

## Alternative drive

### Five reasons why hydrogen cars are hardly in demand

**Most manufacturers rely on battery electric cars. But is not the fuel cell the better engine for the future? The fact that the technology flops so far has to do with a fundamental disadvantage.**

They are quiet, emit no fumes, are refueled after a few minutes and eat kilometers **like a diesel** : fuel cell cars seem to have the perfect drive of the future.

Nevertheless, the technology hangs **a niche** existence so far . As of January 1, 2019, the Federal **Motor** Transport Authority registered only 392 vehicles powered by **hydrogen** . In total, 57.3 million motor vehicles were registered in Germany. The market share of fuel cell cars was only 0.0007 percent. In total, there were 83,175 **electric cars** - most of them with **battery** . Hydrogen has flopped so far for several reasons:

#### 1. There are not enough gas stations

The biggest advantage of the fuel cell is the fast and uncomplicated refueling. But for that you first have to find **a pump** for hydrogen (H<sub>2</sub>). "Around 1000 H<sub>2</sub> filling stations nationwide are needed to make fuel cell cars really interesting for the consumer," says Peter Fuß from Ernst & Young. So far there are 71 nationwide, by the end of the year it should be 100 - too little to supply Germany nationwide. By comparison, the number of public charging points for battery electric cars was according to the energy association BDEW recently at around 17,400. Add to this an unknown number of private charging stations - battery cars can be refueled at home, not hydrogen cars.

#### 2. The cars are too expensive for private customers

The price of hydrogen cars is "unacceptable," says Ferdinand Dudenhöffer of the University of Duisburg-Essen. A hydrogen car costs in Germany 70,000 to 80,000 euros. Some models such as the **Toyota** Mirai (from 78,600 euros) do not qualify for the state subsidy of 2000 euros. The only applies to cars that cost a maximum of 60,000 euros net. Only the **Hyundai** Nexa remains just below this threshold. Lush benefits are only available to commercial customers.

Reason for the high prices: The development is expensive, and the sold quantities are low. Only at high volumes, the cost per vehicle would decrease. "The pure hydrogen car is currently out of reach for the private customer," says Dudenhöffer. Even leasing contracts are not cheap: For the GLC F-Cell requires Mercedes about 800 euros a month.

#### 3. Hydrogen as a fuel is more expensive than electricity

It takes a lot of electricity to get hydrogen from water. This is then stored in gas tanks and converted into electricity after refueling in the car - the expensive process is a fundamental disadvantage. "Only 25 percent of the original energy in a fuel cell vehicle to move, the rest is lost in battery-powered electric cars, the value is about 70 percent," says Florian Hacker of the Oeko-Institut. Also because of its low efficiency, hydrogen as fuel is significantly more expensive than electricity. The Toyota Mirai will cost around seven euros per 100 kilometers (hydrogen price 9.50 euros per kg). In the battery electric car Tesla Model 3 fall on the same route four euros for electricity (electricity price 0.29 euros per kWh). "One should keep an eye on the fuel cell,

#### 4. Automakers hesitate

Many manufacturers share the concerns about technology - and at the most hesitant to rely on hydrogen at best. Take **Volkswagen**, for example : until the mid-2020s, the fuel cell would not be available "at reasonable prices or on an industrial scale with the necessary **energy efficiency** ," said CEO **Herbert Diess** at the AGM in May. VW relies on the battery powered e-car.

There is also a certain lethargy at **BMW** and **Audi** . The fuel cell is being tested - but you can not buy hydrogen cars from them at the moment.

Above all companies from Asia are present in the niche market. Toyota is moving ahead and has sold just under 10,000 H2 vehicles - worldwide. In Germany, there were almost 200. Also, the Hyundai Nexo is rare, in 2018, the manufacturer sold almost 1,000 copies worldwide. Although already in the nineties, Daimler entered the technology and produced from 2009 about 200 B-Class cars as H2 version. In 2018, the Stuttgart brought the **SUV** GLC as a mixture of battery Strome and fuel cell vehicle on the market, even this in small numbers.

## 5. The hen-egg problem

Too few gas stations, hardly available cars and disinterest of many manufacturers: All this leads to a chicken-and-egg problem, says Stefan Bratzel from the University of Applied Sciences in Bergisch Gladbach: "As long as there is not enough demand, the construction of this **infrastructure** is not worthwhile right - and conversely, people will not buy a fuel cell vehicle unless the infrastructure is widely available. " After all, Toyota has recently announced to offer hydrogen cars significantly cheaper. However, that alone should not be enough for the technology to make a breakthrough.

ene / dpa

### URL:

<https://www.spiegel.de/auto/aktuell/brennstoffzelle-deshalb-setzen-sich-wasserstoffautos-bisher-nicht-durch-a-1273042.html>

### Related articles:

Alternative drives: "The fuel cell will prevail" (10.12.2018)

<https://www.spiegel.de/auto/aktuell/wasserstoffauto-die-brennstoffzelle-wird-durchgesetzt-a-1235431.html>

Autograph Mercedes GLC F-Cell: The eats kilometers like a diesel (15.04.2019)

<https://www.spiegel.de/auto/fahrberichte/mercedes-glc-f-cell-erstes-deutsches-hydrogen-seriesauto-im-test-a-1262168.html>

### More on the internet

Hydrogen

filling stations <https://h2.live/>

SPIEGEL ONLINE is not responsible for the content of external websites.