



The Future of the Engine

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Introduction

As part of this module, a one-off lecture was delivered by Owen Williams, discussing the future of the engine, and possible technologies for our future and present that companies are exploring.

This lecture interested me the most as motorsport plays a vital role in the development of such technologies and how they are implemented into widespread use.

Background

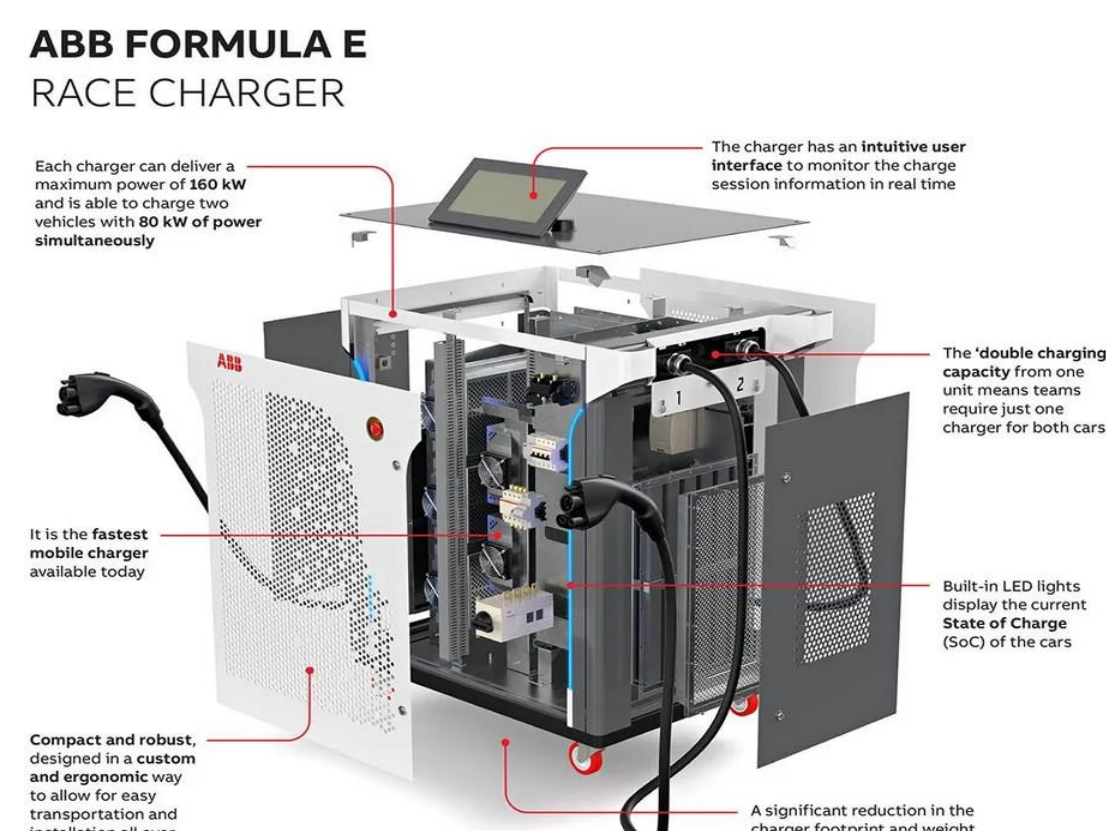
With the threat of climate change becoming a bigger issue, governments have started to issue plans for complete bans of the sale of ICE vehicles. In the UK, this was originally set for 2030, however has been pushed back until 2035.

Because of this, the need for alternative options for vehicle engines is much more prevalent. EVs and Hydrogen-powered engines are the two favoured choices, and motorsport is playing a huge role in the development of the technology being used in these vehicles.

Discussion

Within motorsport, there have been several rule changes which aim to implement battery technology which can be transferred into road cars, and also bespoke racing series created, which solely use electric powertrains.

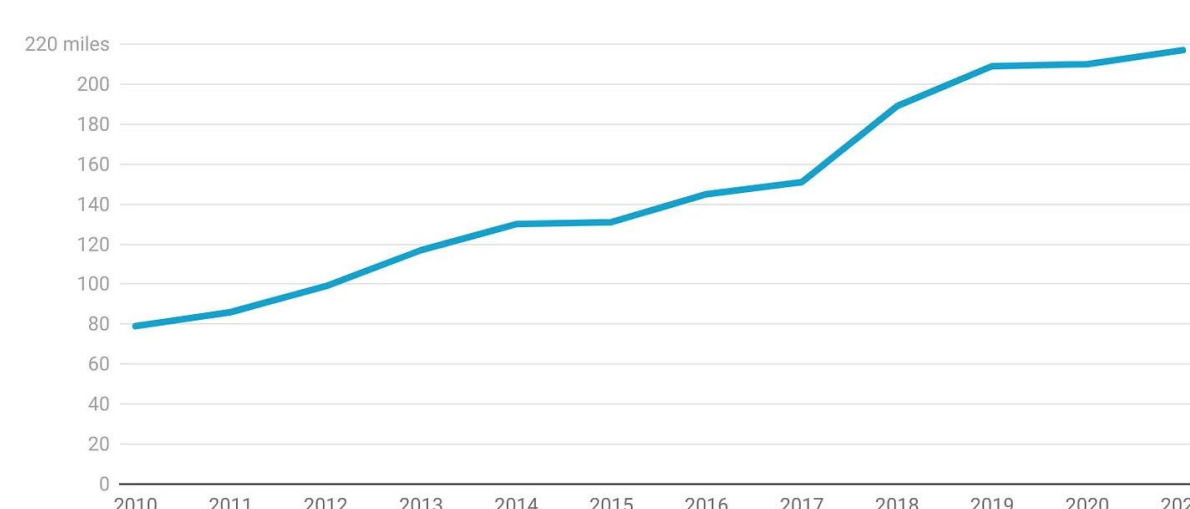
The most prominent of these is Formula E, an all-electric single seater series. This series has been a hotbed for EV development, mainly due to the huge investments made by large companies. With electric cars, there are three big issues, with one of them being charging. In 2022 a new fast-charger was created, which can charge the cars within 30 seconds during races.



An overview of Formula E's brand-new fast-charging system [2].

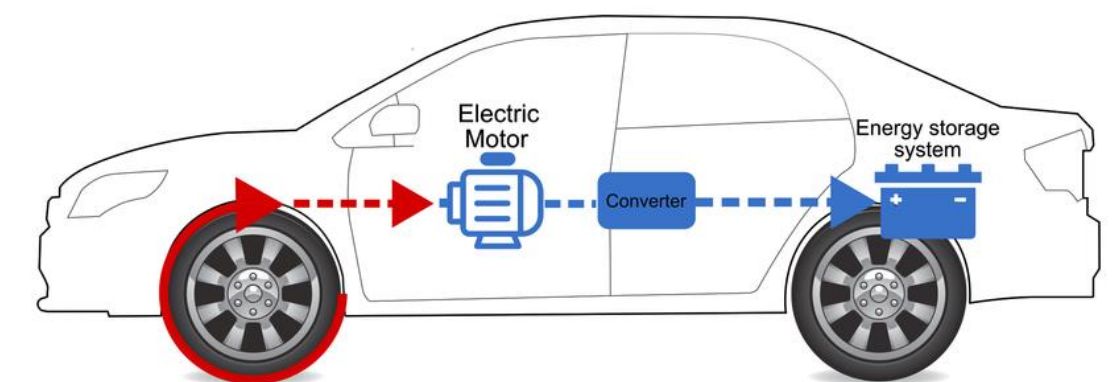
This technology has already been implemented in part for road users, with new fast charging stations already installed across the UK.

Another problem with electric cars is their range. Since 2014, the battery technology in Formula E has been constantly changing. This technology has been implemented into road cars, and battery ranges have increased significantly since then.



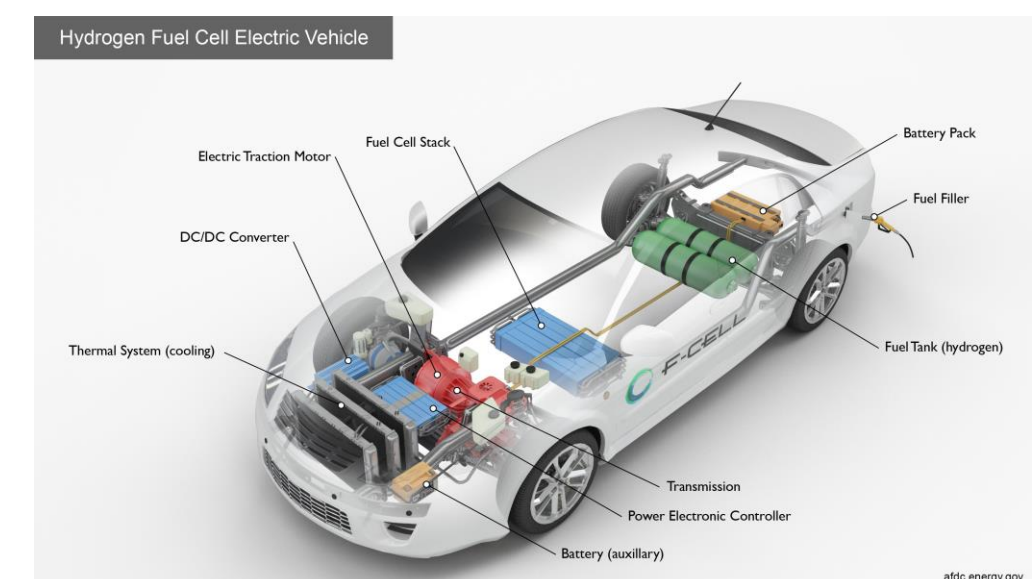
Average range of EVs over time[3].

The other technology to EVs which Formula E is advancing is that of regenerative braking. Under braking, kinetic energy is transferred away from the wheels and towards a motor, which converts this into energy to be used in the battery. EVs that use this system increase range significantly, especially in city environments where the driver is on the brakes much more.



Regenerative braking in an EV [4].

Hydrogen technology has also been explored within motorsport, particularly by Toyota, however this has not yet been fully explored, mainly due to the cost of storage. The prospect of hydrogen-powered vehicles is exciting however, as there would be zero emissions.



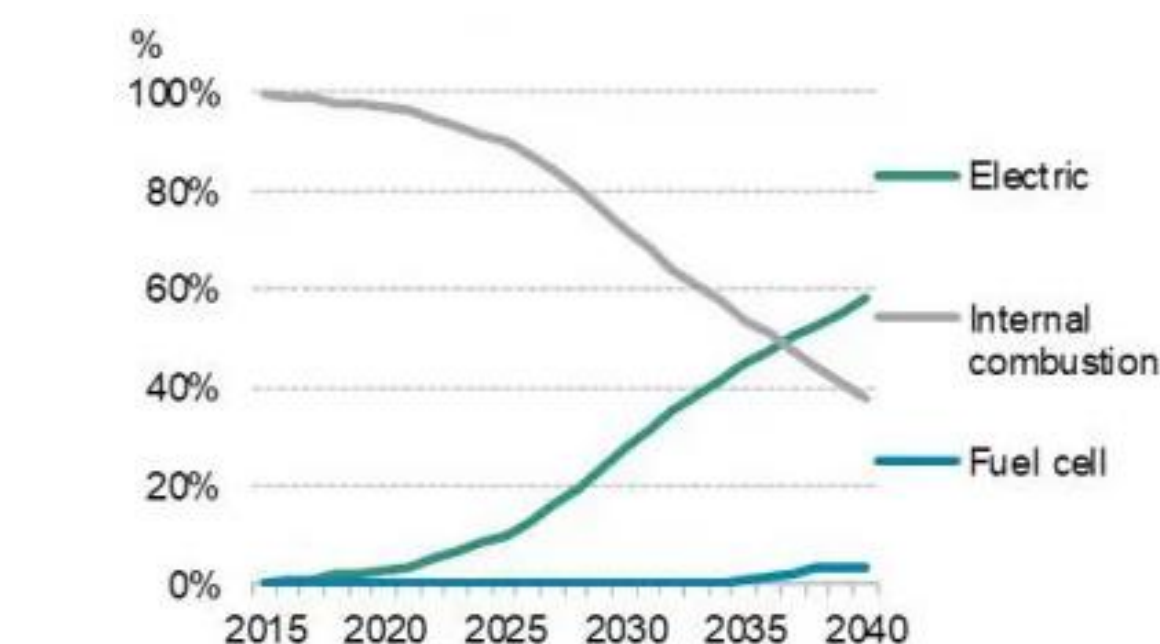
The Key Components of a Hydrogen Fuel Cell Electric Car[5].

Conclusion

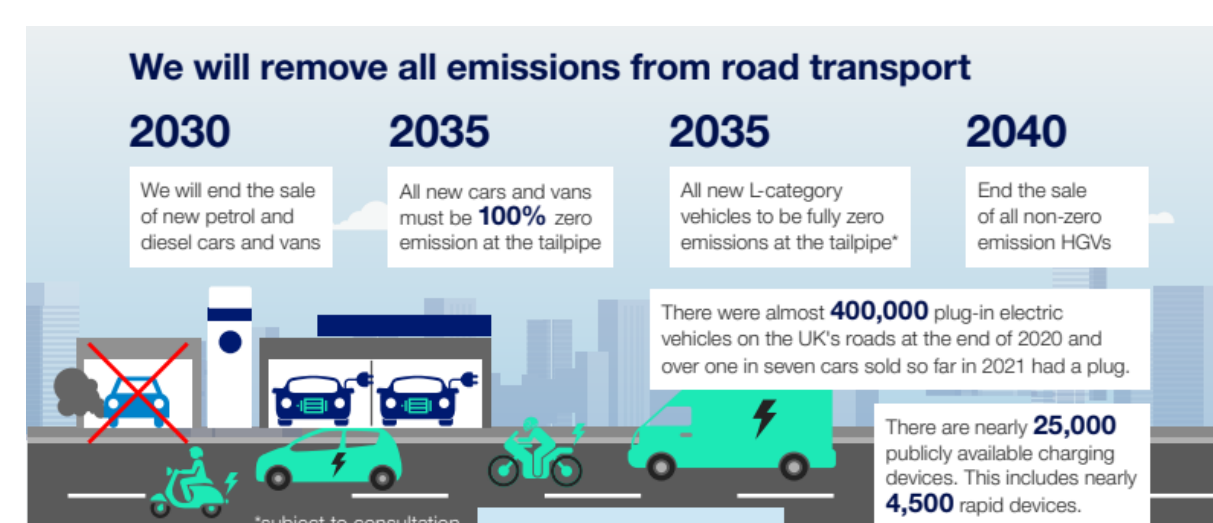
To conclude, motorsports has been vital in the development of the future of the engine. With the addition of hydrogen technology looming, motorsports will be a vital proving ground for this, as it has been for other technologies, to lead us into the future.

References

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- Amamou et al. (2023) *Energy Recovery and Energy Harvesting in Electric and Fuel Cell Vehicles, a Review of Recent Advances*, p. 8
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Global share of total annual passenger vehicle sales by drivetrain (projected) [1].



The UK Government's original plan for the ban of ICE Vehicles, taken from slide 7 of Owen Williams' presentation