's been a very worthwhile partnership on my end, and I plan to continue it into the future."

Even though the company's efforts haven't garnered a great deal of attention in the local community, Moore is enthusiastic about the process and looks forward to a bright – or at least well-lit – future.

"The entire switch is a long and expensive process; you must be patient," he contends. "If it were a quick fix, everyone would've done it yesterday. But I will say the successes have far outweighed the failures."

INFORMATION LINK

Resource: Gordon Moore, McCormick Motors, at www.mccormickmotors.com



McCormick Motors' new solar panel is just one component of the Chevrolet dealer's multi-faceted effort to minimize energy consumption.