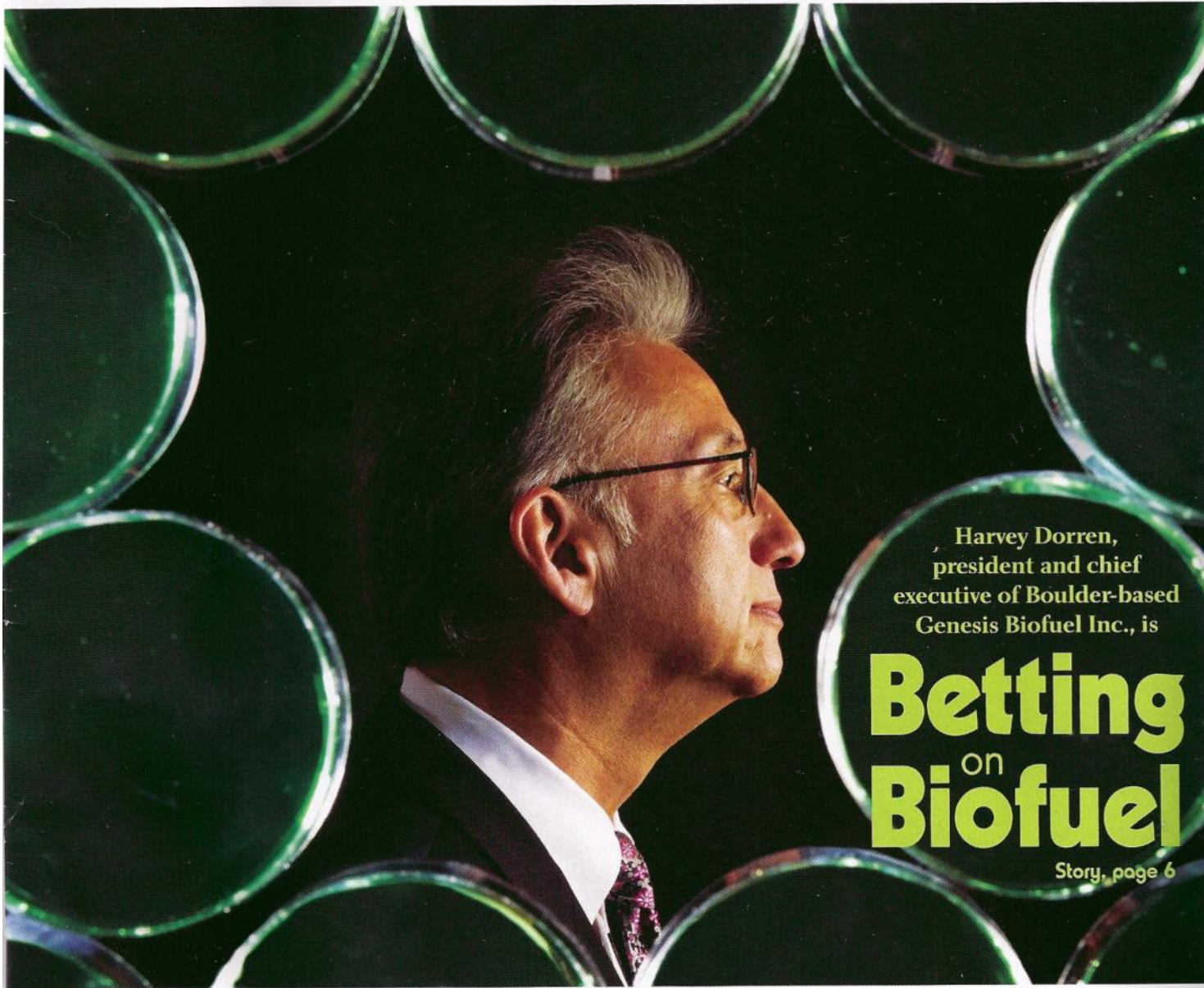


greenbook

GUIDE TO SUSTAINABLE BUSINESS IN THE BOULDER VALLEY



Harvey Dorren,
president and chief
executive of Boulder-based
Genesis Biofuel Inc., is

Betting on Biofuel

Story, page 6

A Special Publication of the Boulder County Business Report july 9-22, 2010

SPONSORED BY

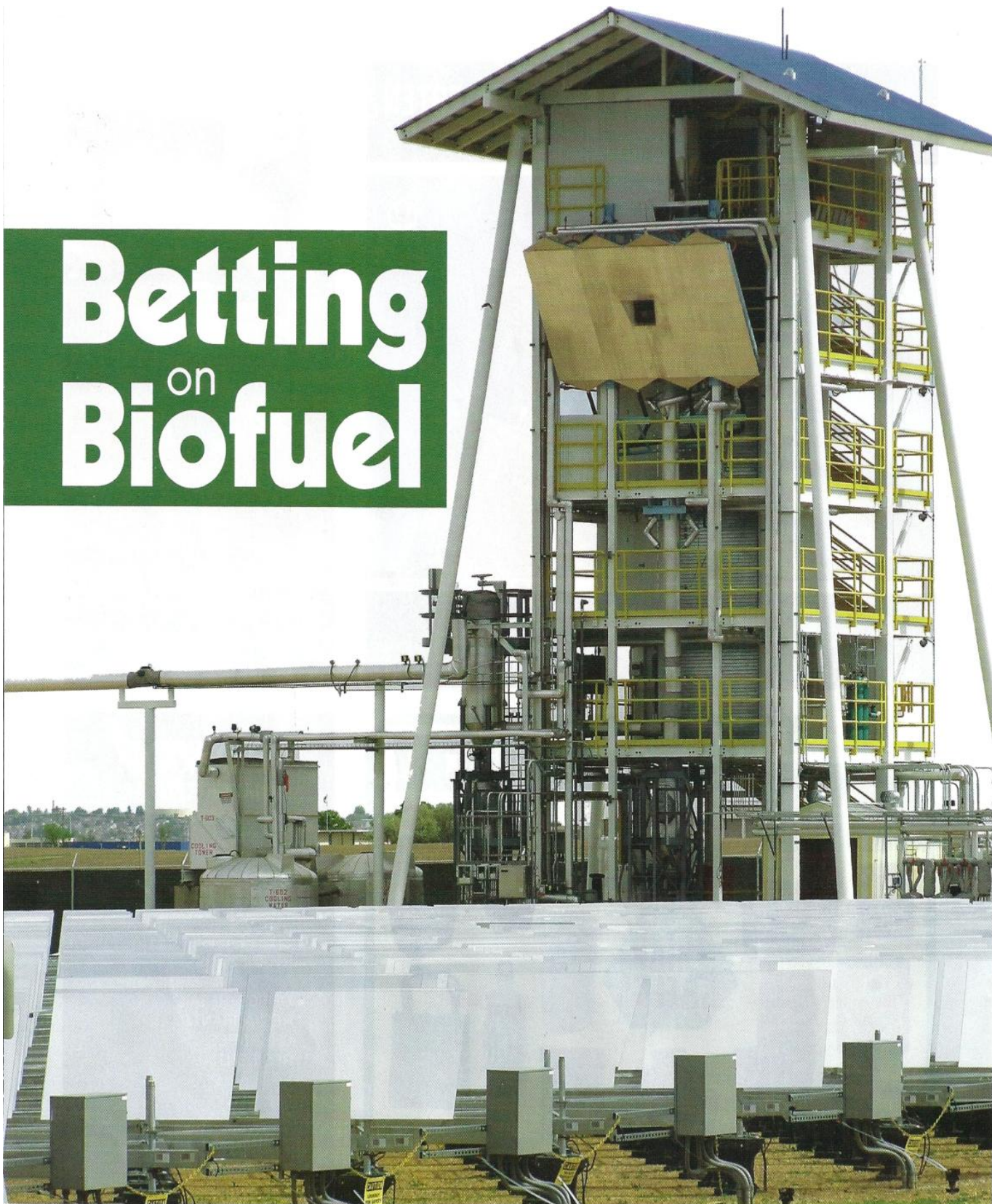


**CONTINUING
EDUCATION
& PROFESSIONAL STUDIES**

**BOULDER COUNTY
BUSINESS
REPORT**



Betting on Biofuel



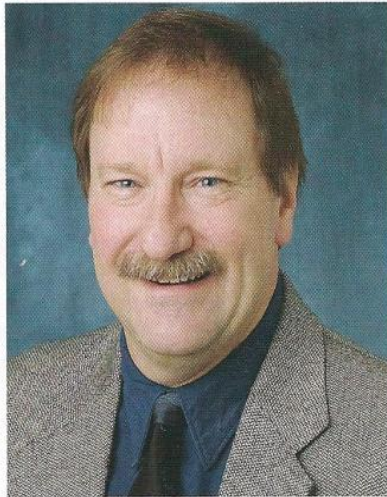
DOUG STORUM

A reactor sits at the top of a tower and collects heat generated by a field of mirrors at Louisville-based Sundrop Fuels' first plant in Broomfield. The concentrated sunlight heats algae, turning it to synthesis gas that can be transformed into products including hydrogen, methanol and gasoline.

Companies race to perfect process for potential billion-dollar industry

BY RYAN DIONNE
RDIONNE@BCBR.COM

With most people in the industry being extremely tight-lipped, it's hard to gauge how long it will take for biofuels to be mainstream.



ogy officer of Louisville-based Sundrop Fuels Inc., said if algae is grown on 30 percent of the Mohave Desert and converted to liquid fuel, it would be enough to replace all the gasoline that's consumed in the country.

But it's not an inexpensive endeavor.

Between the research and development of new technologies to address the big problems — such

“Maybe it's wishful thinking. But I think there's a huge opportunity to help move Conoco in that (renewable-energy) direction.”

Al Weimer
chief technology officer,
Sundrop Fuels Inc.

Each company is working on its own technology, with its own biomass in its own area, with its own hushed staff. There's minimal, if any, collaboration among companies despite a similar goal: Produce fuel from a sustainable resource that will help reduce the United States' dependence on oil.

There are many ways to make biofuel, including burning anything from wood to garbage and corn stalks.

Currently, corn ethanol is the most common biofuel on the market because it's the easiest to produce. But it's neither the best option, nor the best fuel, experts say.

Many companies, nowadays, are looking to grow algae, which is then harvested and turned into biomass.

Grown on water, the algae must be dried, and the oil needs to be extracted from it, which poses other problems. How the oil is extracted is one of the big hurdles many companies face. But it grows extremely fast and is relatively efficient as a fuel.

Al Weimer, a University of Colorado at Boulder chemical and biological engineering professor, executive director of the Colorado Center for Biorefining and Biofuels, and the chief technol-

as whether algae can be grown in salt water or if companies can use salt water but extract the salt — and the incredibly expensive refineries, the money doesn't pour in like with other industries.

Harvey Dorren, Boulder-based Genesis Biofuel Inc.'s president and chief executive officer, said companies have gone through hundreds of millions of dollars and still have nothing to show for it. After all, he said, most things that are research-and-development-driven aren't cheap.

Plants may cost \$1 billion, which means it's hard to find funding. Most venture capitalists don't have that kind of money to invest, and it's nearly impossible to get a bank loan for an unconventional project.

That leaves partnerships with a big oil or gas company — but even that has risks.

Weimer and Dorren said oil companies have invested millions of dollars in biofuel research. Weimer said oil companies see their reserves dwindling and view biofuel as a feasible alternative.

ConocoPhillips' decision to move a major operation to Louisville that'll serve as its global technology and corporate learning center could

SEE Biofuel, page 9



COURTESY SUNDROP FUELS INC.

Sundrop Fuels Inc. uses a field of mirrors to reflect sunlight at a reactor located atop a tower, like this one in Broomfield, seen during construction in 2009. The sunlight heats biomass that's converted to synthesis gas that can be used to produce a variety of fuels.

be a good example.

To Weimer, it's not just coincidence that a huge oil-related company set up shop in left-leaning, green-oriented Boulder County. He said it was likely strategic as ConocoPhillips looks for ways to tap the renewable-energy industry.

"Maybe it's wishful thinking," he said. "But I think there's a huge opportunity to help move Conoco in that direction."

With all the focus on oil independence, the focus should be placed on energy independence in general, because even if the United States decreases its oil consumption, that doesn't mean other countries will, too — which still causes prices to increase.

While many people in the biofuel industry think it'll likely be three years to five years before biofuel becomes somewhat mainstream, it depends on many factors, such as the price of oil.

With gas at the pump being relatively cheap, people aren't as likely to spend more on green-related fuel.

"Everybody is gung ho for the environment as long as it doesn't cost them anything," Dorren said.

Some estimates are that when gas hits more than \$4 per

gallon, biofuel will be worth the investment.

But Dorren isn't too concerned with fuel prices when it comes to Genesis Biofuel because his business is more focused on carbon capture. His company captures carbon, to grow algae and ultimately produce biofuel. He hopes to have his first plant operational within a year.

Most other companies, including Sundrop Fuels, are trying to produce as much biofuel as possible with the least investment.

Sundrop, which, in 2008, acquired Boulder-based Copernican Energy Inc. that Weimer founded, is about three years from a small-scale development plant.

Sundrop uses concentrated sunlight to heat algae in a reactor so it turns to synthesis gas that can be transformed into a handful of products including hydrogen, methanol, gasoline and more — and with greater efficiency than many other operations.

Sundrop and Genesis are just two of several companies in the Boulder Valley in the race to produce biofuel. It's just a matter of who gets to the finish line first and with the best business plan.

"It's a billion-dollar industry," Dorren said. "This is not a nickel and dime endeavor here."