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E - fuels a replacement for fossil fuels

Introduction

With climate change becoming a more pressing issue every year the effects of which are being seen in a number of different industries particularly in the automotive sectors and is mainly focused on the emission produced by current internal combustion engines. This not only affects the manufacture of new car but also existing and classic cars. So, it is vital that an alternative is found for conventional fossil fuel. One answer to this problem is e-fuels.

What is e-fuel?

E - fuels are a type of carbon neutral fuel. Which uses carbon dioxide captured from the atmosphere which can be used to create both synthetic petrol and diesel. (Williams,2023) Although they do produce emissions the idea is that the amount of emissions captured from the atmosphere during the production process is equal to the amount of emissions produced. Making it carbon neutral. (E-Fuels Explained: Everything You Need to Know | Fleet Europe, 2023.)

How is e-fuel produced?

There are many steps involved when producing e-fuel. Below is the process broken down into each step.

- The first step is taking water and splitting it into its two base elements hydrogen and oxygen. Through a process called electrolysis. The hydrogen is used to make the fuel while the oxygen is released back into the atmosphere. This process is powered using renewable energy such wind or solar power.
- The next step takes co2 out of the atmosphere using a technology called DAC (Direct air capture). Which filters air from the atmosphere capturing only the co2.
- The hydrogen and co2 are then combined using a process called fischer tropesch synthesis and then shipped off to refineries where it is made into e-petrol or e-diesel as well as e-kerosene and e- gas. (What Are EFuels? - EFuel Alliance, n.d.)

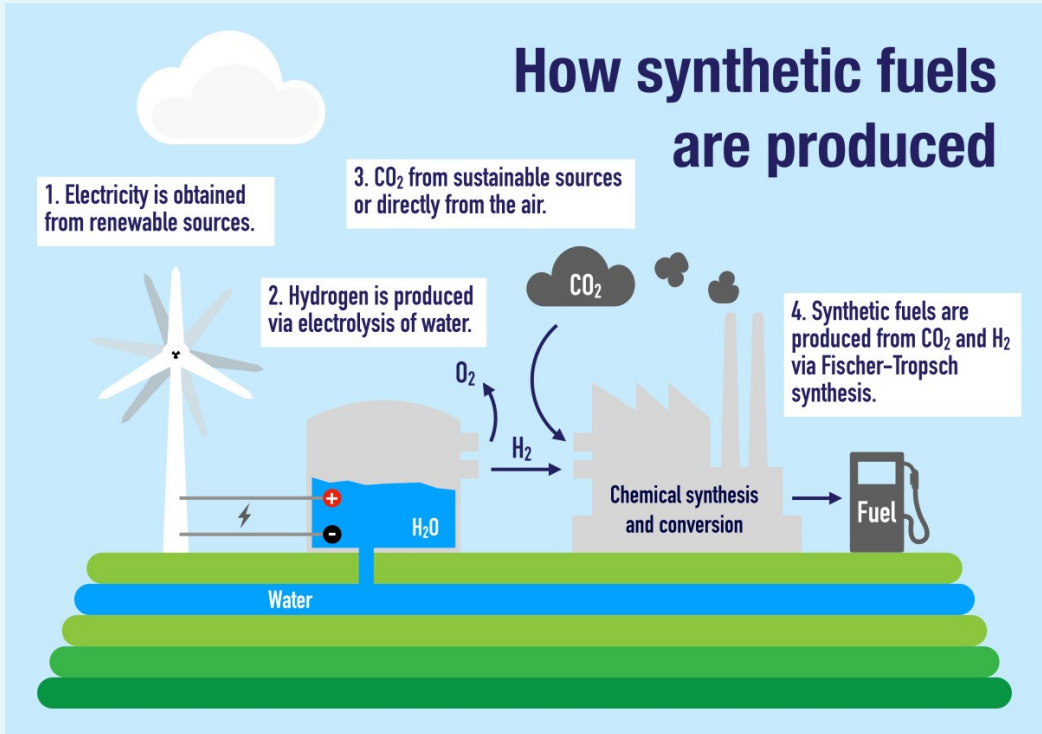


Figure 1 e-fuel production process
(E-Fuels Explained: Everything You Need to Know | Fleet Europe, 2023.)



Figure 2 Image of direct air capture system
(Direct Air Capture Machines Suck Carbon Dioxide from the Atmosphere. Are They Part of the Solution to Climate Change? - ABC News, 2022)

Why use e-fuels?

- The main advantage of e-fuel over conventional fossil fuels is that it is a carbon neutral fuel and unlike fossil fuel it is not produced with finite resources.
- Unlike hydrogen fuel that has to be stored at extremely high pressure. E-fuel can be easily stored and transported using existing infrastructure. Making it not only safer to store than hydrogen but also cheaper to transport.
- E-fuel does not require any adaptations to existing vehicles and can be used the same as ordinary petrol and diesel.
- E - fuels do not face any range issues and can easily be refuelled. Unlike ev battery vehicles.

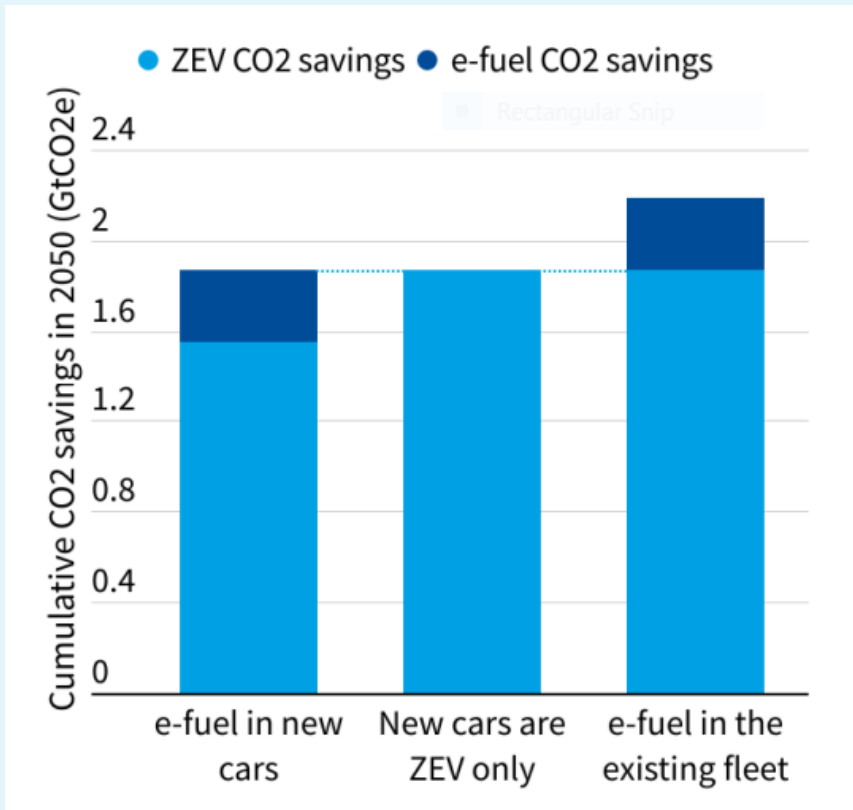


Figure 4 Graph showing co2 savings of e fuel vs zev vehicles.
(Scholz Is Fuelled with Illusions, 2023)



Figure 3 A picture of HIF e-fuel barrel
(E-Fuel Debate Is “Unnecessary Noise”, Says Volkswagen Boss | Autocar, 2023)

Draw backs of e-fuels

- One drawback of e-fuels currently is the cost compared to traditional fuel. This is down to the current supply being very limited and the amount of energy that is needed to produce it. . (Understanding EFuels: Definition, Benefits, and Porsche EFuel,
- When comparing the amount of co2 saved when running a new internal combustion engine car on e-fuel against a new zev (zero emission vehicle) powered car. The zev car is much more efficient. As shown in figure 4.

Conclusion

In conclusion I do think that e-fuel could be used as an alternative to fossil fuel but in conjunction with other alternative fuels such as electric or hydrogen. As shown in figure 4 there is not much benefit having new cars run on e-fuel. I personally believe that new vehicles should be solely zero emissions. However, e- fuel could serve as a viable option for existing cars, due to its ability to be used without any modifications and especially considering the high cost of electric vehicles. Furthermore, I believe that e-fuels could be used as a specialist fuel for use only in high performance and classic vehicles helping preserve them whilst also being carbon neutral. I do believe that further development of e-fuel is necessary to make it a solution for the future.

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