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Attleboro man develops way to harvest energy from waste

BY RICK FOSTER SUN CHRONICLE STAFF

ATTLEBORO - A technological startup company with roots in Attleboro has a new take on creating "green energy" - by generating power from microbes.

Hy-SyEnce, headed by Attleboro resident Donald Crookes, is on the fast track toward developing a demonstration plant based on its microbial fuel cell technology.

The process would not only generate electricity without combustion, but work in tandem with food processing plants, agriculture and municipal wastewater treatment plants to dramatically reduce treatment costs. Since the novel process generates no methane or combustion exhaust, it would also reduce carbon emissions and other greenhouse gases.

Crookes, a former Texas Instruments employee, said Hy-SyEnce's process is similar to a fuel cell, except with microscopic life forms doing all the work.

"It's a completely natural process," Crookes said.

According to a recent article in Mass High Tech, microbial fuel cells work on the same process as traditional fuel cells, in that a catalyst between an anode and a cathode is stimulated to produce electron flow.

However, microbes take the place of the traditional metal catalysts. The microbes, in turn, consume organic material, such as that in food processing plant waste streams and give off energy in the form of electricity.

That's big news for anyone whose business generates large quantities of organic waste. And according to Crookes it's even bigger because microbial fuel cells would replace multimillion-dollar storage tanks and processing facilities now used to digest and treat waste, substantially reducing capital costs.

At the same time, Crookes calculates that microbial fuel cells could dramatically improve profitability for a plant by turning a costly-to-operate treatment plant into a profit center that can produce either electricity or hydrogen.



Hy-SyEnce, headed by Attleboro resident Donald Crookes, is on the fast track toward developing a demonstration plant based on its microbial fuel cell technology. (Staff photo by Martin Gavin)

Since waste treatment times would be far shorter than that needed for conventional "digestion" systems, huge storage tanks would not be needed.

If reducing costs and generating electricity isn't enough, Crookes says Hy-Syence technology would also eliminate methane emissions typically given off by conventional waste treatment, eliminating 3.7 tons per day from a typical anaerobic digester processing 300,000 gallons per day.

In the approaching era of cap-and-trade for regulating greenhouse gases, cutting such emissions could provide a distinct advantage.

Crookes said the fuel cell process has been proven in the laboratory. His company, which recently moved to a business incubator space at the University of Massachusetts Dartmouth's Technology Venture Center, is preparing to set up a prototype plant this fall for an undisclosed client.

Since the fuel cells are designed to be modular, it would be theoretically simple to scale Hy-Syence's product up or down to suit the size of any facility.

The company currently has five employees, including chief scientist Ciro DiMeglio, who are spearheading the technology which Crookes says could find a major niche in what he calls the future "hydrogen economy."

If all goes well, he said, Hy-Syence may have found a microscopic solution that pays big dividends for both the country's energy and environmental needs.

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