

TOYOTA alternative propulsion systems

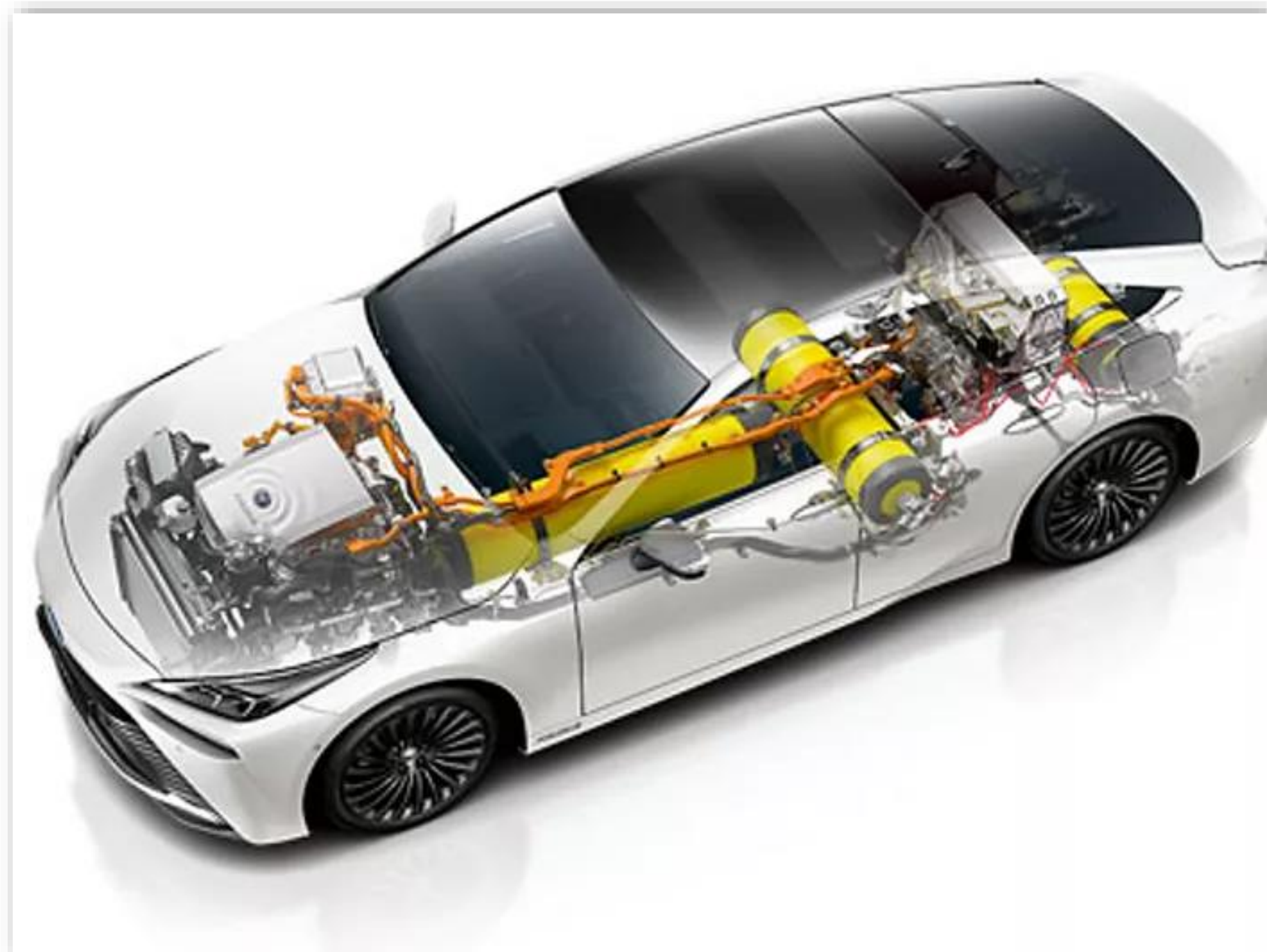
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Student Project

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Hydrogen will not only change the future of transport, it will also change many other things. From the propulsion of cars, trains and ships to the heating of apartments - we are slowly migrating towards a hydrogen-based community. Because, unlike other energy sources, its only by-product is water.

Additionally, hydrogen is easy to store and transport in large quantities. Sustainable systems are needed to replace fossil fuels, whose extraction and burning have a negative impact on the environment. Hydrogen promises the greatest impact in the process of eliminating carbon emissions. It is an important alternative that brings us closer to the goal of a cleaner environment. Easy to refuel, offering an autonomy of over 500 km and without emitting anything but water.



TOYOTA electric vehicles with hydrogen fuel cells have the potential to revolutionize the way we drive. After launching the world's first hydrogen-powered car in 2014, it takes zero-emission fuel cell technology to new heights in the second-generation Mirai, with a new vision for clean mobility, which is on the road today. A fuel cell does not produce a large amount of electricity, so the Mirai combines several cells to power the electric propulsion motor.

The process is extremely efficient, over 80% of the hydrogen energy being converted into electricity, more than double the performance of a heat engine that wastes a good part of the fuel's energy in combustion.

As elementary as the working principle of hydrogen fuel cells is, as complex is the technology used to implement the solution in a vehicle, from the development and construction of the fuel cell unit to the design and realization of capable hydrogen tanks to withstand extremely high pressures (700 bars), having a high degree of impermeability. From the very beginning, Mirai was not an experimental vehicle, but a coherent proposal for alternative mobility, with a distinct design, with a high level of comfort and performance.



The maximum power of 154 HP and the torque of 335 Nm supported an acceleration from 0 to 100 km/h in 9.6 seconds, and the pleasant dynamic behavior benefits from the optimal distribution of the masses and the center of gravity close to the ground: the electric motor and the electronic unit control were placed on the front deck, fuel cells and a hydrogen tank under the seats, the second tank and the additional battery for storing renewable energy on the rear deck.

The dynamic and comfort characteristics, the specificity of the propulsion solution, the possibility of refueling with hydrogen in an interval close to a conventional car (3-5 minutes) and the autonomy of about 500 km have attracted the attention of public institutions and companies interested in "green" mobility.

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