Invention turns brewery waste to fuel

JOHN CURRAN - Associated Press - Associated Press

SOUTH BURLINGTON, Vermont (AP) - Before he started "saving the earth, one beer at a time," all inventor Eric Fitch knew about home brewing was that it could make quite a mess.

Once, he accidentally backed up the plumbing in his apartment building by dumping into his garbage disposal the spent grain left over from his India Pale Ale home brew. The oatmeal-looking gunk choked the pipes in his Cambridge (Massachusetts) building, flooding the basement.

These days, he is doing something more constructive, fulfilling the dream of beer lovers everywhere by recycling the stuff: The MIT-trained mechanical engineer has invented a patented device that turns brewery waste into natural gas that's used to fuel the brewing process.

The anaerobic methane digester, installed last year at Magic Hat Brewing Co. in Vermont, extracts energy from the spent hops, barley and yeast left over from the brewing process - and it processes the plant's wastewater. That saves the brewer on waste disposal and natural gas purchasing

The 42-foot (12.5-meter) tall structure, which cost about $4 million to build, sits in the back parking lot of Magic Hat's brewery, where it came online last summer.

Fitch, 37, is CEO of PurposeEnergy, Inc., of Waltham, Massachusetts, a renewable energy startup company whose lone product is the biphase orbicular bioreactor, which is 50 feet (15.2 meters) in diameter, holds 490,000 gallons (1.85 million liters) of slurry and produces 200 cubic feet of biogas per minute.

Brewers big and small have wrestled with waste issues since the dawn of beer-making. In recent years, they've turned to recycling - both as a cost-saver and for environmental reasons.

Anheuser-Busch, which makes Budweiser, uses a bio-energy recovery system in 10 of its 12 U.S. breweries to convert wastewater into natural gas that's then used to fuel the brewing process.

New Belgium Brewing Co., in Fort Collins, Colorado, captures excess heat from cooling wort and funnels it beneath its loading dock so it doesn't ice up in wintertime. The wort, the liquid made with malt and hot water, is fermented to make beer or ale.

Coors' breweries sell ethanol from their brewing process to refineries in Colorado. Some European breweries dry their spent grain and then burn it, using the heat and energy in their manufacturing process.

Most operations dispose of their spent grain by selling it - or giving it away - to farmers, for use as cattle or animal feed.

But PurposeEnergy says its digester is the first in the world to extract energy from the spent grain and then re-use it in the brewery, and all in one place. At Magic Hat, the big brown silo is located about 100 feet (30 meters) from the main complex.

"Feeding it to cattle is pretty direct recycling, especially if you get steak back out of it," said Julie Johnson, editor of All About Beer magazine. "Carting it off as animal feed is pretty common. In this case, by closing the loop at the brewery, this is turning it into savings quite directly for Magic Hat."

After getting the idea in 2007, Fitch pilot tested it in Florida, taking spent grain from a Yuengling & Son brewery in Tampa, Florida, trucking it to a farm and putting it through a 400-gallon (1,500-liter) methane digester. That helped refine the design of the facility. Then he scouted New England breweries that might agree to a pilot project and got a bite from Magic Hat, which had been looking for ways to reduce its wastewater treatment bill.

"Over the years, we looked at ways of reducing it, and the strain on South Burlington's system, and we came up with ideas ranging from using women's pantyhose to filter solids while flushing the brew kettle to having the spent grains hauled off to a local farm to be used for feed," said Steve Hill, social networking manager for North American Breweries, which owns Magic Hat.

"They (PurposeEnergy) laid out what we could save . and how the digester could benefit things from a 'green' standpoint, and it was too good to pass up," Hill said in an e-mail.

Other than the plume of flame that rose up off the top of the silo - triggering a few panicky calls by neighbors to the fire department - it has succeeded.

"There's a lot of money to be saved, there's a lot of strain to be taken off local wastewater systems," according to Hill. "The carbon footprint of a brewery is lessened a great deal when there's a power company in their backyard."

Others are taking notice.

"It's something that's definitely exciting for breweries to look at," said Mark Wilson, brew master at Abita Brewing Co., in Abita Springs, Louisiana, who is at work on a handbook outlining environmentally friendly brewing operations for the Master Brewers Association of the Americas.

Fitch, whose company's slogan is "Saving the earth, one beer at a time," has helped develop iPhone applications that allow him to control pumps and other operations within the digester. He says it can save brewers up to $2 per barrel in costs, a considerable savings for even a medium-sized operation like Magic Hat, which produces about 154,000 barrels of beer a year.

"I hope to be in large breweries throughout the world," he said.

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