DECARBONISATION CONTRIBUTION IN TRANSPORT WITH BIOFUELS

First, the bad news: Germany is still making only slow progress on decarbonisation in the transport sector. According to the carbon footprint figures published in March 2026, transport emissions actually rose again in 2025, reaching 146.3 million tonnes of CO_2 equivalent. That was 2.1 million tonnes more than in the previous year. This trend highlights just how wide the gap between political targets and the reality of transport has become. At the same time, it is often overlooked that biofuels are already making a measurable contribution today. Without them, the increase would have been more than 11 million tonnes of CO_2e higher.

This is precisely where the crux of the problem in the public debate lies. There is intense discussion about electric mobility, charging infrastructure, purchase incentives and range. The contribution of sustainably certified biofuels, on the other hand, is often reduced to the role of an inconspicuous additive.

Why the transport sector is under particular pressure

From a climate policy perspective, transport is undoubtedly a cause for concern. There are several reasons for this. Millions of vehicles with petrol and diesel engines remain on the roads, vehicle lifespans are increasing, freight transport is growing, and the uptake of electric mobility is proceeding more slowly than political targets suggest. Expert estimates suggest that around 35 million vehicles with combustion engines will still be registered in Germany by 2030.

This figure is crucial for the assessment of biofuels. It makes it clear that decarbonisation in transport cannot be organised through the future new car market. Even if the number of battery-electric vehicles continues to rise, the fleet of conventionally powered vehicles will remain a dominant factor for many years to come. Anyone wishing to effectively reduce transport emissions in this decade must therefore also utilise solutions that address the existing vehicle fleet. This is precisely where the particular strength of biofuels lies.

The contribution of biofuels is often underestimated

Biofuels have long been part of everyday life. E10 is well established in the petrol sector. In the diesel sector, biodiesel has been integrated into the market for years via the standard fuel quality B7. This means that a proportion of renewable energy is already being used at public filling stations today, without motorists having to fundamentally change their mobility behaviour or purchase new technology.

A look at the figures shows just how significant this contribution is. Without biofuels, the increase in transport emissions in 2025 would have been more than 11 million tonnes of CO_2e higher. Furthermore, the available potential for sustainable biofuels in this country is by no means being fully exploited. On the contrary: in 2024 and 2025, approximately 1.6 and 1.1 million tonnes of biodiesel were exported respectively. At the same time, the German biodiesel industry produces around 3.6 million tonnes per year. That amounts to just under 12 per cent of diesel consumption in Germany. These figures are not only of interest from a climate policy perspective. They also highlight a second aspect that is often overlooked in public debate: security of supply.

Decarbonisation and security of supply go hand in hand

Unlike with petrol, Germany is heavily reliant on imports for diesel fuel. Import requirements stand at around 36 per cent. Domestic biodiesel production can help to close this supply gap, at least in part, and thus reduce dependencies. In times of geopolitical tensions, this is more than just an industrial policy argument. The price spikes and supply fears linked to military conflicts in the Middle East have once again shown how sensitive energy markets are to crises.

Against this backdrop, it seems difficult to justify that domestically produced biodiesel is exported whilst Germany continues to import large quantities of fossil diesel. Anyone discussing resilience in the energy system should therefore not only talk about electricity grids and batteries, but also about how sustainably certified biofuels can be used more extensively as a domestic component of the energy transition in transport.

The EU sets the guidelines

The fact that biofuels may currently only be credited under strict conditions is the result of a long political learning process. The regulatory starting point was the European Union's Renewable Energy Directive (RED I) of 2009. This was followed by RED II in 2018 and RED III in 2023. With each revision, the requirements regarding sustainability, guarantees of origin and greenhouse gas reduction have been tightened.

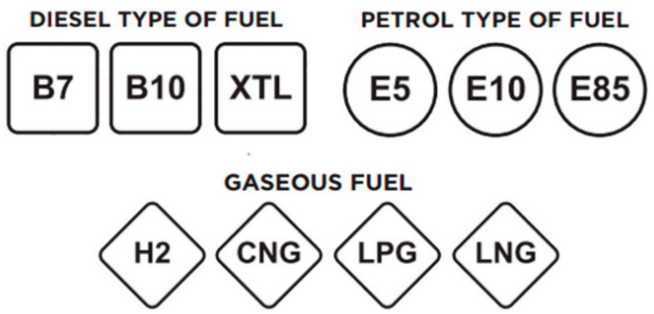
As a result, biofuel policy has evolved from a purely quantitative target to a differentiated regulatory system. It is no longer merely decisive that a biogenic component is present in the fuel. What is far more crucial is the raw materials from which it is derived, where these were produced or collected, the actual verified contribution to greenhouse gas reduction, and whether all links in the value chain are certified and monitored.

This is precisely the point that is often overlooked in the public debate. There are few value chains in agriculture that are monitored so closely, from the field or the collection of waste and residual materials right through to the end product. Once Germany and the other Member States have fully transposed RED III into national law, these requirements will be tightened further. Sustainable biofuels are therefore, to a large extent, products of trust. Their acceptance by the public and in political circles depends directly on compliance with the rules and the consistent prosecution of violations.

In Germany, the Federal Office for Agriculture and Food (BLE) is responsible for monitoring the legally prescribed documentation requirements. In particular, it checks the certification bodies it has recognised and publishes annual reports on its findings, which are also regarded as noteworthy in a European context.

The GHG quota is the real driving force

Although barely visible to consumers, the greenhouse gas reduction quota is of central importance to the market. It is the key instrument by which policymakers are gradually increasing the decarbonisation contribution of fuels. Companies in the petroleum industry that place fuels on the market are obliged to reduce the fossil CO_2 footprint of their sales by a greater percentage year on year. Under the latest amendment, this obligation is set to rise to 65 per cent by 2040.



This is a decisive lever. The quota forces the companies concerned to utilise real reduction options. These include renewable electricity in transport, certain advanced, so-called synthetic fuels (e-fuels), but above all biofuels. Those who fail to meet the legal requirements must pay a substantial penalty. The figure under discussion is 600 euros for every tonne of CO_2 reduction that is missing. This amount is far higher than the current CO_2 price incurred for fossil fuels. This is precisely why the GHG quota is such an effective instrument. It makes decarbonisation in the fuel market economically relevant whilst simultaneously driving technological innovations such as the production of e-fuels. At the same time, greenhouse gas reduction efficiency is promoted. The company is naturally keen – and this is also in the interests of its customers – to meet its obligations at the lowest possible cost. In short: here, the CO_2 price works in several ways.

To consumers, this mechanism may seem complicated, but its impact is tangible. It determines which biofuels are even offered at the petrol station, the level of renewable component blending, and the extent to which new compliance options are entering the market.

Filling up with a decarbonisation contribution: what the abbreviations really mean

Anyone filling up today doesn't need a degree in engineering, just an eye for geometry: a circle marks petrol, a square stands for diesel and a diamond for gas. If you find the same symbol on the fuel cap and at the pump, everything's fine. The abbreviations reveal the biofuel content: E10 contains up to 10 per cent ethanol, whilst the classic diesel B7 contains 7 per cent biodiesel.

But development is not standing still. To meet climate targets, E20 is increasingly coming into focus for petrol. In diesel, HVO (hydrogenated vegetable oil) is driving the pace: this eco-fuel is very similar to fossil diesel and can massively increase the biofuel content without putting a strain on the engine. Of particular interest here is R33, a fuel with 33 per cent renewable content that fully complies with the diesel standard (B7).

In addition to blending, pure biofuels are also gaining in importance. HVO100 and B100 are standardised, with manufacturers gradually granting approvals for them. This is of interest not only to the traditional car market, but above all to fleets, commercial vehicles, the construction industry and agriculture. It is precisely in these sectors that the pressure to demonstrably reduce emissions is mounting. After all, the use of biofuels has long been more than just image-building. For large companies, demonstrating environmental credentials is often already a legal requirement (CSR Directive) and is thus incorporated into their sustainability reports. But the same applies to private motorists: the higher the biofuel content, the smaller the individual carbon footprint.

Biofuels are particularly attractive for these sectors because they have a high energy content, are readily available and do not require long charging times. Those who move heavy loads, have long operating hours or work under harsh conditions still reach the limits of battery-electric propulsion more quickly than in the passenger car sector.

Why the physics should not be glossed over

Anyone wishing to make a fair comparison between biofuels and electric mobility should not idealise either one. Battery-electric propulsion has a clear advantage in terms of efficiency. A significantly larger proportion of the energy used is actually converted into motion. Liquid fuels, including biofuels, lose more energy in the combustion engine.

Conversely, biofuels have a considerable advantage in terms of energy density. They store many times more energy per kilogramme than today's lithium-ion batteries. This has implications for weight, range, payload and refuelling time. Electric mobility is particularly strong where efficiency, short journeys and locally emission-free operation are key. Biofuels are particularly valuable where long ranges, heavy loads and rapid availability are required.

Characteristic	Biofuels (e.g. biodiesel/HVO)	Batteries (Li-Ion)
Energy density	**Very high** (approx. 9,000–12,000 Wh/kg)	**Low** (approx. 100–250 Wh/kg)
Efficiency	**Low** (high losses due to combustion in the engine)	**Very high** (90–95% overall efficiency)
Infrastructure	Existing filling stations can be used	Charging network must be rolled out nationwide
Refuelling	A few minutes	20 minutes to several hours
Weight	Minimal impact on payload	High dead weight reduces payload

A more pragmatic approach would be beneficial to the debate

Biofuels in the tank are more than just a marginal issue. They are already an important part of the decarbonisation strategy for transport, and their contribution could be greater than it currently is. The regulatory instruments are in place, as are the technical options. In the diesel sector in particular, there are opportunities to further increase the share of renewables. At the same time, domestic production can help reduce dependence on imports.

Anyone serious about decarbonisation in transport should therefore avoid two mistakes. The first would be to overestimate biofuels and present them as the sole solution . The second would be to underestimate them and play down their potential for ideological or communication-related reasons. Neither approach would do justice to reality.

What is needed is a fuel policy that takes a differentiated, technology-neutral and objective approach to distinguishing between different application profiles. Petrol and diesel are not the same, nor are heavy goods transport and urban transport. And a fleet of many millions of combustion-engine vehicles will not disappear simply because it is ignored politically. That is precisely why sustainably certified biofuels can be an indispensable part of the solution. **Not at some point in the future, but now.**