

Is Hydrogen the Future of the Automotive Industry?

Jaydan Carter 2305706

Andrew Noble

Wales Institute for Science & Art

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Introduction

Due to combustion engines and the vast amount of carbon emissions being linked to the ever-growing threat of climate change. Demands have been made to change the philosophy of how vehicles are powered forever. This poster will delve deeper into a viable alternative to combustion engines – hydrogen power.

Hydrogen Power

Toyota, Hyundai and BMW are some of the big-name manufacturers that have either Hydrogen powered cars on sale or are being conceptualised ready for production.

How does it work?

The image on the right demonstrates how the Toyota Mirai's Hydrogen fuel cell system works:

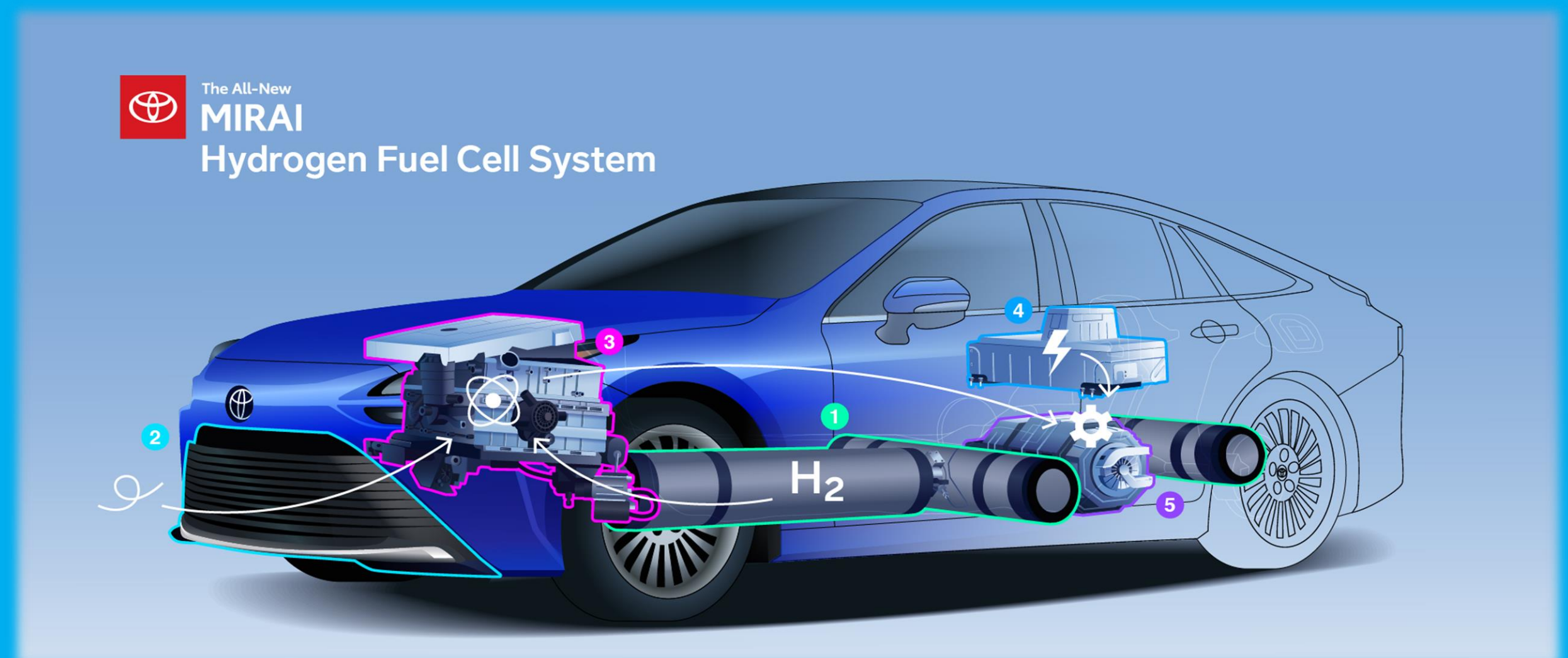
- 1) The Hydrogen tank distributes Hydrogen to the Anode of the fuel cell system. Once here, electrons are stripped from the Hydrogen by a Platinum catalyst.
- 2) The air intake supplies Oxygen to the Cathode side of the fuel cell system, which later combines with the now positively charged Hydrogen to create water as a byproduct.
- 3) The fuel cell system provides the right environment for the Hydrogen to form with the Oxygen to create electricity and water. This then generates the electricity that flows to the electric motor.
- 4) The battery supplies extra power and stores energy from regenerative braking.
- 5) The electric motor powers and turns the wheels.



Conclusion

As of right now, Hydrogen power is not a viable option for the public due to the lack of refuelling stations. On top of that, Hydrogen is not yet commercially and environmentally viable to produce on a large scale.

However, that does not mean to say Hydrogen power is out of the question. It is still regarded as one of the best long-term solutions and with more resource and development, it won't be too long until we see Hydrogen powered vehicles on the road more frequently.



Positives of Hydrogen Power

- As well as being considered one of the best long-term solutions, there are no dangerous tailpipe emissions produced by a Hydrogen powered vehicle, only water.
- Hydrogen powered vehicles are a more efficient powertrain as they use 40-60% of its fuel's energy along with a 50% decrease in consumption. From this it is not unusual to see a 400-mile range on a single tank.
- Unlike electric vehicles, the range of a Hydrogen power vehicle cannot be swayed by outside temperatures.
- Hydrogen vehicles are also quicker to refuel in comparison to electric vehicles. Refuelling in a fraction of the time.
- Hydrogen is also the richest element on Earth.

Negatives of Hydrogen Power

- There is not enough Hydrogen refuelling stations to support a 'Hydrogen Takeover'. Therefore, consumers will be put off.
- Hydrogen powered vehicles are expensive due to their innovative engineering. Take the Toyota Mirai for example, a customer is looking at a £49,000 entry price.
- Similarly to electric powered vehicles, producing the resource can be quite environmentally damaging. According to Pirelli, 'as much as 10kg of CO2 is produced for every kilogram of Hydrogen.

References

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