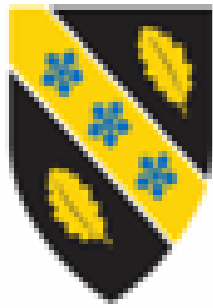


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Introduction

This essay will be looking at the different types of fuel technologies and looking at the benefits as well as negative effects of it all. It will also look at the history of fuel technologies dating back to 1885 until 2023 with the ongoing plans in the future to combat the climate change through carbon emissions. In the end the essay will also entail which is most predominately used in the present and which fuel source is taking over in the near future, the aim of this is to promote research on different fuel alternatives to encourage a safer environment with less carbon emissions.

Background of alternative fuel technologies

The background of automotive vehicles goes back to 1885 when Benz made the first vehicle with a four-stroke engine, this vehicle ran on gas and due to the low regulations on fossil fuels and emissions they produced a significant amount of emissions than they do today (Benz Patent Motor Car: The first automobile (1885–1886) | Mercedes-Benz Group & Company > Tradition & Company History). The vehicles in the 1890's was running on gas, which produced mass amount of carbon and nitrogen, only a few scientists was worried on how this may pan out in the future with the heavy use of fossil fuels and pollution (Timeline of Major Accomplishments in Transportation, Air Pollution, and Climate Change | US EPA [2022]). Although the first vehicle was brought out in 1885, Frank ford was already trying to find alternative fuel technologies by trying to develop an electric vehicle in 1914 (Leftfield, 2023). Only recently, in the last 40 years they have made minor adjustments to spark-ignition engines that produce a higher amount of carbon and nitrogen, however recently they have made huge considerations in rebuilding new engines or finding a different fuel source, whether that'd be electrical, water or hydrogen (Handbook of Air Pollution From Internal Combustion Engines, Academic Press, 1998, Pages 537-546).

Due to the demand of vehicles in present times, the engine has to be capable of being safe in traffic and deal with high heats and low temperature as well as maintaining a cool enough engine to ensure the safety of the passengers/driver (Advanced Direct Injection Combustion Engine Technologies and Development, Woodhead Publishing, Vol 1, 2010, Page iv). Although it may be possible to produce an engine with low emissions and be able to do the listed abilities, it still has to produce enough power for low to medium speed driving for ordinary drivers (Advanced Direct Injection Combustion Engine Technologies and Development, Woodhead Publishing, Vol 1, 2010, Page iv). In the 1970s the US and Japan created an emissions standard to protect the environment, from this standard they have implemented catalytic converters which work for both gasoline and diesel vehicles (Studies in Surface Science and Catalysis, Elsevier, Vol 172, 2007, Pages 27-34).

F1/E catalysts

In recent events, F1 have been doing an ongoing plan to cut out all carbon and become sustainable to the environment by doing a plan called net zero, this is aimed to be completely finished by 2030 (F1, 2023). Each year F1 vehicles put out 256,000 tonnes of carbon dioxide. F1 has been reducing the carbon footprint by normalising the v6 engine and recycling tyres, with the plan carbon net zero they intend to cut carbon emissions by 50% (Diya, 2023). Although the

f1 uses petroleum vehicles, the actual racing only causes 0.7% of carbon emissions (Diya, 2023). In formula E, they have worked onto low emissions by only putting out 33,000 carbon emissions in the whole year, they have also started using renewable fuel sources such as hydrogenated vegetable oil and bio-diesel, using this alternative fuel generates electrical energy locally (FE, 2023). This has been used to reduce fuel consumption, however, it wasn't able to be used for 3 of the 10 races which proves it can't be used in every area, but they are planning to work on that for the future (FE, 2023).

Different types of fuel

Diesel and Petroleum vehicles have been really dominant in the past 130 years but we have been using different sources of fuel, whether that'd be bio-diesel, electric, water based engine and solar. Due to the Paris agreement countries have been putting more work into electrical and hybrid vehicles, with the aim to have at least 20% electrical vehicles on the road overall by 2030 (European Climate Law [2015])). There is a brand called 'Lightyear' who are building a cleaner environment by using solar powered energy for their vehicles, this is aimed to be done by using power conversion, data platform and panels across the bonnet and roof of the vehicle (Lightyear Layer, 2023). The vehicles they are trying to sell it to are passenger vehicles, light vehicles and maritime (Lightyear Layer, 2023). Although this is a smart idea as there are many houses who use energy the same way, some countries lack sunlight and heat more than others.

Although electric vehicles are becoming more common among the roads, they are limited by the range of miles and the hours of charging (Top nine alternative fuels for cars | RAC Drive [2022]). Tesla is the most popular electric type vehicles and in the UK the most popular is Nissan LEAF (Top nine alternative fuels for cars | RAC Drive [2022]). Another con for electric vehicles is that the batteries are much more expensive and eight times more likely to be struck by lightning than other vehicles (Electric Cars More Likely To Be Struck By Lightning New Research Finds – OsVehicle [2022]).

Another type of fuel is steam which was introduced in the 19th century, it lowered the emissions but it has been around for a while and there are many concepts for modern high power steam engines in cars (Top nine alternative fuels for cars | RAC Drive [2022]). The steam vehicles was replaced by internal combustion engines, however, the steam vehicles are external combustion engines so the fuel isn't combusted in the engine (Top nine alternative fuels for cars | RAC Drive [2022]).

Hydrogen is something that can be used for fuel and electricity, producing zero emissions, although this is a strong renewable fuel for the ongoing future, it remains expensive for fuel cell technology (Top nine alternative fuels for cars | RAC Drive [2022]). Bayerische Motoren Werke have made a hydrogen vehicles and are planning on selling them in United Kingdom, this fuel source can be very much reliable as there are no harmful emissions from hydrogen, only water (Top nine alternative fuels for cars | RAC Drive [2022]).

There's also Liquid Petroleum Gas which was used for the first vehicles and was highly valued. It is more used to power houses and some vehicles, although houses use it most it is recognised as a fuel with multiple applications that emits minimal carbon dioxide (Top nine alternative fuels for cars | RAC Drive [2022]).

Discussion

After looking at the facts of different alternative fuel technologies, the fuel that is used most on the road are petroleum and diesel, with a rise of electrical vehicles. Although the rise of electrical vehicles are coming across the world and different motor companies are promoting them, they're not efficient with long journeys as they usually only have a 100 mile radius according to RAC. If they become the main fuel type for vehicles then it can be exceptionally more expensive for electricity for charging vehicles and if the batteries become faulty then it'd be costly to fix.

However, if we continue to use petroleum and diesel fuel then the carbon dioxide emissions would be significantly higher than the other fueled vehicles although companies have started to take more care into emissions since the Paris agreement. Bio-diesel is promising as it is more eco-friendly than diesel powered vehicles as it is powered by vegetable oil and animal fat which is both renewable and both replace non-renewable crude oil-derived fuels.

A more promising fuel would be hydrogen, on the other hand, it would require more extensive research and fuel cell technology. As there are no fuel stations for hydrogen vehicles in the United Kingdom, there would be more stations and vehicles running on hydrogen fuel. Another pro to hydrogen fuel is that it can be used for electric as well as fuel for vehicles which could be more sustainable for the fuel stations too as the only substance that is produced by hydrogen is water.

Although Liquid Petroleum Gases has been used in the past for vehicles, it had much more wasted chemicals and substances in the air, now it is used more productively for households. This could possibly remain that way as companies venture out to different fuel alternatives as it hasn't been used since petroleum and diesel vehicles taken over.

Figure Graphs

Below is a figure graph of different carbon incentives from different fuels.

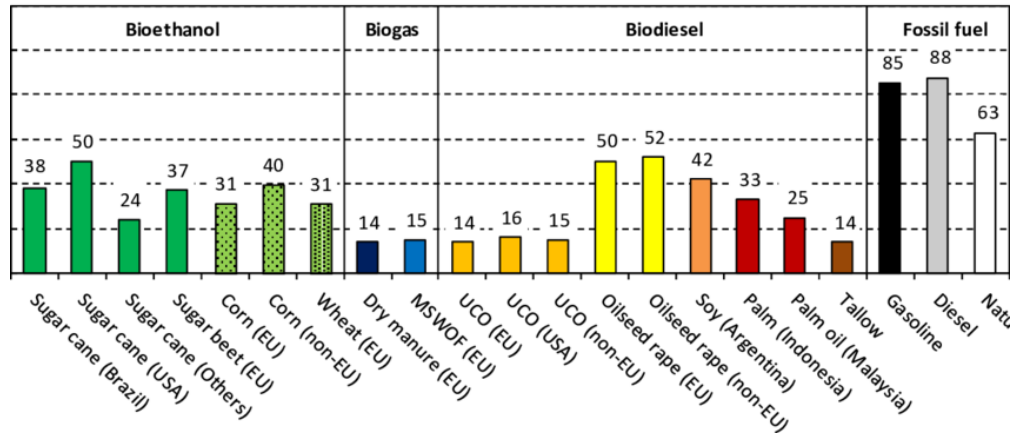


Figure 5. Carbon intensity of biofuels resulting from different feedstock and technology, compared to traditional fossil fuels.

The graph above shows that the carbon intensity is highly produced by gasoline and diesel vehicles, it is using fossil fuels that are non-renewable. It also furthers the point that biodiesel/gass is better for the environment and produces low emissions towards the atmosphere.

The variety of different fuel sources also shows that the possibility to move over to a different source of fuel is highly achievable, however, due to the amount of engines that don't run off the alternative fuels shown above, it is proven harder to move over to an alternative energy.

Conclusion

In conclusion, electric vehicles have become a new source of fuel with there being more alternative fuels that are being researched, with the first mass made electric vehicle being in 1997 called Toyota Prius, it started the revolution of mass made electric vehicles after so many years of Petroleum/gas/diesel vehicles. United Kingdom have planned to ban the selling of new petrol and diesel cars in 2035 after being pushed back 5 years (Department of Transport, 2020), this has started the turn over to electrical/hybrid vehicles and the expansion of looking into other possible fuel routes to lower the carbon emissions.

As there are more charging points in each car park and in placed into new homes, it has become increasingly easier to own an electric vehicle in 2023, with the con of limited travel on miles electrical vehicles have done well in the market to compete with diesel and petrol vehicles.

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