

# Pond full of scum produces a tank full of cheap diesel

A local company produces diesel for \$1.25 to \$1.75 a gallon. And that attracted the interest of financiers, scientists and Uncle Sam.

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BRUCE BISPING Clayton McNeff explained how the Sar Tech company has figured out how to make biodiesel out of almost anything with oil, including algae.



**NEAL ST. ANTHONY**

A Minnesota biofuels company that has attracted visits from financiers, scientists, customers and the federal government has produced a clean diesel fuel from algae harvested from a pond next door to its Anoka County plant.

The development could prove big for the alternative-fuels business and the Midwest economy.

Clayton McNeff, a chemist and veteran industrialist, said his family-owned SarTec Corp. has perfected a three-year-old "continuous flow" process and produces about 1,000 gallons of diesel weekly for \$1.25 to \$1.75 per gallon from a variety of feedstocks that range from restaurant and ethanol-plant waste oils to non-edible crops and plain old pond scum.

"We see this as revolutionary technology, and we're not trying to keep it a secret," said McNeff, 40, who recently published a peer-reviewed scientific paper.

"You can deploy this technology using small mobile units, so you don't need to send feedstocks hundreds of miles," McNeff said. "You just use local crop waste, or ethanol waste oil or algae. We will license it and make money. We also want this to do as much good in the world as possible."

McNeff has raised about \$7 million from family and friends to construct a "two-reactor" pilot plant in Isanti, Minn., that will open in June.

His "Ever Cat Fuels" expects to produce 4 million gallons of clean diesel annually from a variety of feedstocks.

"This technology has the potential to help with energy security and climate change," Peter Agre, a Nobel Prize-winning chemist who directs the John Hopkins Bloomberg School of Public Health, said in a recent letter of support to federal officials. "These are two of the most important issues we face in terms of our country's economic and environmental future."

The promising technology is rooted in a 2006 research project by then-Augsburg College student Brian Krohn and chemistry professor Arlen Gyberg, who turned to McNeff, also an Augsburg-trained chemist, to help them develop a "pressurized, heated, continuous column catalysis using solid-state acidified zirconia" -- what I would call clean lube in a tube -- and an instantaneous alternative to the lengthy, energy-heavy, waste-laden "batch" process.

In fact, SarTec uses waste oils from traditional ethanol and biodiesel plants as a couple of its numerous feedstocks.

The U.S. consumes about 140 billion gallons of gasoline and 60 billion gallons of diesel per year, mostly distilled from imported oil, to fuel vehicles, trains and ships. Last year, in response to soaring fuel prices, national security and global warming concerns, then-President George W. Bush signed into law legislation that mandates increasing amounts of homegrown fuels from renewable sources.

National demand for biodiesel has grown from 25 million gallons in 2004 to 450 million gallons this year, according to the Agricultural Utilization Research Institute.

"There are some really good business opportunities that make use of waste oils such as technology that Clayton is developing," said Doug Cameron, chief scientific adviser at investment bank Piper Jaffray & Co. "These plants will not get us entirely off petroleum, but they have the potential to contribute to our fuel supplies. There is a big opportunity with algae. It is unproven at this point. But the research and use of algae at waste treatment plants, which also cleans up the phosphorus and other pollutants, and the use of carbon dioxide at power plants is encouraging. There's a double benefit. I'm cautiously optimistic."

The promise of Ever Cat's "Mcgyan Process" is that it can convert a variety of domestic nonfood feedstocks through a low-energy, no-waste process that also could potentially employ hundreds throughout the Midwest in an emerging energy industry. In an interview, McNeff said SarTec, a 25-person company, and the Mcgyan Process have solved a vexing algae problem that should speed development of the promising feed stock.

For example, SarTec has started to work with University of Minnesota chemist Roger Ruan, who is growing carbon-fed algae at the Metropolitan Council's sewage-treatment plant near South St. Paul. Traditionally, microwave or chemical conversion of the algae to oil still yields problematic fats and acids.

"The technology for treating algae oil traditionally produces soap," McNeff said. "We can take the free-fatty acids and turn them into fuel, as well as the waste streams coming off biodiesel and ethanol plants."

Ruan said Monday that challenges remain, but he is optimistic about the relationship.

Algae would turbocharge the industry. The Ag Utilization Institute estimates that algae boasts up to 9,000 gallons of oil per acre vs. 48 gallons for soybeans.

Ever Cat also has an agreement to refine carbon dioxide-fed algae heated by waste water at Great River Energy's Coal Creek power plant in North Dakota.

The reactors are 6 feet long by 6 inches. Engineering students at Augsburg and the University of St. Thomas have developed "pickup" models that can go to farms and small towns.

"One of our feedstocks is 'pennycress,' more commonly known as stink weed," McNeff said. "It can be a winter crop that can be harvested on the same land as soybeans or corn. That would be billions of gallons of pennycress oil just on that land. We could meet 10 percent of our need using that."

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