Fuels for cars: a dead end for industry, consumers and the environment

T&E note on the impact of fuels in the car CO2 regulation

E-fuels are being touted as a solution for cleaning up emissions from cars, but they come with a double cost. Not only would they derail the decarbonisation of the sector by slowing down electrification, but they would also weaken the competitiveness of Europe's automotive industry. By diverting investment away from electric vehicles, e-fuels would leave European manufacturers lagging behind their international competitors, jeopardising jobs and their global status in the transition to clean mobility. This short note outlines why allowing fuels (both synthetic and bio-) in cars makes no environmental, economic, or industrial sense, and why their role (if any) must be strictly limited with the highest sustainability criteria ensured.

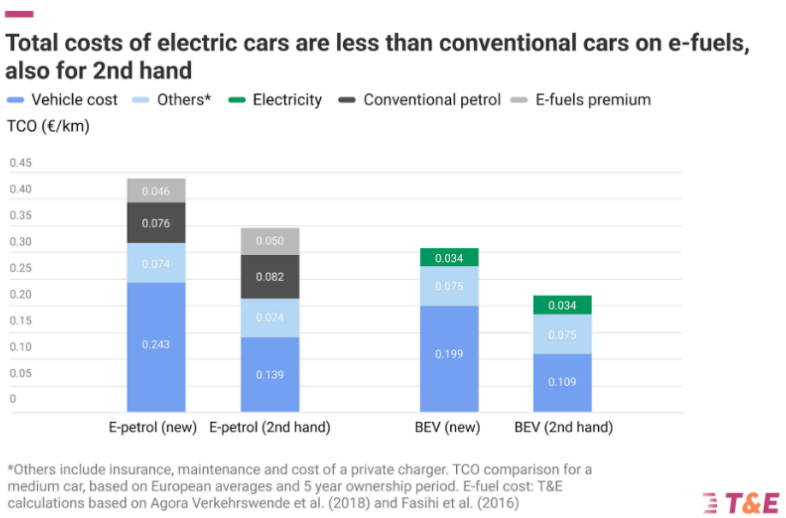
1. Efuels

E-fuels - or synthetic petrol and diesel - can be made by combining hydrogen and CO2 to create a hydrocarbon. When the synthetic fuel is burned in engines it releases similar amounts of CO2 and pollution as conventional fuel, however, provided Direct Air Capture (DAC) technology is used to capture CO2 from the air (not yet commercial), this can neutralise the CO2 burnt and released (but not air pollutants like NOx). T&E has already outlined its position on the use of e-fuels in cars on several occasions, the most recent can be found here and here.

1.1 Why e-fuels make no sense for cars (and are expensive, inefficient, and polluting)

E-fuels are expensive (for both consumers and industry):

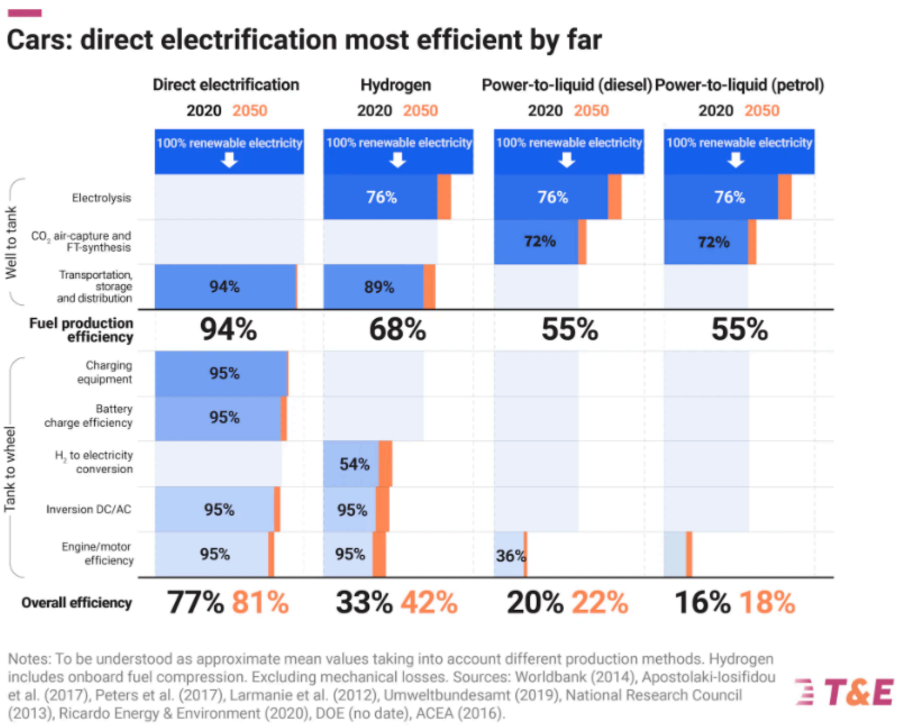
- **A fuel for the wealthy (1/2)**: Taking the total cost of ownership into account, running a car on e-fuels over five years will cost a driver €10,000 more than running a battery electric car. High e-fuel costs will also make running second-hand cars on e-petrol around €10,000 more expensive over the same timeframe.



- **A fuel for the wealthy (2/2)**: With a more complex and energy intensive process for making e-fuels comes a more prohibitive cost at the pump. Using a baseline with a retail e-petrol price in Germany in 2030 of €2.8/L[1] would mean that in 2030 drivers would need to pay at least €210 to fill up their tank compared to €140 today, a 50% cost increase for drivers. However, even this is likely to be an optimistic assumption and uncertainties regarding the e-petrol price are very high. In a more recent report we highlight a range of e-petrol prices at the pump in 2040 from €1.9/L to €5.2/L, with a central price of €3.6/L, which would mean an approximate doubling of the price of fuel at the pump.
- **Hurting industry competitiveness**: E-fuels would also be the most costly CO2 compliance route for carmakers. It would cost vehicle manufacturers around €10,000 for the amount of synthetic petrol needed to compensate for the emissions of an efficient petrol car placed on the market in 2030. Burdening the European automotive industry with e-fuels solutions instead of electric cars would jeopardise its competitiveness and divert large investments away from the transition to e-mobility. See section 2 of this paper.

E-fuels are inefficient:

- **An inefficient use of scarce renewable energy**: Producing e-fuels is significantly less energy-efficient than using (renewable) energy to directly power EVs. Supplying just 10% of new cars with e-fuels requires 26% more renewable electricity in Europe compared to fully electrifying them. Our graph below shows that, when comparing direct electrification of cars to hydrogen or e-fueled powered cars, battery powered direct electrification is almost four times more efficient than using e-fuels.

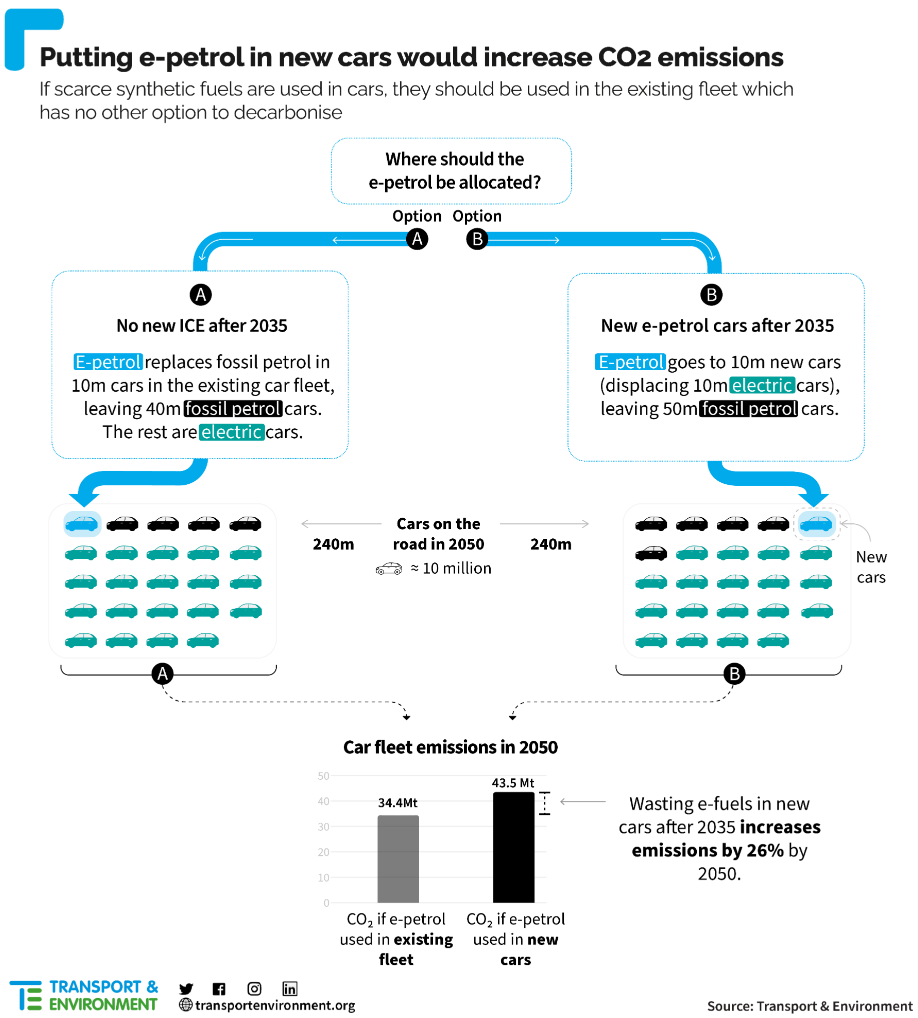


[1] Based on ICCTs estimate of the retail e-diesel price in Germany in 2030, assuming the tax rate for e-fuels is 0.15 euros per GJ as in the proposed revision to the ETD. We conservatively assumed that e-petrol price would be similar to e-diesel prices. In reality more processing is required to produce e-petrol from naphtha and would lead to higher prices than e-diesel. Production cost hypotheses detailed in ICCT. (2022). Current and future cost of e-kerosene in the United States and Europe.

- **Limited supply and competing demand:** E-fuels should be reserved for sectors like aviation and shipping, which don't have an efficient and affordable decarbonisation path via batteries. By diverting the limited supply of inefficient e-fuels to the road sector, the EU risks jeopardising the decarbonisation of other sectors. Find out more about why e-fuels would be wasted on cars.

E-fuels are polluting:

- **Limited climate benefits**: Synthetic fuels release comparable CO2 emissions to fossil fuels when burned. Only e-fuels produced with 100% renewable hydrogen and carbon captured directly from the air (Direct Air Capture) could be climate-neutral, but this is not guaranteed.
- **Putting e-fuels in new cars would increase overall emissions:** If we allocate e-petrol to new cars after 2035, the new ICE cars running on e-petrol registered after 2035 would displace an equal amount of electric cars. This scenario (where e-petrol is earmarked for new e-petrol cars) would result in increased emissions compared to a similar scenario where the e-petrol goes to the existing legacy ICE vehicle stock and actually replaces fossil petrol fuel.



- **No solution to air pollution**: E-fuels do little to improve urban air quality. Cars running on synthetic fuels emit similar levels of toxic nitrogen oxides (NOx) as burning fossil fuel and generate three times more carbon monoxide and billions of particles per kilometre. Find out more here.

1.2 *If* e-fuels *are* allowed, they must be CO2-neutral

Although using synthetic fuels in cars remains a bad idea, if an exemption were to be allowed, only cars running exclusively on 100% CO2 neutral e-fuel should be included.

- **The need for a 100% CO2 reduction**: When burnt in petrol or diesel cars, synthetic fuels release similar amounts of CO2 (and air pollution) as fossil fuel. It is only by fully eliminating greenhouse gas (GHG) throughout their production that they can be made climate neutral. This means that the hydrogen used to produce these e-fuels must come from 100% additional renewable electricity sources, while the carbon molecules necessary to turn the hydrogen into the fuel should be captured from air (Direct Air Capture – DAC). Only the Commission's existing proposal for a draft implementing act requiring these fuels to deliver a 100% GHG reduction compared to fossil fuels would ensure this climate neutrality. As a compromise, and to simplify the accounting, the emissions linked from the transport & distribution of the fuels (see methodology for RFBNOs under the RED) could be removed from the scope.
- **Impact of weakening the 100% GHG reduction requirement:** There have been calls, notably from the oil and gas dominated eFuel Alliance, to water down the sustainability requirements for using e-fuels in cars to between a 70-80% GHG reduction. T&E has shown how a 70% GHG reduction requirement (the Renewable Energy Directive's criteria for carbon neutrality) would mean e-petrol cars would emit 61 gCO2e/km in 2035. This contrasts with EVs, which would only emit 13 gCO2/km when charged with electricity from the EU average grid in 2035. Under such a system, e-petrol cars would be considered CO2 neutral but would still emit around five times more CO2 emissions than equivalent EV models. Under a slightly stricter 80% GHG requirement, T&E analysis shows that e-petrol cars would emit 41 gCO2e/km in 2035 and would therefore still emit around three times more CO2 emissions than equivalent EV models.
- **Regulatory loophole risk**: Allowing e-fuels as an exemption in the car CO2 standards risks undermining emissions targets unless strict production rules are enforced. Ensuring any future cars that are approved as CO2-neutral under a new vehicle category are exclusively fuelled by CO2-neutral e-fuels is critical to guaranteeing that the EU car CO2 standards are not undermined through continuing use of fossil fuels in these cars (as fossil fuels and e-fuels are interchangeable), especially if carmakers are allowed to count these vehicles towards their CO2 targets. To ensure this, new technical requirements, including vehicle hardware solutions, are needed for these vehicles, as well as regular in service conformity testing. See section 3 of our paper for detailed recommendations.

2. Biofuels should not be allowed in the fuels derogation

2.1 Biofuels are not CO2-neutral and cannot be scaled

Only CO2-neutral e-fuels or RFNBOs (Renewable Fuels of Non-Biological Origin) must be allowed under the scope of any future opening for fuels in the car CO2 standards. Biofuels are not, and cannot be considered as CO2-neutral as they are not able to deliver a 100% CO2 reduction. Crop biofuels for instance deliver only an average reduction of 50-57%, according to Annex V of the Renewable Energy Directive. However, when taking into account emissions from indirect land use change (ILUC), current average EU biodiesel emissions appear 20% worse than fossil fuels, while bioethanol only provides 30% emissions savings. Furthermore, they contribute not only to indirect deforestation and severe climate change but also to biodiversity loss and food insecurity.

In regards to advanced and waste biofuels - those not derived from food and feed crops - these can not be considered as climate neutral either. The sustainable feedstocks are extremely limited if we take into account competing uses and proven emission savings compared to fossil fuels. Including biofuels in the e-fuels derogation for cars would divert limited resources from other sectors and therefore weaken the competitiveness of these sectors during the crucial transition phase. Moreover, it may lead to indirect emissions if their existing applications start to use less sustainable materials, canceling out any savings compared to fossil fuels. When it comes to the transport sector, sustainable advanced and waste biofuels have a smaller role to play in the aviation sector, which will have to rely heavily on fuels to decarbonize, and can only cover 8% of the EU's aviation energy demand by 2050.

Find out more about why biofuels should not be covered by any future fuels provisions in section 2 of this paper.

2.2 What would an 80% GHG reduction requirement mean for biofuels?

Biofuels that can deliver a higher than 80% GHG reduction are used cooking oil (UCO) biodiesel (including pure oil and HVO from UCO) and animal fats from rendering biodiesel (including in the form of HVO). These fuels are all biodiesel which cannot be used in gasoline engines and are therefore not relevant for the future of combustion cars. Based on GlobalData forecast, it is estimated that diesel cars would only account for 1-2% of cars sold already in 2030 (down from around 13% today), with petrol accounting for 35%. Plus these fuels (UCO in particular) suffer from suspicions of certification frauds, which create serious economic, political and environmental problems that arise from import dependence.

The EU RED Annex V also provides emissions for a number of "future" biofuels that could achieve a 80% GHG reduction but which are considered separately (Annex V - B) given they were not on the market in 2016 (or only in negligible quantities). These fuels are Fischer-Tropsch diesel/petrol, DME, and methanol production pathways, whose development remains uncertain today. Crucially, the assessment doesn't account for any land use change or indirect emissions from competing uses which is a very strong assumption given the limited supply of these advanced fuels.

3. How a Carbon Correction Factor (CCF) would weaken the target

The idea of a Carbon Correction Factor (CCF) was originally floated by the oil and gas industry during the negotiations on the truck CO2 standards back in 2023. The central principle of the CCF would be to look at the volumes of so-called 'renewable and low-carbon fuels' already in circulation in a given year, and what share these make up of the total fuel volume. Vehicle manufacturers' new vehicle fleet tailpipe emissions would then be 'corrected' (i.e. reduced) by the same factor.

Including a CCF for cars would undermine the transition to zero-emission vehicles and create loopholes that favour the fossil fuel industry. By crediting already-mandated, i.e. double counting, alternative fuels under the Renewable Energy Directive (RED), a CCF would effectively weaken the EU's CO2 targets for carmakers as they would need to sell fewer EVs, reducing their incentive to invest in cleaner cars and jeopardising progress toward decarbonisation.

Furthermore, as it relies on fuels already circulating in the fuel mix, a CCF would not even incentivise additional alternative fuels coming to the market. Rather than a climate measure, it is an attempt to ensure as many fossil-powered ICE cars enter the fleet over the coming decades to keep up demand for fossil fuels and slow down the transition to EVs.

Finally, introducing a CCF in car regulations would weaken Europe's auto industry's global competitiveness. Carmakers risk falling behind foreign rivals without clear investment in zero-emission technologies. A diluted regulatory framework would slow the adoption of EVs, leaving the European market vulnerable to foreign automakers. To maintain its position as a leader in the global automotive industry, Europe needs strong, unambiguous rules that incentivize a swift and complete shift to EVs, rather than creating loopholes to prolong fossil fuel dependence.

Further information

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