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Are Backyard Ethanol Brewers an Answer to High-Priced Gas?

Company debuts ethanol home refinery system to offer consumers an alternative to gasoline

By Larry Greenemeier



IMAGE 1 of 4

MICROFUELLER: E-Fuel Corp.'s EFuel100 MicroFueller can produce up to 35 gallons of ethanol a week that consumers can pump directly into their cars and trucks. Courtesy of E-Fuel Corp.



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\$10,000 DO-IT-YOURSELF DEVICE: The EFuel100 MicroFueller transforms sugar feedstock, yeast and water into ethanol fuel, although some question whether ethanol is better for the environment than gasoline. Courtesy of E-Fuel Corp.

A company banking on drivers' weariness of skyrocketing gasoline prices unveiled a home refinery device on Thursday offering another option: [ethanol](#). [E-Fuel Corporation](#) says its EFuel100 MicroFueller can produce up to 35 gallons (132 liters) of ethanol a week that consumers can pump directly into their cars and trucks. There is no combustion inside the device, which runs on a standard household 110- to 220-volt AC power supply (consuming about 150 watts per day) and uses a membrane system to distill the sugar, yeast and water solution required to make ethanol rather than combustion heating elements, as commercial ethanol producers do.

Interested drivers in the U.S. can put in their orders now for their own EFuel100 MicroFueller at the company's Web site with a \$3,000 down payment toward the total \$10,000 tab; the first units are expected to ship some time this fall. The company, which has plants in Los Gatos and Paso Robles, Calif., as well as Hong Kong, also plans to sell MicroFuellers in Brazil, China and the U.K.

The prototype rolled out at a press conference in New York City yesterday is 72 inches (1.8 meters) high, 42 inches (1.1 meters) wide and 72 inches long, but the company says the consumer units are likely to be a bit smaller.

Ethanol fuel is made from a combination of water, yeast and sugar, Tom Quinn, E-Fuel founder and CEO, said at the press conference, adding that the process was no more complicated than what is taught in "third-grade science." The adoption of ethanol has been held back because drivers do not have access to the fuel, he said, pointing out that there are only 1,200 ethanol stations in the U.S., compared with about 176,000 gas stations.

To make ethanol in the EFuel100, feedstock (consisting of sugar and yeast) or discarded liquor is loaded into the device's 200-gallon (757-liter) tank. Using the LCD screen located on the front of the device (next to the pump), the operator places the EFuel100 either in ferment (for feedstock) or distillation (for liquor) mode to begin the process. The EFuel100 is hooked up to a water source—much like one's washing machine or dishwasher is—and regulates the amount of water flowing into its tank to begin the ethanol-conversion process.

Once the feedstock is fermented, the device transfers the solution to its distillation system, where it is vaporized in a vertical column tube and sent through a membrane that separates the alcohol from the water. The distilled vapor is then cooled back into liquid form and sent to the 35-gallon storage tank, from which it can be pumped into an automobile using a 50-foot (15-meter) retractable hose. The process of turning sugar into ethanol fuel takes nearly a



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DISTRIBUTION ALBATROSS: The adoption of ethanol has been held back because there isn't nearly enough supply to meet the demand--the U.S. has only 1,200 ethanol stations, compared to about 176,000 gas stations. Courtesy of E-Fuel Corp.



IMAGE 4 of 4

HOME BREW: The prototype E-Fuel100 measures 72 inches (1.8 meters) high, 42 inches (1.1 meters) wide and 72 inches long, but the company says the consumer units are likely to be a bit smaller. Courtesy of E-Fuel Corp.

week (although alcohol distillation can be done in a matter of hours).

The cost of operating and maintaining the E-Fuel100 vary, depending on rebates (a \$1,000 federal tax credit is available) and the cost of the sugar feedstock—it takes 14 pounds (6.4 kilograms) of feedstock to produce a gallon of ethanol. E-Fuel also offers its Carbon Credit Coupon Program, which will allow its customers to buy discounted E-Fuel—certified sugar feedstock for an estimated 15 to 30 cents per pound, the company said Thursday. One of the company's main objectives with the program is to keep the cost of ethanol less than \$1 per gallon.

The company says that families would save a barrel of cash in the long run. It estimates, for instance, that a family will save about \$4,200 per year on fuel (assuming gas costs \$3.60 per gallon and ethanol costs \$1 per gallon) if it has two cars that get 22 miles per gallon (9.3 kilometers per liter) and are driven a total of 34,500 miles (55,500 kilometers) annually. Automobiles do not require their fuel to be 100 percent ethanol, so greater savings are possible if drivers dilute the finished product with water (as long as that mixture contains at least 65 percent ethanol).

E-Fuel chose sugar as its raw material (instead of corn feedstock or [cellulose](#)) because of its ease and abundance: corn feedstock or cellulose have to be broken down into sugar before they can be turned into ethanol. But E-Fuel said it plans to eventually build corn and cellulose versions of its microfuelers, although no time frame has been set. A version that uses corn is lower priority, Quinn said, because corn, unlike sugar, is an essential part of the world's food supply. As Bruce Padula, the company's vice president of sales and marketing puts it, "Doctors aren't telling you to eat more sugar." Still, much of the ethanol-producing infrastructure in place is designed to use corn feedstock—corn-based ethanol accounts for most of the total ethanol produced in the U.S. at this time, according to [Louisiana State University's Agriculture Center](#).

However, the company's claims about the environmental friendliness of ethanol are in dispute. E-Fuel touts ethanol as cheaper and more environmentally sound than gasoline, claiming that it produces 85 percent fewer climate change-causing carbon emissions than gasoline. But Mark Jacobson, a Stanford University professor of civil and environmental engineering, says ethanol is no better for air quality. Jacobson last year published [a report in *Environmental Science & Technology*](#) noting that ethanol produces less benzene and butadiene than gasoline, but it releases more formaldehyde and acetaldehyde into the atmosphere.

Although ethanol is made from seemingly innocuous

materials (like sugar or corn), it becomes dangerous when broken down in the atmosphere into acetaldehyde and acetic acid (the latter of which is corrosive and irritates the eyes), Jacobson says. "[Ethanol] kills people," he says. "Just like cigarette smoke, you're breathing in particles that are harmful."

Criticism by Jacobson and [others](#) against this fuel that many hope will become an alternative to high-priced, foreign-sourced petroleum is an issue E-Fuel and other ethanol backers will have to address, no matter how much cheaper their product is.