The Fight for Biofuel

Wright state university | ENG 2140-90

[Document subtitle]

Zimmer, Michael J

2024

Table of Contents

Table of Figures **2**

Introduction **3**

**Type chapter level (level 2) 3**

Type chapter title (level 3) 3

Problem **3**

**Type chapter level (level 2) 5**

Type chapter title (level 3) 5

Solution **4**

**Type chapter level (level 2) 5**

Type chapter title (level 3) 5

Impact **5**

**Type chapter level (level 2) 5**

Type chapter title (level 3)

Implementation **7**

**Type chapter level (level 2) 8**

Type chapter title (level 3)

Conclusion **3**

**Type chapter level (level 2) 2**

Type chapter title (level 3) 3

Works Cited **3**

**No table of figures entries found.**

**Introduction**

Why does biofuel need to be discussed? The future of transportation and a new fuel source is a hot topic. How will we travel from place to place? What will replace gasoline as the next source of energy for vehicles? Are Electric Vehicles (EVs) the best option to replace gasoline cars and the combustion engine? One argument to finding a new fuel source is due to digging into the ground for fossil fuels, yet our current next best option is EVs which require us to dig into the ground to mine the resources for the batteries. Another argument is about the amount of emissions combustion engine vehicles produce, but the emissions produced the electricity to power EVs, build them, mine the resources and more does not put the EV argument in good light either.

Throughout this paper, it will discuss the problem of needing to find a new fuel source, along with the drawbacks of the current push for EVs. What biofuel is and how it is the best solution to our environmental problem with fossil fuels and mining for EVs will also be discussed. It will list the benefits and impact for biofuel, including environmental, livability, and economic impacts. Finally, implementation will be covered for the best course of action to produce enough biofuel to fuel the vehicles on the road.

**Problem**

Start with issue of finding a new fuel source.

Detail problems with EVs – environmental impact and infrastructure issues.

**Solution**

The question remains: what is biofuel, and why is it the solution to the future for a new fuel source? Biofuel is biomass turned into usable energy. The sources of the biomass used are plants, algae, waste cooking fat, and even animal waste (Selin 2024). There are two main types of liquid biofuels, which is ethanol and biodiesel. Of the two, ethanol is the most produced form of biofuel, with the United States and Brazil being two of the largest producers of ethanol in the world. For the United States, ethanol is primarily made from maize grain, while Brazil’s ethanol is primarily made from sugarcane (Selin 2024). Biodiesel is the second most produced form of liquid biofuel, which is widely used in Europe. It is primarily made from oily plants, such as soybeans and oil palm, along with waste from restaurants deep fryers (Selin 2024).

Ethanol is the equivalent to the gasoline used in cars today. At gas stations around the country, there are warning stickers stating “CONTAINS 10% ETHANOL” or “MAY CONTAIN UP TO 10% ETHANOL” on all gas pumps. The 10% of ethanol used in gasoline today is “to oxygenate the fuel … which reduces air pollution” (“Ethanol Fuel Basics”). Currently, 94% of the ethanol produced in the USA is from the starch in corn grain. As of now, the current production method has a positive energy balance, which means producing ethanol “does not require more energy than the amount of energy contained in the fuel itself” (“Ethanol Fuel Basics). Ethanol’s chemical makeup is CH3CH2OH, and it goes by a few different names, such as ethyl alcohol and grain alcohol. Regardless of what type of matter is used, such as corn and sugarcane, it is all the same basic chemical makeup. The most common type of ethanol based fuel at gas stations is E85, which stands for 85% ethanol and 15% gasoline.

Biodiesel is the equivalent to petroleum based diesel.

For biofuel applications, there are changes vehicles on the road and future vehicles being manufactured will need. Vehicles need to have their fuel systems converted to Flex Fuel. Flex Fuel refers to a vehicle’s ability to accept higher or lower percentages of ethanol (Jaleco 2024). As an example, if a vehicle has half a tank of gasoline and the driver fills up with ethanol, then the fuel will have a mixed ratio of 65% gasoline and 45% ethanol. Without a Flex Fuel system, then the vehicle will not run correctly. To convert a car to Flex Fuel, there needs to be a sensor to monitor the ethanol content in the fuel. The vehicle will also need new Teflon-lined fuel lines to hold up to the corrosive nature ethanol poses to rubber lines. A new fuel pump and fuel injectors are required to withstand the ethanol and deliver the additional fuel required to power the vehicle. Finally, a change in the ECU (Electronic Control Unit) to accept the new changes (“How to Run E85 in Your Car” 2023).

**Impact/Defense**

Benefits of biofuel.

Environmental impact.

Livability impact.

Lightly discuss economic impact for farmers. May not.

**Implementation**

Vertical Farming. What is it? Pros/cons.

What needs to happen for refining and manufacturing.

Mentioned earlier, our current production of ethanol is in a positive energy balance. However, it is possible to improve the energy balance and lower the amount of fossil fuel used through cellulosic ethanol. Cellulosic ethanol is produced from “waste, coproducts of another industry (wood, crop residues), or dedicated crops – such as switchgrass and miscanthus …” (“Ethanol Fuel Basics”). This method requires less water and fertilization than what is needed for corn. There also needs to be a standardization for quality of ethanol and biodiesel.

At gas stations that have E85, the quality can vary on a large margin. Federal standard requires E85 to be between 51% and 83% ethanol content. However, there is no requirement for quality of gasoline blended in, so gas stations are able to order E85 with low quality gasoline. In doing so, it lowers the quality of E85 at the pump, and high quality fuel is ideal for the smooth driving experience and longevity of a vehicle’s engine and fuel components (“Getting Good Quality E85” 2024). By moving to biofuel, high quality gasoline is needed in all ethanol blended fuel to prevent long term damage to the vehicle.

**Conclusion**

Restate problem and remind about benefits.

# Works Cited

“Biodiesel Fuel Basics.” *Alternative Fuels Data Center: Biodiesel Fuel Basics*, afdc.energy.gov/fuels/biodiesel-basics#:~:text=Biodiesel%20is%20a%20renewable%2C%20biodegradable,of%20the%20Renewable%20Fuel%20Standard. Accessed 16 Nov. 2024.

“Biofuel Basics | Department of Energy.” *Office of Energy Efficiency & Renewable Energy*, www.energy.gov/eere/bioenergy/biofuel-basics. Accessed 9 Oct. 2024.

“Ethanol Fuel Basics.” *Alternative Fuels Data Center: Ethanol Fuel Basics*, afdc.energy.gov/fuels/ethanol-fuel-basics. Accessed 27 Oct. 2024.

“Getting Good Quality E85.” *Advanced Fuel Dynamics*, 21 Feb. 2024, www.advancedfueldynamics.com/blogs/all/getting-good-quality-e85#:~:text=When%20you%20find%20a%20station,start%2Dup%20in%20cold%20weather.

“How Do Flexible Fuel Cars Work Using Ethanol?” *Alternative Fuels Data Center: How Do Flexible Fuel Cars Work Using Ethanol?*, afdc.energy.gov/vehicles/how-do-flexible-fuel-cars-

“How to Run E85 in Your Car.” *Mighty Car Mods*, Mighty Car Mods, 17 Sept. 2023, mightycarmods.com/blogs/news/how-to-run-e85-in-your-car?srsltid=AfmBOoqiB3TitSFntZVnYnOLQjampfXlzEFmS4RQISDNKYUU8qmoX90w.

IER. “Biden’s Energy Grid Not Prepared for the Onslaught of Electric Vehicles.” *Institute of Energy Research*, 15 June 2023, www.instituteforenergyresearch.org/uncategorized/bidens-energy-grid-not-prepared-for-the-onslaught-of-electric-vehicles/#:~:text=A%20National%20Electric%20Reliability%20Corporation,and%20suffer%20from%20unplanned%20blackouts.

Intelligence, GlobalData Thematic. “The Cost of Green Energy: Lithium Mining’s Impact on Nature and People.” *Mining Technology*, 30 Oct. 2023, www.mining-technology.com/analyst-comment/lithium-mining-negative-environmental-impact/?cf-view.

Jaleco, Jeric. “Here’s How a Flex Fuel Kit Works and Why You Should Get One.” *Acceleramota*, 6 Jan. 2024, acceleramota.com/saturday-morning-car-tune-how-a-flex-fuel-kit-works/.

Kalale, Rithwik. “Lithium Mining for Evs: How Sustainable Is It?” *APM Research Lab*, 22 Feb. 2024, www.apmresearchlab.org/10x/lithium-mining-for-evs-sustainability.

Rinke, Raquel. “Increasing Ethanol Production Efficiency and Yield to Unlock the Sustainability of Biofuels.” *Veolia Water Technologies & Solutions*, 16 June 2022, www.watertechnologies.com/blog/increasing-ethanol-production-efficiency-and-yield-unlock-sustainability-biofuels.

Selin, Noelle Eckley, and Clarence Lehman. “Biofuel.” Encyclopædia Britannica, Encyclopædia Britannica, inc., 6 Sept. 2024, britannica.com/technology/biofuel.