


2014

# Eagle Diesel Environmental Impact

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## Recommended Citation

Habberfield, Skyelar, "Eagle Diesel Environmental Impact" (2014). *Eagle Biodiesel*. Paper 5.  
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# Environmental Impact

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## Pros

- Biofuels are renewable and when using waste vegetable oil (WVO), they come from an existing and otherwise almost useless and continuous waste stream.
- Biofuels require little transition and require very little to adopt using current infrastructure and equipment.
- Biodiesel is significantly less expensive to manufacture, economically and environmentally, than petro diesel.
  - Biofuels can also be produced locally and on a small scale allowing widespread adoption to occur.
- Biodiesel usage typically results in 50-60% lower greenhouse gas and particulate emissions (the bulk of emissions are attributed to the WVO's life cycle). Biodiesel results in an 85% reduction in carcinogenic compounds.
  - Biodiesel according to the U.S. Department of Energy reduces net carbon dioxide emissions by 78%
- Biodiesel has higher lubricity and clean burning properties that support healthy equipment function and cleaner energy exchanges.
- Blending biodiesel with petro diesel at a B20 (20%) level results in only a 2% change in fuel energy content and no noticeable mileage or economy changes will occur
  - EPA covered fleets such as ours will be able to meet alternative fuel vehicle purchase requirements by simply using 450 gallons of pure biodiesel at a minimum blend of B20; biodiesel is the least costly alternative fuel option meeting EPA compliance requirements.
- Biodiesel is a less toxic and volatile compound than petro diesel, and is fully biodegradable.
  - Biodiesel has a flash point of over 266 F versus gasoline at -40 F making it a much safer fuel to store and handle.
- Positive community impact resulting from reduced emissions and recycling of WVO
- Studies show that biodiesel outperforms gasoline, ethanol, and conventional diesel in reducing climate-altering carbon dioxide emissions and in overall fuel-efficiency.
- Biodiesel eliminates all of the sulfur emissions associated with conventional diesel, cuts emissions of carbon monoxide and smog-producing particulate matter almost in half, and reduces hydrocarbon emissions by between 75 and 90 percent. Perhaps most significantly, using B100 reduces the emissions of carbon dioxide—the main greenhouse gas causing global warming—by more than 75 percent. Even using a blended biodiesel fuel like B20 (a 20-percent biodiesel/80-percent petrodiesel blend offered at most biodiesel fueling stations) still reduces carbon dioxide emissions by 15 percent, according to the Department of Energy.
- Besides lowering emissions at the point of use, biodiesel fuel—made from corn, soy, or other plant matter—had a past life absorbing carbon dioxide while it was growing as a crop in the

field. With its past carbon dioxide absorptions balancing its later carbon dioxide emissions, biodiesel results in an overall life-cycle lowering of carbon dioxide emissions over both conventional diesel and gasoline. The industrial processes used to produce biodiesel are cleaner than conventional diesel processes, reducing emissions associated with the life cycle of the fuel by more than 80 percent.

- As a cleaner burning fuel, biodiesel is better for a car's engine than conventional diesel, providing greater lubrication and leaving fewer particulate deposits behind. Biodiesel's high ignition point (350°F vs. -43°F for gasoline) makes it a safer fuel as well. Biodiesel is biodegradable and considered nontoxic by the Environmental Protection Agency. All diesel vehicles have 20- to 30-percent higher fuel economies than comparable gasoline vehicles.
- Biodiesel also frees car-drivers from reliance on dwindling fossil fuel resources and the world politics associated with obtaining those resources. It also keeps fuel dollars in the US. Biodiesel is more accessible than ever, with the number of public fueling stations in the United States rising from zero in 1997 to 750 today.
- In the long term, renewable energy experts differ on the upper limit of biodiesel's possibilities as an industry, should biodiesel become wildly successful, adopted as America's primary choice for fuel.

## Cons

- When biofuels are made of primary oil (non WVO) content made directly from farmed soy and other beans, they typically cost more energy to produce than they generate
  - Using crops to create fuel instead of food taxes the food supply system and has proven ineffective in terms of resource usage. Converting 5% of our petro usage to biodiesel would require a 60% diversion of farmland soy crops for production needs.
    - This is why we use existing waste vegetable oil (WVO) and not raw supply
- There are many constraints to using biodiesel such as vehicles that simply cannot run the fuel, and the issue exists that there are very few distribution systems such as filling stations for the fuel to be easily obtained.
- Water usage to cultivate crops (non WVO) is highly taxing, and the manufacturing of biodiesel does require significant amounts of water; however this water when properly managed is fully treatable.
- Biodiesel has higher gelling point and will need to be mixed with winter treated diesel in colder months.
- Biodiesel can clog filters but typically this is not a concern unless using blends over B20.
- Hazardous and combustible materials are used in biodiesel production and safety precautions must be taken.
- Methanol
- Toxic/ poisonous if ingested and is a highly flammable liquid.
  - -Methoxide, a mixture of methanol and lye, if inhaled can damage lungs. Skin exposure can cause severe skin burns.

- Excess methanol in the biodiesel produced may result in a product that is a fire hazard or that may not burn cleanly.
- Sulfuric Acid
  - Corrosive. Causes eye and skin burns. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns. Cancer hazard. May cause fetal effects based upon animal studies. May cause kidney damage. May be fatal if inhaled. May cause lung damage. Hygroscopic. Strong oxidizer. Contact with other material may cause a fire. May cause severe eye, skin and respiratory tract irritation with possible burns. Target Organs: Kidneys, heart, lungs, respiratory system, cardiovascular system, teeth, eyes.
- KOH
  - Corrosive. Water-Reactive. Harmful if swallowed. Causes severe eye and skin burns. Causes severe digestive and respiratory tract burns.
- Glycerol should not be dumped on the ground, into a septic system or into any surface waters. An accidental spill of the glycerol may impact surface waterways such as streams, rivers, or lakes. Concerns include disposal of wastewater containing free fatty acids that have a high biochemical oxygen demand, or BOD, that can remove oxygen from water bodies and harm aquatic life. It is illegal to put anything other than domestic wastewater into a septic system.
  - The best way to dispose of the glycerol is through a wastewater treatment plant.
- Mixing and "cooking" (reacting) of the components will cause a foul odor which may impact neighbors.
  - -The area where biodiesel is brewed should have proper ventilation. Check with the local fire marshal for specific details and suggestions.
  - -Biodiesel reactors should be a closed system not open to the environment.
- Always wear safety goggles, chemical resistant gloves and a chemical resistant apron when working with any chemicals.