

Fuels of the Future

**Kaitlin Spak
Bear River High School
California**

October 27, 2004

When an enterprising farmer shades his eyes and gazes down a row of crops, he doesn't just see food for the table. Now, that farmer sees those plants as energy. In his mind's eye, each individual plant takes on the characteristics of a tiny gas pump, producing barrels and barrels of fuel that can power his tractor, fuel the family car, and keep America running. Unfortunately, there are too few of these enterprising farmers, and too few individuals share this vision of clean, renewable fuel. America has been shackled to fossil fuels for so long that many are content to continue guzzling gas, not realizing that superior alternatives exist. So how can we break free from our petroleum bonds? The answer lies in the production and use of biofuels. Biofuels are organic materials, such as grains or vegetable oils, which are used to produce energy or fuel (Hudson, 2004). Today, I will be discussing some of the problems with our current energy and fuel supplies, and how the use of biofuels can reduce or eliminate these problems in the areas of the environment, the economy, and energy security. Biofuels such as ethanol and biodiesel are creating an exciting opportunity for farmers, as well as the general public, and everyone can benefit.

To begin, biofuels will contribute to a cleaner environment. The petroleum fuel that America currently depends on is a non-renewable resource that pollutes our air, contaminates our soil and water, and

compromises our health. Petroleum gasoline is the largest source of carcinogens and toxic emissions (American Coalition for Ethanol, 2004). In fact, emissions from motor vehicles produce almost 95% of the carbon monoxide in a typical U.S. city (Environmental Protection Agency, 2002). In addition, gasoline and diesel fuel release nitrogen oxides, particulate matter, and hydrocarbons, all of which are harmful to both our environment and ourselves (Environmental Protection Agency, 2002). We need a safe, clean, and sustainable alternative to petroleum based fuels. We need ethanol and biodiesel. Ethanol, a crop-based fuel alcohol, adds oxygen to gasoline, helping to improve vehicle performance and reduce air pollution. Biodiesel, an alternative or additive to petroleum diesel, is a nontoxic, renewable resource created from soybean or other oil crops (Pacific Biodiesel, 2004). Pure biodiesel, or B100, reduces particulate emissions by 70%, hydrocarbon emissions by 40%, and completely eliminates sulfate emissions (Environmental Protection Agency, 2002)! Biodiesel works in almost any diesel engine, with no expensive modifications (Farm Bureau News, 2002). In fact, if you own a diesel car or truck, you could fill 'er up with biodiesel this very minute, reducing pollution and giving off the smell of freshly popped popcorn rather than acrid diesel fuel (Heinberg, 2003). Even better, both ethanol and biodiesel are biodegradable, making spills, accidents and

disposal simple and worry-free (Pacific Biodiesel, 2004). Using biofuels will limit further environmental pollution and ensure the health of our planet.

Not only are biofuels environmentally friendly, they also provide great economic benefits and the potential for economic growth. Biofuel production saves consumers money by displacing oil imports. Ethanol use is expected to cut the U.S. trade deficit by 34.1 billion dollars through 2012 (American Coalition for Ethanol, 2004). In addition, the production of ethanol and biodiesel factories provides employment and revenue.

Currently, the ethanol industry provides nearly 200,000 jobs (National Renewable Energy Laboratory, 2000). In 2004, this industry will spend nearly 4.6 billion dollars on raw materials, and will purchase 1.3 billion bushels of corn from farmers, a value of 3.2 billion dollars (Urbanchuk, 2004). Developing a superior biofuels network in the United States will have lasting economic benefits, including trade debt reduction, job creation, and agricultural profit. The use of ethanol and biodiesel promote new and expanded uses of U.S. crops such as soybeans and corn. By working to produce and use bio-fuels, farmers are finding new supplements to their income and new markets for their crops. These new markets add value to crops, improve farm economy and keep U.S. farmers competitive in both domestic and international markets (Farm Bureau News, 2002). Clearly,

increasing our use of biofuels will strengthen the agricultural economy, create more jobs and industries, and provide significant economic benefits.

Finally, producing and using homegrown biofuels helps to maintain homeland security. As sources of oil disappear, our nation's continued reliance on imported oil makes America increasingly vulnerable, and threatens our economic and energy security. In 1990, Congress resolved that a dependence of more than 50% on imported oil would be a "peril point" for our country (National Renewable Energy Laboratory, 2000). But that peril point is long past, since today the United States imports 62% of its petroleum supply from other countries (Renewable Fuels Association, 2004). This makes America a dangerously dependent nation and sends billions of dollars out of our economy. The amount of American-grown biofuels that farmers create replaces imported petroleum gallon for gallon. This gives the United States self-sufficiency, independence, and security from foreign, often fluctuating, sources of fossil fuels (American Coalition for Ethanol, 2004). National Biodiesel Board Chairman Bob Metz points out that, "Since biodiesel is renewable and domestically produced, everyone who uses it contributes to national energy security" (Farm Bureau News, 2002). Making our own energy and fuel contributes to a safer and more secure America.

As you can see, the use of biofuels will preserve the environment, boost the economy, and maintain energy and homeland security. But these aren't just fuels of the future; the future is here! The American ethanol industry now comprises 78 manufacturing facilities, and 10 new plants are currently under construction (Textor, 2004). Biodiesel is available in all 50 states, and current production capacity is estimated to be between 60 and 80 million gallons per year (National Biodiesel Board, 2004). However, the biofuel network still has room to grow. With the technology to produce and use renewable fuels, farmers need to seize this opportunity. Not all of us are crop farmers, but we too can help alleviate the fuel crisis by choosing renewable fuels and educating others. Every one of us can share in the vision of that enterprising farmer and imagine gas pumps growing alongside our corn. Gone are the days of growing edible crops just for food; now our crops can go from the field, to the family table, to the fuel tank. Today's farmer can be part of tomorrow's solutions, and can grow the energy that will fuel our future!

Bibliography

American Coalition for Ethanol. (2004). *Benefits of ethanol*. Retrieved July 29, 2004, from <http://www.ethanol.org>

Farm Bureau News. (2002, March). Biodiesel truck on national tour. *Farm Bureau Publication*. Washington D.C.

California Energy Commission. (2002). *Energy Commission MTBE Study*. Retrieved February 20, 2004, from <http://www.energy.ca.gov/mtbe/>

Campbell, J. (2004, July 29). Telephone Interview.

Department of Energy (DOE). (2004). *Energy prices and trends*. Retrieved March 28th, 2004, from http://www.energy.gov/engine/content.do?BT_CODE=PRICESTRENDS

Energy Efficiency and Renewable Energy. (2004). *Biofuels*. Retrieved June 25, 2004, from http://www.eere.energy.gov/RE/bio_fuels.html

Environmental Protection Agency. (2002, March). *Biodiesel emissions characteristics and carbon monoxide facts*. Retrieved July 1, 2004 from <http://www.epa.gov/otaq/consumer/fuels/altfuels/biodiesel.pdf>

Haines, L. (2002, May 6). U.S. is headed for an energy supply train wreck, oil and gas executives warn. *Petroleum Finance Week*.

Heinberg, R. (2003). *The party's over*. Canada: New Society Publishers.

Herran, R. (2002). *The science of agriculture: A biological approach*. Delmar Publishers Inc. Albany, New York.

Hudson, J. (2004, June). Davis-based novozymes biotech reduces the cost of ethanol production 12-fold. *Comstock's Business*, 86-87.

Johnston, J. (2003). North Dakota mulls ethanol/biodiesel mandate. Ag Web. Retrieved February 19th, 2004 from http://www.agweb.com/news_show_news_article.asp?file=AgNewsArticle_20031231120_3312&articleID=94655&news_cat=GN

McCord, Pat. (2004, July 30). Telephone Interview.

Minnesota Pollution Control Agency. (2004). *Motor vehicle pollution*. Retrieved 19 February, 2004 from <http://www.pca.state.mn.us/air/mvpollution.html>

National Biodiesel Board. (2004). *Fuel fact sheets*. Retrieved March 20, 2004 from <http://www.biodiesel.org/resources/fuelfactsheets>

National Corn Growers Association. (2003, May 15). *Ethanol section*. Retrieved August 1, 2004, from <http://www.ncga.com/ethanol/main/ethanol.htm>

National Renewable Energy Laboratory. (2000, June). *Biofuels for sustainable transportation*. Retrieved June 25, 2004, from <http://www.nrel.gov/docs/fy00osti/25876.pdf>

Organization of Petroleum Exporting Countries. (2003). *Frequently asked questions*. Retrieved March 14th, 2004 from <http://www.opec.com>

Pacific Biodiesel. (2004). *Fuel properties*. Retrieved June 15, 2004, from <http://www.biodiesel.com/theFuel.htm>

Parnell, J. (2004, July 27). Telephone Interview.

Renewable Fuels Association. (2000). *Ethanol 101*. Retrieved March 20, 2004, from <http://www.ethanolrfa.org/factfic.shtml>

Renewable Fuels Association. (2004). *Synergy in energy: Ethanol industry outlook 2004*. Retrieved August 6, 2004, from <http://www.ethanolrfa.org/2004outlook.pdf>

Soybean Digest Staff. (2002, August 1). U.S. versus the world: In Europe, biodiesel's king. In Brazil, ethanol rules. *Soybean Digest*. Retrieved February 20, 2004, from <http://soybeandigest.com/magazinearticle.asp?magazinearticleid=15323&magazineid=20&siteid=5&releaseid=10375&mode=print>

Textor, S. (2004, August 6). Telephone Interview.

Urbanchuk, J. (2004, March 12). The contribution of the ethanol industry to the American economy in 2004. *National Corn Growers Association*. Retrieved July 25, 2004, from <http://www.ncga.com/ethanol/pdfs/EthanolEconomicContributionREV.pdf>