



# Energy storage & the role of hydrogen For nett zero carbon emissions UK

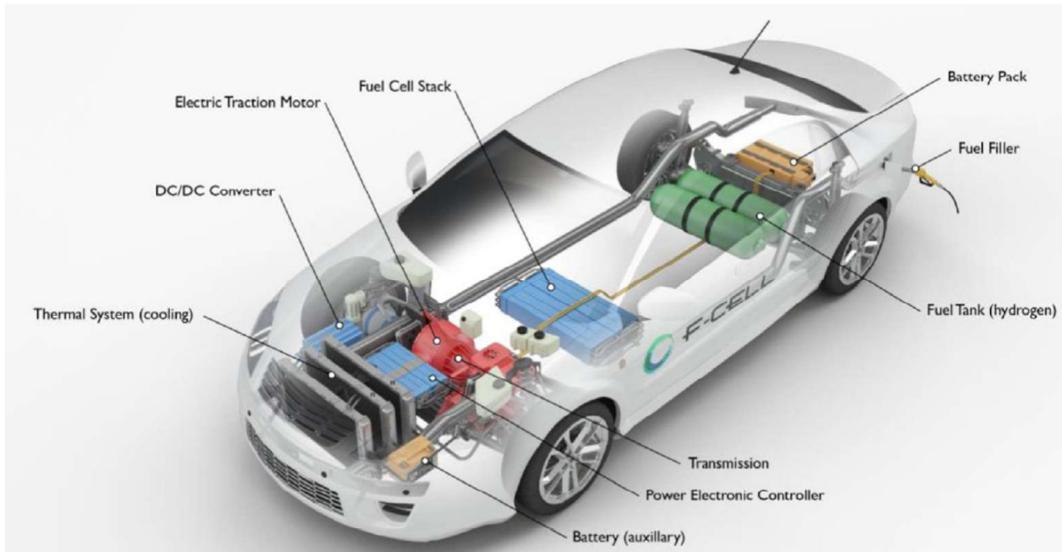


Image courtesy Hydrogen Fuel Cell Vehicles, Current Status and Future Prospects, by Manoharan Y, Hosseini S E, Butler B & Alzehrani H, Applied Sciences, 9(11), May 2019

## EMSTA's 22<sup>nd</sup> Prestige Seminar - Online

Wednesday 17th November 2021 – 18:45 to 21:30

**Free entry - advance registration required - book online**

To help combat climate change, the UK has committed to net zero carbon emissions by 2050. Good progress is being made to decarbonise generation of electricity using renewable energy from wind and photovoltaics. However renewable energy is intermittent so storage is needed for when the wind doesn't blow and the sun doesn't shine, and that's the key attraction of hydrogen. Also emissions from transport and heating buildings have yet to reduce, so a zero carbon energy solution is needed to decarbonise them.

There are pumped storage hydro-electric schemes in Scotland and North Wales, but they do not have the capacity to store all the electrical energy that is generated when demand is low.

Battery electric vehicles (BEVs) are one answer. They can be charged up overnight and are starting to compete with fossil-fueled cars and light goods vehicles, but the weight of batteries makes long range and heavy loads difficult. Also, it takes longer to refuel a BEV than a fossil-fueled car so millions of charging points are needed at homes, kerbsides, workplaces, public car parks and motorway service areas.

Hydrogen fueled vehicles are another answer: they can be refueled in the same time as fossil-fueled vehicles. Refueling points for them are starting to appear, but so far only a few in the UK. While some charging stations do have an electrolyser on-site, the majority of stations in Europe have their hydrogen delivered by a diesel truck. The cost of hydrogen is expected to fall when it can be generated by electrolysis of water on off-shore wind farms, and on a large scale from natural gas by Steam Methane Reformers with Carbon Capture and Storage to store the unwanted carbon dioxide in disused gas wells. Hydrogen can be stored in salt caverns and distributed by pipelines and road tankers.

Trials have started on the use of Hydrogen to replace some or all of the natural gas in the gas mains and used to heat homes and for cooking. Also, individual heat pumps are starting to be used to heat buildings. All buildings need to be well insulated to reduce the energy needed to heat them.

This prestige seminar will provide an overview of these technologies and their prospects to help reduce carbon emissions. This evening seminar will be the twenty second annual prestige seminar organised by EMSTA CIC as a joint event with the Satcoms Innovation Group and various professional engineering and science Institutions.

After the Welcome from Professor Quinin McKellar CBE, Vice-Chancellor and Chief Executive of the University of Hertfordshire, the Seminar Chairman, Dr Colin Brown, Former Chief Executive, Institution of Mechanical Engineers, will present EMSTA's Innovation Award to a promising young student. He will then introduce the Session and Speakers.

In his opening talk, **Hydrogen Research – energy transition and large scale testing**, Andrew Cummings will present an overview of the hydrogen research ongoing at DNV Spadeadam Engineering and Research, including methods used to generate Hydrogen, its important role in energy transition, and the use of Hydrogen for domestic heating.

Marcus Taylor's paper, **Hydrogen in Transport**, will presents the latest developments and future projections for hydrogen, not only in road transport, but also in rail, shipping and aviation.

In the final paper, **Long, Medium & Short Duration Energy Storage**, Simon Bailey will show how a combination of short and medium duration storage may be usefully implemented to balance the daily load curve on the demand side, while at the same time balancing intermittent renewables generation on the supply side. Long duration storage comprising both hydrogen storage and pumped hydro, may be used to effectively balance intermittent renewables 'when the wind doesn't blow' or the 'sun doesn't shine'.

An important element of the prestige seminar is the final chaired discussion when the audience can put forward their questions to the speakers and debate some of the issues discussed.

The Chairman will sum up after the audience Q&A session, and Dr Peter Blair-Fish, Master, Worshipful Company of Engineers will give a Vote of Thanks.

**How do I attend? Entry is free, but advance registration is required.**

**Book online at <https://emsta.org.uk/wp/seminarregistration>**

**Helpline:** 0845 474 3341\*

\* Calls cost 5p [plus 5p per minute after the first 60 seconds] plus your phone company's access charge.

For more information visit [www.emsta.org.uk/seminars.php](http://www.emsta.org.uk/seminars.php)

We would be particularly pleased if you brought a young person to this event: they may be involved in the widespread use of hydrogen technologies to achieve net zero emission by 2050.

To discuss EMSTA's events and STEM project support, contact Roger Boddy, Chairman EMSTA. 07956 109337 or by e-mail [chairman@emsta.org.uk](mailto:chairman@emsta.org.uk).