

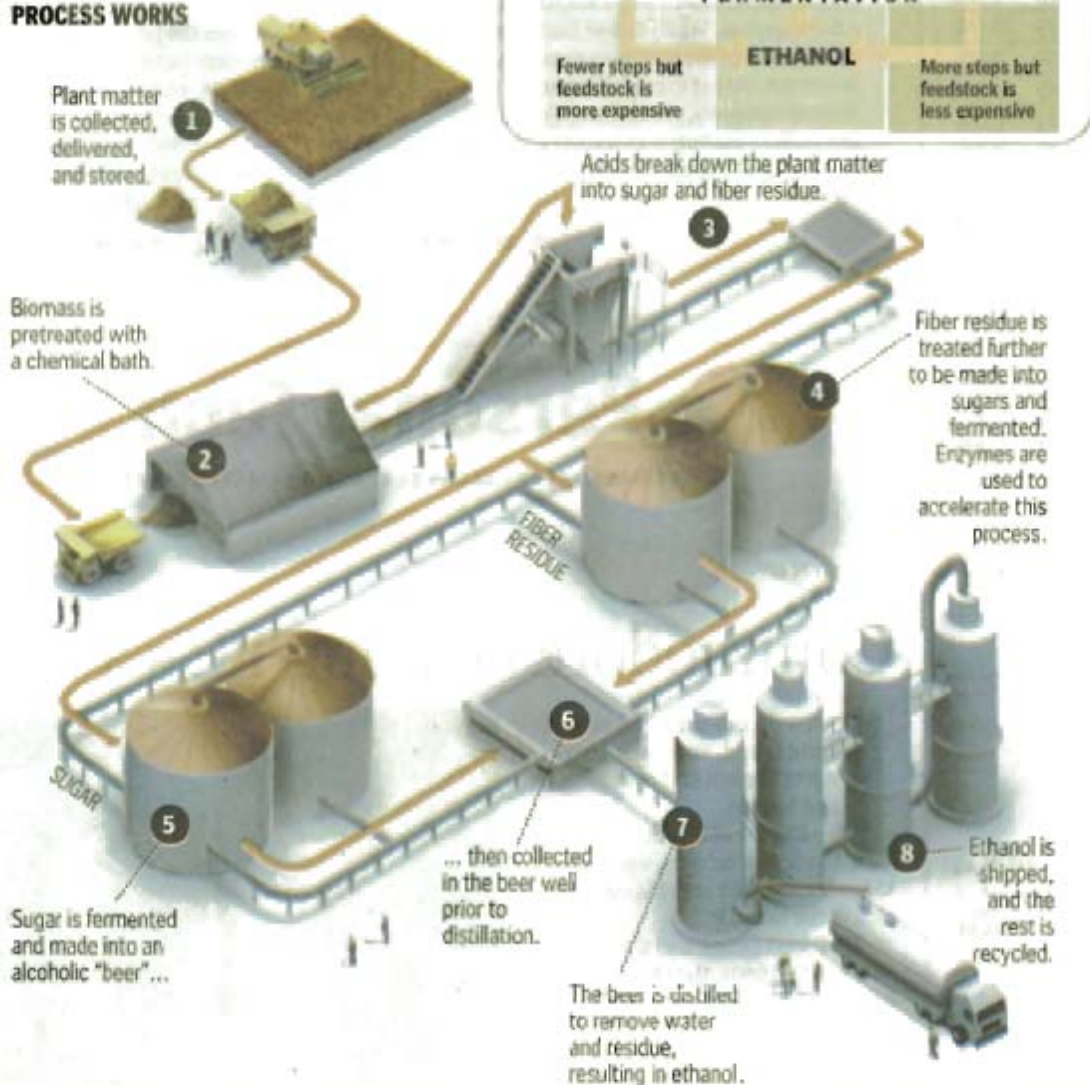
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# Biotech firms sprint to cut ethanol's cost

## Creating fuel from plant waste

Ethanol, the leading alternative to gasoline, is now made from the edible parts of corn or sugar cane. A more efficient method would be to use the rest of the plant, but the leaves and stalks need to be broken down and fermented — currently an expensive process. Two Cambridge companies are trying to invent new ways to produce so-called "cellulosic ethanol" more cheaply. This graphic depicts the process used by Celunol Corp.

### HOW THE PROCESS WORKS



Two in Cambridge among many seeking practical ways to make the clean-burning alternative fuel

By Stephen Heuser  
GLOBE STAFF

If the car of the future runs on old cornstalks and scraps of sugarcane, you might be able to thank a group of executives sitting eight stories above the Charles River.

That's where energy-industry veteran Carlos Riva presides over Celunol Corp., one of a host of new companies racing to turn farm waste into potent, clean-burning ethanol.

It might seem unlikely that the fuel industry and big agriculture, two goliaths of the red-state American economy, would intersect at a conference table overlooking CambridgeSide Galleria. But increasingly, energy analysts say, the next major shift in American energy is likely to come from high-tech science being developed in places like Cambridge.

"Historically, energy companies were located near the energy supply. You had oil companies in Houston, coal companies where they get the coal. I think what we're going to see now is almost a new type of company emerge — an energy innovation company," says Jeff Andrews, a venture capitalist with Atlas Venture of Waltham, which invests in several "cleantech" firms.

Recently, privately held Celunol said it would merge with Diversa Corp., a public California firm, creating a 240-person national company. Diversa will buy Celunol for \$115 million in stock, but the resulting company will be run by Celunol's executives in Cambridge.

Several competitors, including East Cambridge neighbor Mascoma Corp., are jostling with Celunol to be the first to prove

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SOURCE: Celunol Corp., American Coalition for Ethanol, Diversa Corp.

JAVIER ZARRACINA, DAIGO FUJIMURA/GLOBE STAFF



John Bardsley (left), a researcher at Mascoma Labs in Cambridge, takes a sample from a bioreactor. Above, farmers in a field of switchgrass, among the materials being explored for a cheaper way to produce ethanol as an alternative to gasoline.

