

Petrol PLAZA

Will hydrogen-fuelled vehicles change petrol station forecast use?

Geoff Oldham, Chairman of Suresite, writes about the opportunities of hydrogen fueling for petrol station operators, the advantages of the fuel, and general characteristics.



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The British Government is exerting great pressure for transportation to switch to zero emissions, with two competing technologies vying for supremacy to implement this change. Currently the vast majority are electric vehicles (EVs) using rechargeable battery technologies such as lithium-ion and lithium polymer systems. The other uses hydrogen fuel cell technology similar to that used by the US National Aeronautics and Space Administration (NASA) in the mid-60s to put a man on the Moon.

The technology used in Hydrogen Fuel cell vehicles (FCEV) to give zero emissions is still in the early development phase, and adoption lags significantly behind electric vehicle systems using lithium battery systems. Hydrogen fuel technology can be used in heavy goods vehicles and public service vehicles in addition to cars and vans. The first cars using the technology are in limited production and commercial vehicles, like buses for example, were initially trialled by Transport for London (TfL) in

2004 and have been running in London since 2010.

So, would garage forecourts change massively if hydrogen fuelled vehicles achieved significant uptake in the UK?

A big advantage for customers is that the travel range and refuelling times for hydrogen-powered vehicles are similar to the standard petrol and diesel vehicles they use today. For drivers travelling long distances, having faster refuelling and the ability to travel much further than EV vehicles on a single charge, makes it much more suitable for them. Not being able to charge their EV system at home would be another reason to prefer FCEV.

Hydrogen is much more compatible with the current forecourt network and can either be generated on site at larger retail locations by electrolysis of water and stored in a dedicated pressure vessel (PV) or delivered and piped straight into the PV by gas producers such as Air Products Ltd. or the British Oxygen Company (BOC). The 'gold standard' for this electrolysis would be to use renewable electricity sources - otherwise it defeats the ethos around green energy. All this presumes that the economics of putting this new infrastructure stack up.

Since the pressure vessel containing the hydrogen has to be above ground, the forecourt must have a sufficiently large footprint to accommodate this. There'll also be a security need and protective containment for the PV, and there is already an established delivery network to replenish fuel stocks. Filling times are similar to those experienced when filling up with liquid petroleum gas (LPG) so there would be no issue with customers waiting - as there would be if they were to charge their EVs at garages.

This is a major problem for customers charging EVs, because it's difficult for the current forecourt network to accommodate a large number of charging points, due to space and power constraints. This explains the recent plans for build-outs of EV charging forecourts in green field locations and supermarkets.

So the major change to garage forecourts would be the space required for delivering, storing, and dispensing hydrogen at the forecourt. This is an important factor to consider, especially in inner city areas. Of the various supply options, on-site production would require more space, although there has been a lot of optimisation work carried out to reduce that space. A few years ago, hydrogen facilities were still housed in 40-foot containers, whereas smaller containers measuring 11 feet exist today.

Although many believe FCEVs are the greener and therefore better long-term transport solution, all this is conjecture given the fact that presently the vast majority of zero emission vehicles use battery technology. Hydrogen-fuelled car development is advanced, but the adoption rate is very low, albeit increasing. The major factor in the speed of the adoption will be the car manufacturers themselves and a big increase in the number of hydrogen refuelling stations - it's the classic 'chicken and egg' situation.

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