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Success Story

Green Business: Biodiesel

Bently Biofuels

Minden, Nevada

KEY FINDINGS

- A gallon of biodiesel results in 78% less CO₂ emissions than its petroleum diesel equivalent¹.
- For biodiesel made from used cooking oil, the reduction of carbon emissions is even greater - 85% less than petroleum diesel².
- In 2012, Bently produced enough biodiesel to offset 9.6 million pounds of CO₂ emissions: The equivalent of taking 820 cars off the road.
- During the 2013 holiday season, Bently collected 230 gallons of cooking oil from local families, offsetting approximately 6,500 pounds of CO₂ emissions.



Bently Biofuels' plant is located at the base of the Sierra Nevada Range in Minden, Nevada. Photo by Kelsey McCutcheon.

From Burgers to Biodiesel: Bently Creates Eco-Friendly Fuel From Used Cooking Oil

Doctors may tell you to pass on the French-fries, but the folks at Bently Biofuels won't. Bently Biofuels, located in Minden, Nevada, collects used cooking oil from restaurants and converts it into biodiesel, a renewable, domestically produced, environmentally friendly alternative to petroleum diesel fuel.

The environmental benefits of Bently's biodiesel fuel operation are many: First,

they are preventing waste by repurposing energy-rich cooking oil that would otherwise be discarded. Second, they are preventing pollution by encouraging proper disposal of this waste.

In the past, restaurants had to pay to get rid of old cooking oil. "The temptation was to dump it down the sink, and that had some very real implications for the sewer company," said Carlo Luri, Director

"The type of work that Bently is doing is important. It's proof of concept. It shows that individuals and individual companies can take the high road when it comes to environmental responsibility."

*-Christopher Turbeville
Bently Biofuels Plant Manager*

¹ According to the [National Biodiesel Board](#).

² Calculated from [California Air Resources Board](#) data.

of Business Development for Bently Enterprises. Today, Bently purchases used cooking oil from restaurants in Northern Nevada and the Bay Area, providing companies with a profitable and environmentally responsible alternative.

A third benefit of Bently Biodiesel's fuel is in reduced carbon emissions. The CO₂ that is released from use of petroleum-based fuel represents a release of carbon that has been stored as a fossil fuel for millions of years, thus leading to a net increase of CO₂ in the atmosphere. The CO₂ that is released from combustion of biodiesel represents a release of carbon that has been removed from the atmosphere relatively recently, during the lifetime of the plant or animal that the oils came from, thus was already part of the atmospheric carbon cycle and is considered to have a much lower net impact.

"The work that we're doing is actually making a difference," said Christopher Turbeville, Plant Manager at Bently Biofuels. "We are recycling. We are diverting material from landfills. We are changing the emissions profile from the



Bently personnel at work in the biodiesel plant. Photo by Kelsey McCutcheon.

way we run our vehicles on renewable fuels."

Company background

In 2002, Don Bently, owner of Bently Ranch in Minden, NV, took an interest in finding a clean and sustainable fuel source to run his farm. Don Bently, an entrepreneur and an industrialist, had purchased several large ranches and historic buildings in the Minden area, and

was raising cattle and crops on the land. A large portion of the ranch budget was going toward transportation fuels, and Bently predicted that fuel prices would increase greatly over the long term.

"In 2002, he had the foresight to say that oil is going to get to \$100 a barrel," said Luri of Don Bently. "Oil was trading for about \$25 a barrel back then. And that was the historic high, so nobody in their right mind would have even forecast or predicted that oil could have quadrupled in price. It only took five years for that to happen." Sure enough, by 2008, oil was selling for \$100 a barrel, but Don Bently and his employees had long since begun experimenting with an alternative form of fuel that could be produced with material grown on their ranch: biodiesel.

First, Bently needed a "feedstock", or a source of raw material to convert to biodiesel. They began by growing soybeans. When soybeans failed to thrive, Don Bently and his employees tried canola. Canola fared somewhat better, but still wasn't as successful as they had hoped. Bently considered

Recycled Holiday Cooking Oil Program

During the 2013 holiday season, Bently Biofuels teamed with the Western Sustainability and Pollution Prevention Network (WSPPN) to collect used cooking oil left over from people's holiday turkey fryers. Bently Biofuels collected 230 gallons of used cooking oil during the course of this program. Once converted into biofuel, this biodiesel offset approximately 6,500 lbs of CO₂ emissions – the equivalent of taking one car off the road for 7.5 months of the year. Next year, Bently Biofuels hopes to expand this program into the San Francisco Bay area.

The Recycled Holiday Cooking Oil program was part of the Environmental Protection Agency's Food Recovery Challenge, in which participants find ways to reduce food waste.



A vat of used cooking oil being processed into biodiesel at the Bently Biofuels plant in Minden. Photo by Kelsey McCutcheon.

How Does Bently Make Biodiesel?

Bently Biofuels purchases used cooking oil from restaurants in Northern Nevada and California in the form of “yellow grease”, a commodity also used by the animal industry for chicken feed. Convenient service and proper incentives are key to securing contracts for cooking oil, according to Carlo Luri, Bently’s Director of Business Development. “The financial incentive is ‘we’re going to pay you for every gallon of oil that we collect from you’, said Luri, “Also, we have to make it easy. We can’t tell them to carry all this oil in the back of their car or pickup to our plant.” Bently’s drivers provide door-to-door service, collecting the oil from each restaurant’s bin with a big vacuum truck, and transporting it to their plant in Minden.

Back at the plant, yellow grease is converted to biodiesel. Cooking oil, a triglyceride, has an “E” shaped molecular arrangement, with three connected chains of molecules. The oil is mixed with an alcohol (methanol) in the presence of a catalyst (potassium hydroxide), to liberate these three chains, creating an oil with molecular arrangement similar to that of diesel fuel. Food particles are washed out of the oil, then the mixture is dried (to remove water), polished, and goes through a quality control process. In the end, all of the additives that go into the cooking oil to convert it to biodiesel are removed, leaving behind B100 – a pure, unblended form of biodiesel.

Another benefit of Bently’s biofuel operation? Almost all of their waste products can be composted. Biodiesel is a non-toxic, biodegradable substance, and the composted leftovers from the biodiesel plant are used to fertilize farm fields at Bently Biofuels’ sister company, Bently Ranch.

buying soybean and canola oil from the Midwest, but transportation costs were problematic. Finally, they hit upon a solution: Fast-food grease. At the time, restaurant owners had to pay to dispose of this grease, sending it to landfills where containers could be crushed or damaged, and oil would spill out into the landfill. Bently started collecting and processing waste cooking oil in 2002, and opened a plant for biofuel production in 2005. By the third quarter of 2005, they had produced all of the fuel they needed for Bently Ranch, and in 2006 began to market and sell the product in California. Today, the nine-person team at Bently Biofuels sells biodiesel to customers in Northern Nevada and California from fueling stations in Minden, Reno, Berkeley and San Francisco. The company is managed by Chris Bently, son of Don Bently, who passed away in 2012. "Leading by example is one of the ways that he got his reputation for being a visionary and being an environmental activist," said Turbeville of founder Don Bently.

Small company, large impact

Life cycle carbon emissions from biodiesel are 78 to 85 percent lower than emissions from petroleum fuels. If used in place of petroleum diesel, Bently's 2012 production of biodiesel would offset 9.6 million pounds of CO₂ emissions – the equivalent of taking 820 cars off the road for one year.

Biodiesel can be used alone as "B100" (100 percent biodiesel), or mixed with petroleum diesel and blended into many different concentrations. Bently produces a variety of blends, including B5 (5 percent biodiesel and 95 percent ultra-low sulfur diesel), B20 (20 percent biodiesel and 80 percent ultra-low sulfur diesel), B50 (50 percent biodiesel and 50 percent ultra-low sulfur diesel) and their best-selling product, B99.9 (99.9 percent biodiesel and 0.1 percent ultra-low sulfur



Bently Biofuels Plant Manager Christopher Turbeville explains how biodiesel is made. Photo by Kelsey McCutcheon.

diesel). Bently also sells bioethanol, an alcohol-based biofuel that can be blended with unleaded gasoline to run in gasoline engines. Low concentrations of biodiesel like B5 can be used in all diesel engines, but only certain diesel engines can use B99.9. Likewise, low concentrations of bioethanol, such as E10 (10 percent bioethanol and 90 percent unleaded gasoline) can be used in any gasoline engine, but only specialized Flex Fuel rated engines can use high bioethanol concentrations.

By blending biofuels with petroleum products, it may be possible for companies like Bently Biofuels to help people act collectively on large-scale problems like climate change and carbon emissions, even without investing in a new vehicle. "If we get to the point where pretty much every gallon of fuel that we buy has a percentage of biofuel in it – and I'm talking biofuel more generally, whether it's alcohol based fuel with gasoline replacement or diesel replacement – and they have a reduction

in greenhouse gas emissions, I think that's a good thing," said Luri.

One final benefit of biodiesel is that it can be produced domestically. According to the National Biodiesel Board, replacing five percent of our country's diesel fuel with biodiesel would equal the amount of diesel fuel that we refine from the crude oil imported from Iraq. And if Bently and other biodiesel companies can help us reduce our dependence on foreign oil while recycling a fast-food waste product? All the better. "The type of work that Bently is doing is important," said Turbeville. "It's proof of concept, it's to show that individuals and individual companies can take the high road when it comes to environmental responsibility."

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