

The Death of Range Fuels Shouldn't Doom All Biofuels

The influential biofuels startup failed because its technology proved too expensive.

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This month, Range Fuels, one of the first companies in a wave of startups that promised cheap biofuels made from sources such as wood chips rather than corn, shut its doors for good and was forced to auction off its assets.

The company failed for many reasons, but the biggest seems to be that its technology proved too expensive, something that experts say shouldn't be a surprise, since it was similar to other technologies with well-known problems.

Range Fuels benefited from being an "early mover" in the field, says [David Berry](#), a partner at the venture capital firm [Flagship Ventures](#). "It got a lot of attention, and so it was well positioned to raise a bunch of money. The reality was, the technology couldn't quite keep up with the attention," he says. "That led to the company's demise."

Range Fuels, which had planned to turn wood chips into ethanol, received substantial attention in 2006, after President Bush declared in his State of the Union Address that the United States was "addicted to oil" and pointed to "cutting-edge methods of producing ethanol, not just from corn, but from wood chips and stalks, or switchgrass."

By the following year, Range Fuels had received a \$76 million grant from the U.S. Department of Energy and had broken ground on a commercial-scale plant in Soperton, Georgia. That plant was [designed](#) to produce 20 million gallons of fuel a year at first, and eventually 100 million gallons.

At the time, Range Fuels said its plant could produce fuel by 2008, but it still wasn't finished in 2009, when it received an \$80 million loan guarantee from the U.S. Department of Agriculture to help with construction. In addition to government funding, over its history, the company received over \$150 million in venture capital.

The Range Fuels plant produced some methanol in 2010, but it operated at a loss, and it was shut down in 2011. By December 2011, the company had received just over \$40 million of the full grant awarded by the DOE (the rest was to come at the next phase of construction). David Aldous, the CEO of Range Fuels, says \$37 million of the loan guarantee is outstanding.

Range Fuels's technology is similar to a process that's long been used to convert coal into liquid fuels. It starts with a gasification step that uses heat, pressure, and steam to turn wood chips into a combination of hydrogen and carbon monoxide known as syngas. The company then used catalysts to make a combination of methanol and ethanol. It claimed that by using a proprietary

catalyst, and some smart engineering, it could make the normally expensive process more economical.

Beyond the Oil Patch Note: The above method is not the "Ultimate" method, that of using 10,000°F Plasma torches such as developed by Westinghouse. At 10,000°F, everything organic is vaporized.

As early as 2007, energy experts were raising red flags about the technology (as *Technology Review* noted [here](#)). Researchers at the National Renewable Energy Laboratory in Golden, Colorado, said that their attempts to scale up similar technology had revealed a number of problems.

One possible problem, says [Helena Chum](#), a research fellow at NREL, is tar formation during the gasification step, something that has plagued similar attempts at gasification by Georgia Pacific and other companies. "Even if it's a small amount in experiments, when you go into industrial production, it becomes an enormous amount to deal with," Chum says. The problem was known to researchers, she says, "but technology developers sometime ignore research results in trying to move fast."

Chum says other problems can arise from gasifying biomass—including the presence of inorganic impurities and irregular proportions of the gases formed, which requires modifying catalysts and processes, all of which can be expensive and time-consuming.

Some sources have suggested that the culture at Range Fuels caused the company to downplay the significance of technical challenges as it rushed to scale up the technology. Chum says that's common. "Usually developers are optimistic, so they go with very short time frames. Even if companies have people on the staff that say it will take longer, the investors don't want to wait a long time, and sometimes neither does the government," she says.

Aldous says the biggest problem Range Fuels encountered was securing enough money to address the technical challenges it faced, especially in the midst of a recession. He says the company could only get enough money to build the plant in stages, and that the partial plant had to operate at a loss.

The system for feeding biomass to the gasifiers, which Range Fuels bought from a supplier, could only provide enough to supply one of the company's two gasifiers, while the other stood idle. "This meant we were losing money with each gallon we produced; the supplier needed a few months to redesign their system, which is why we mothballed the plant," he says.

By early 2011, even Vinod Khosla, the prominent investor who provided seed funding for Range Fuels and who had written enthusiastically about the company during its early days, was

criticizing the company's basic technology. "In our view, the traditional path of chemical catalysis of syngas to fuels (be it ethanol or Fischer-Tropsch synthesis) appears economically challenging," he wrote in January. "Technologies like Range that started with chemical catalysts will need to switch over to these newer fermentation techniques."

Commenting in a recent e-mail to *Technology Review*, Khosla noted, however, that it is typical for many of the companies pursuing a new technology to fail. "The nature of the venture race is that the best technology (lowest cost, highest performance, etc.) in each technology does very well, some do okay, and many fail because their technology was not good enough," he says.

Chum agrees. "We shouldn't call the failure of one company the failure of a field," she says.