Differences Between Electric Car, Hybrid Car And Hydrogen Car

Even if hybrid cars have been on the road for a long time, few people know how they work and its differences with an electric car, a hydrogen or plug-in hybrid car… Explanations!

The hybrid car:

It is simply a petrol car - sometimes diesel - to which we will add a small electric motor and a battery. The interest of this battery and of this motorization is to be able, during the deceleration and braking phases, to recover kinetic energy to transform it into electricity and to store it in the battery. This will then be reused during the vehicle start-up phases during which, depending on technology, they may not even run a few hundred meters in 100% electric mode.

Important thing: you do not charge a hybrid car on a socket. Its electrical energy is only recovered during the braking and deceleration phases. In reality, a hybrid car is, therefore, more like an electrically-assisted thermal car than a real hybrid where energy is distributed equally by the two engines.

The plug-in hybrid car:

Considered an evolution of the hybrid car, the rechargeable hybrid car is simply a hybrid in which we have enlarged the size of the battery, and sometimes of the electric motor, and add a connector to directly recharge the battery from the electrical network.

The advantage of having a larger battery is that it can travel several tens of kilometres in an electric mode without consuming a single drop of fuel. The autonomy which is sufficient to cover most of the daily journeys: going shopping, picking up children from school or going to work.

For longer journeys, hybrid mode will be used. A way to overcome the 'limits' of the electric car in terms of autonomy, availability of terminals and charging time. On the other hand, we still continue to burn oil since the heat engine will be used…

Today, the plug-in hybrid is rather reserved for the high-end with vehicles whose price is generally higher than 30,000 euros. This is due to the multiplicity of components (batteries, electric motor, controller, etc.) that are added to the conventional engine. Between a classic hybrid and a plug-in hybrid, the additional cost is generally between 6,000 and 9,000 euros depending on the model.

The electric car:

On an electric car, no fuel tank or combustion engine but an electric motor controlled by an electronic controller and associated with a battery. More or less large, it allows you to travel from 100 to several hundred kilometres depending on the model and recharges directly on the electrical network, at home or on a public charging station.

In terms of design, the electric car is much simpler than a thermal or hybrid car. Results: reduced maintenance cost and much cheaper energy than traditional fuels. Added to this is 100% silent operation, pleasant driving and zero emissions in use, electric cars being quite simply devoid of exhaust.

The downside: it will be necessary to deal with the problems linked to autonomy and the lack of charging infrastructure in certain territories.

The electric car with range extender:

An electric car with range extender typically rests on the same basis as the electric car but with an additional heat engine. Unlike rechargeable hybrids, it is not used to drive the wheels but only to recharge the battery.

System advantage: being able to benefit from all-electric autonomy, which is greater than on plug-in hybrid models, while having the peace of mind of the extender for long journeys. Disadvantages: a rather rare offer (only the BMW i3 offers it to date) and a certain dependence on petroleum, the extender always burning fuel.

The hydrogen car:

By definition, a hydrogen car is an electric car. The main difference: the mode of supply of the electric motor.

While an electric car draws its energy from a battery accumulating kWh and recharged on the electric network, a hydrogen car uses a fuel cell that directly produces electricity onboard from pressurized tanks (700 bars) storing hydrogen.

Note that some hydrogen cars, such as the Mercedes GLC F-Cell, combine its fuel cell with a battery recharged from the mains allowing a few tens of kilometres of autonomy.

On paper, the advantages of hydrogen are manifold: zero emissions (apart from water vapour) and a range generally greater than that of electric cars for a refuelling time of just a few minutes.

The development of hydrogen comes up against several difficulties, however: there is the lack of supply from manufacturers but also the question of the distribution network which remains very fragmented in France today. From a technical point of view, the efficiency of a fuel cell, much lower than that of a battery, is also pointed out, as is the production of hydrogen, today mainly of fossil origin. In the case of electrolysis, the production of hydrogen from electricity, the losses are also significant during the transformation with a yield today announced between 50 and 70%.