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## **Green Micro-breweries**



Three micro-breweries manufacture ‘green’ beers. No, the beers are not the color green, but the micro-breweries power their plants with renewable energy.

**New Belgium** of Ft. Collins, Colorado became the first U.S. brewery to power its plant with wind turbines in 1998. New Belgium didn’t stop with using renewable energy. The brewery recycles, uses the methane produced by process water treatment to power 15 percent of its electricity and heat. New Belgium provided Solix, a company developing the capability to produce bio-diesel from algae, with several acres on its property, carbon dioxide from fermentation, and warm water from its process water treatment plant.

Next to New Belgium’s property the company Oberon installed a small treatment plant which will use the brewery’s wastewater to harvest sludge which will be used to create fish food for aqua-farms.

“We’re a partner in developing a process to use the carbon dioxide byproduct from fermentation to feed fast-growing algae in silo-shaped bioreactors,” says Nicolas Theisen, New Belgium’s sustainability specialist. “The oil in the algae can be pressed to make biodiesel, and the rest can go into our waste treatment ponds to make methane.”

Kim Jordan acknowledges the benefit of going green. “But building a brand by being green is not our motivation,” she says. “The beautiful part of it is we believe in what we’re doing.”

In California, **Sierra Nevada** installed four 250 kilowatt co-generation fuel cell power units in order to provide electricity and heat for its brewery. The co-generation units will harvest waste heat and produce steam for boiling the beer and will harvest waste heat. Sierra Nevada recycled 33,738 tons of material, 97.8 percent of its total waste, in 2006. Since 2001 they have earned a Waste Reduction Awards Program from California.

The brewery installed a system that recovers and recycles most of the carbon dioxide produced during the fermentation process. Sierra Nevada also reduced its water usage to nearly half of what breweries typically use.

In January the brewery installed a 1.3 megawatt solar system which provides 34 percent of its electricity. The system uses technology from Mitsubishi Electric.

“Sierra Nevada Brewery is one of the most environmentally conscious companies in the industry and we are honored to be working on this project with them,” says Gina Heng, director of marketing for Mitsubishi Electric & Electronics USA’s Photovoltaic Division.

**Brooklyn Brewery** became the first New York City company to generate 100 percent of its electricity from wind turbines. Community Energy, the company that manages the brewery’s 20 wind turbines, estimates that using wind energy stops 335,000 pounds of carbon dioxide, 1,500 pounds of sulfur dioxide, and 500 pounds of nitrogen oxide from being released into the atmosphere every year.

"It's the right thing to do, and not too many years down the road it will be a common choice," said Steve Hindy, Brooklyn Brewery founder. "If you are going to be in business, it's good to have principles."

### **Company invented system to turn brewery waste into ethanol**

Diversified Ethanol Corporation (DEC) released a product, the Butterfield Closed Cycle System, in February that makes it possible for breweries and microbreweries to convert their waste products into ethanol. Instead of microbreweries paying to discharge and treat their waste streams, they will be able to turn it into a renewable transportation fuel.

“Our company is focusing on producing valuable renewable energy from substances that presently are considered waste,” said Robert Johnson, Chairman and CEO of Greenbelt Resources. “In this case, the brewery waste stream produced by breweries and microbreweries. In essence, we are converting an existing waste stream into a viable revenue stream, while providing much needed alternative energy.”

Conventional ethanol requires much water to be produced, but DEC’s product eliminates that, and makes ethanol production more environmentally friendly and cost effective.

“This new technology is clearly a breakthrough in recycling and in creating a new source of revenue for breweries,” Johnson said. “Using our new sustainable ethanol plant design, our company will install ‘green’ production plants into existing breweries and microbreweries throughout the U.S. Our small modular plant design makes Ethanol production affordable for small to medium sized operations.”