

Sabrina Kremer's focus on facts



Cross-Asset- and Strategy-Research

Technology neutral on German roads

Pros and cons of a hard combustion-engine phase-out

More than 700,000 people are employed in Germany's automotive industry, and the sector generates annual revenue of over EUR 500bn. It is therefore no surprise that business and politics are up in arms over CO₂ fleet limits and the phase-out of combustion engines. Jobs, prosperity and, some would say, Germany's industrial heart are at stake. A look at the drive technologies in Germany's vehicle fleet shows a mixed picture (fig. 1) – conventional combustion engines, diesel and petrol, clearly dominate. But there are also a number of vehicles powered by natural gas or LPG, more than 3 million hybrid drives and almost 2 million fully electric cars (BEVs).

The share of pure electric vehicles in new registrations stood at 24.8 % in the first six months of the year (full year 2025: 19.1 %). In 2023, it had still been around 18%, before falling to less than 14 % in 2024 following the end of the electric-car premium. Yet even China is not relying solely on fully electric vehicles. They are the largest group among New Energy Vehicles there; their share stood at more than 63 % in June 2026. But plug-in hybrids and range extenders also play an important role. Why should this not be the case in Europe? The question is not whether transport must be decarbonized. It is whether hybrids can still be a sensible part of this decarbonization after 2035.

Technology openness as an efficiency issue

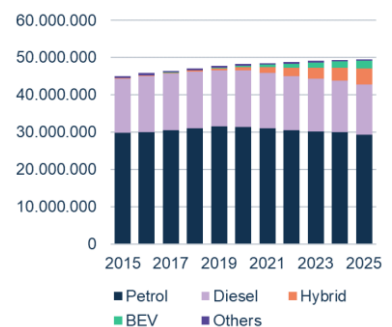
Put simply, there are two scenarios for the future: a 100 % fully electric vehicle fleet, or a mix of pure electric cars and hybrids based on electricity and e-fuels. Synthetic fuels also mean electricity consumption – but with several conversion steps in between. The electricity is not used directly, but is first converted

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Fig. 1: Vehicle fleet by technology



Source: Kraftfahrt-Bundesamt,
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Hybride drives:

Plug-In: drive via a battery that can be charged from a socket or charging point

Range extender: vehicle drives electrically; a combustion engine generates electricity for the battery when needed

Classic hybrids: battery cannot be charged externally; only short distances electrically

into hydrogen and then into synthetic fuel. A great deal of energy is lost in the process. A BEV uses around 75 % of the electricity supplied. With e-fuels, only around 15% remains in the end. With the same amount of electricity, a BEV therefore travels around five times as far as a vehicle powered solely by e-fuel. A hybrid saves fuel as long as it drives electrically. But once the combustion engine kicks in, it needs fuel – after 2035, that means e-fuel, and thus indirectly electricity – and quite a lot of it. In a scenario in which 30 % of new registrations after 2035 are still hybrids running on e-fuels, the additional electricity demand in 2050, according to our calculations, could quickly exceed 200 TWh for passenger-car traffic in Germany alone. By way of comparison: today, Germany consumes around 500 TWh in total. If the old combustion-engine vehicles were also to run on e-fuels, the calculated electricity demand would exceed 500 TWh in 2035.

Scarcity has its price

E-fuels solve one problem – and create a new one. Producing them requires hydrogen, ideally from renewable electricity. For Germany, this means that we will probably have to import e-fuels on a large scale. The price for consumers? Significantly above today's fuel prices. In addition, industry, shipping and aviation also need e-fuels and hydrogen – except that there are hardly any better alternatives there so far. This is different for passenger cars: fully electric vehicles already represent a significantly more efficient technology today. Using e-fuels in cars is technically possible and has the advantage of building on existing infrastructure. In the long term, however, it makes only limited sense.

Openness to technology, yes – but not as a blank cheque

The vehicle fleet is a slow-moving mass: on average, a vehicle is in use for around 17 years. Some combustion-engine vehicles and hybrids from 2035 will therefore still be on the road in 2050. A solution is needed for these vehicles. Charging infrastructure would also have to be massively expanded if Europe were to rely solely on electricity from 2035 onwards.

Then there is the industrial-policy problem. A hard cut in 2035 would hit value chains, supplier structures and jobs. A middle way is conceivable: hybrids continue to be registered after 2035 – but only to a limited extent. Their share of new registrations declines year by year – a clear phase-out path by 2050. At the same time, they may only be operated with CO₂-neutral fuels.

This would leave more time for industry to transform, and e-fuels would not become a permanent solution for passenger cars. Openness to technology would then have a clear framework. It would not be a blank cheque to perpetuate inefficient paths, but a bridge to the future. Hybrids could help cushion the structural break. As a mass-market solution beyond 2050, however, they would be the more expensive and more electricity-intensive route in the passenger-car segment.

Same amount of electricity, five times the distance

200 TWh for passenger cars alone



In 2026, the [Karlsruhe Institute of Technology \(KIT\)](#) and the [Fraunhofer Institute ISE](#) presented new methods for hydrogen production that no longer compete with the power supply for green electricity. This is still a vision for the future, but the examples show that technological progress can be part of the solution.

Clear framework, not a blank cheque

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