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Dear Sirs

UK HFCA response to 'Low Carbon Fuel Strategy: Call for ideas'

Introduction

I am writing on behalf of the UK Hydrogen and Fuel Cell Association (UK HFCA) in response to your "Low Carbon Fuels Strategy: Call for ideas". The UK HFCA is the largest and longest running pan UK hydrogen focused association, dedicated to supporting stakeholders across the entire value chain of both the Hydrogen sector and the Fuel Cell industry. Our members represent over 200,000 employees globally, with combined revenues over £400 billion, and cover the entire value chain from raw material sourcing, to supply chain and components, financing, professional services, B2B and consumer facing solutions. With over 15 years of experience, the UK HFCA is a leader in advocating for and accelerating the transition to Net Zero in the UK through the deployment of hydrogen & fuel cell solutions. We promote and represent our members' interests across the hydrogen and fuel cells space, and campaign for the best policy outcomes for the industry across the full range of applications and opportunities.

There is widespread recognition from organisations such as the Committee on Climate Change and the International Energy Agency that hydrogen will play a key role in the decarbonisation of heavy transportation. The UK's Hydrogen Strategy envisages hydrogen demand from heavy transport reaching 20-45TWh by 2035 – just over ten years away. Implementing hydrogen transportation in the UK benefits not only the Net Zero transition in some of the hardest to abate sectors such as HGV's, Rail, and shipping, but also brings fuel security through the UK centric supply chain associated with hydrogen.

This response from the UK HFCA covers the following four questions as a whole:

i. ***How can the low carbon fuels strategy best improve certainty about the deployment of low carbon fuels to support the decarbonisation of the transport sector and the growth of this industry in the UK?***
ii. ***Are there specific examples or best practices, the government should take into account when drafting the strategy?***

xix. ***In your view, how should the government best deliver its aims of using LCFs to maximise environmental and economic benefits and are there specific measures the government should take to support the sector's transition?***

xx. ***In view of the different challenges and opportunities, are there specific policy measures the government should prioritise and why?***

Hydrogen transportation is being seen internationally as an important aspect of governments' decarbonisation plans for transport, and large targets and funds are being mobilised to get the industry started. EU nations such as the Netherlands, France and Germany are placing enormous emphasis on hydrogen's role across all vehicle types. Looking to Japan, the nation is targeting more than 800,000 hydrogen cars by 2030[1].

Where we are now

The Call for Ideas is almost entirely focused on the Renewable Transport Fuel Obligation (RTFO) which, as is noted, is the main mechanism to support the growth of hydrogen as a transport fuel. As the Call also notes, the RTFO has not been effective for hydrogen and there has been very little progress to date. Even for other fuels, it has had a trimming effect on CO_2 emissions when what is needed is step change. A further failing is that the RTFO addresses only one part of the hydrogen transport ecosystem with no current support for aspects such refuelling infrastructure.

The use of hydrogen for light vehicles such as cars and light vans has been written off by DfT, with the focus being put on electrification and biofuel for this category. This is in contrast with many other countries (see below) and fails to recognise hydrogen's potential for cars and light vans.

Whilst there is some evidence of early progress in maritime and zero carbon freight and rail, further advancement will be limited unless there is a system level change in the overall approach to hydrogen for transport.

Opportunity for Hydrogen Transport

Hydrogen is increasingly recognised as the best option to decarbonise a range of transport modes, with fuel cells offering zero carbon emissions at point of use and hydrogen combustion is an option for heavy transport. Outlined below are other benefits that hydrogen brings the transport sector (except for Light Duty Vehicles, hydrogen transport references cover both fuel cell electric and hydrogen combustion):

- **Light Duty Vehicles (LDV):** A recent study by the Hydrogen Council found that by the late 2020's or early 2030's the total cost of ownership of a Fuel Cell Electric Vehicle (FCEV) will be less than that of a Battery Electric Vehicle (BEV)[2]. Whilst the UK has no activity to support hydrogen transport in light vehicles, the picture internationally is significantly different with South Korea targeting 5.9 million fuel cell cars by 2040[3]

[1] https://www.iea.org/reports/hydrogen
[2] https://hydrogencouncil.com/wp-content/uploads/2021/10/Transport-Study-Full-Report-Hydrogen-Council-1.pdf
[3] http://www.ukhfca.co.uk/wp-content/uploads/fuel-cells.pdf

- **Buses:** Hydrogen fuelled buses provide a similar user experience to the petrol and diesel buses used today. With refuelling at the depot, hydrogen buses allow current routes to be serviced across the UK without inter-day refuelling (which might not be the case for electric buses). Adding to this, fleets benefit from shorter refuelling times compared with other clean alternatives. Hydrogen offers particular benefits in rural areas with long distance routes, hilly terrain or colder temperatures which are unlikely to be servicable by battery technology in the foreseeable future. Grid infrastructure constraints in some regions will also be a consideration.
- **Heavy Goods Vehicles (HGVs):** Hydrogen fuel brings benefits to HGV's in providing un-paralleled range compared with other clean alternatives. Fewer, faster refuels mean that hydrogen fuelled HGV's can remain on the road for longer periods, while being capable of carrying large payloads. These benefits make hydrogen HGV's a strong option to decarbonise without altering day to day operations.
- **Rail:** Fuel cell powered trains are smoother, quieter and more efficient, and are anticipated to be easier and cheaper to maintain than diesel equivalents. While the train itself is more expensive than diesel or electric models, hydrogen fuelled rail travel a cheaper alternative than electrifying lines. Beyond its use in trains, there is the opportunity for hydrogen to play a role in upgrading terminals and stations For example, FCEV van fleets or maintenance equipment could be a beneficial application. Hydrogen combustion is also an option for both trains (particularly freight) and for larger vehicles at terminals and stations.
- **Marine:** Currently, many ports have poor air quality so adopting fuel cells in maritime applications would greatly reduce air pollutant emissions. For shorter distances, electric propulsion combined with fuel cells could bring a cost competitive solution to the sector relatively quickly. Hydrogen offers benefits over other options for medium distance and high utilisation functions, and would be viable for many ferry routes which Government ultimately has control over and responsibility for decarbonising. There is growing interest internationally in hydrogen for marine applications, potentially starting with combustion and progressing to fuel cells, with ammonia as a potential hydrogen vector.
- **Aviation:** In its recently published "Vision For Zero-Carbon Emission Air Travel", the Aerospace Technology Institute (ATI)[4] envisages liquid hydrogen fuelled aircraft as the medium term trajectory for net zero aviation, with entry into the market in the mid-2030's. The ATI also sees green liquid hydrogen as the most viable zero-emission fuel, that will allow scaling to large aircraft. In the short term, Sustainable Aviation Fuel is being viewed as the way forward. This can include a combination of hydrogen and CO_2 derived from direct air capture. Hydrogen can also be used in rocket propulsion.
- **Non**-road Machinery: Given the limitations of electricity, there is considerable interest in hydrogen to power non-road machinery. For example, JCB has developed a hydrogen powered excavator and SANY has produced a dump truck and mixer truck.

[4] https://www.ati.org.uk/wp-content/uploads/2022/03/FZO-ALL-REP-0004-FlyZero-Our-Vision-for-Zero-Carbon-Emission-Air-Travel.pdf

What's needed: A Hydrogen for Transport Strategy

In considering the roadmap for low carbon transport as a whole, the UK HFCA recognises that a combined approach that considers both hydrogen and electrification is the way forward for the UK to reach its goals. However, with respect to hydrogen policies that target fuels alone will not work, and any strategy must address infrastructure, vehicles, and the range of energy vectors that carry hydrogen, such as ammonia. Furthermore, the development of hydrogen for transport will proceed in parallel with a system wide suite of developments as hydrogen scales up to take its role across transport, power, heat and overall system resilience. Different components of this journey must not be considered in isolation.

To date, hydrogen for transport has had to rely on a patchwork of grants and policy levers that share no clear strategy to link and progress all aspects of a hydrogen transport network over the medium term. Hydrogen needs additional attention to get to a point of critical mass where the industry becomes self-sustaining. A long-term vision is the key to progress, and will aid in removing risk for those contemplating investment in the sector. This in turn will help to bring down system wide costs and help to accelerate scale-up in line with targets. Action now will not only ensure we reach critical mass more quickly, but also ensure that it is a UK supply chain servicing the industry.

For a hydrogen network to flourish, it will require fuel production, refuelling infrastructure and vehicle funding support to be connected. Earlier vehicle trials were made possible through CAPEX funding of local hubs which included refuelling and maintenance of the fleets. To ensure fuel is available for future fleets, a combination of CAPEX and OPEX funding should be offered by DfT to a level delivers growth.

Light duty transport should form a significant component of the Strategy. As mentioned above, fuel cell powered cars and vans could be cost competitive with BEVs by the late 2020s and offer a much better user experience, particularly for those without access to dedicated off-street parking. Electrification of all road transport is already proving challenging and including FCEVs will reduce the burden on the electricity network, take advantage of the growing hydrogen infrastructure and offer choice for consumers. With other countries setting targets for FCEVs, the UK risks passing up a viable avenue for decarbonising this sector.

Future proofing – for example, with respect to states and pressures of hydrogen fuel - should be a key consideration with the roll-out of hydrogen transport to ensure public funds bring value for money.

In line with the above, the UK HFCA calls on Government to develop a 'Hydrogen for Transport Strategy' which covers the full role for hydrogen in transport and sets out a clear roadmap with appropriate and linked policy levers to guarantee scale up and growth at the rate the UK needs to meet its net zero goals. These policy levers should be designed to complement and align with wider hydrogen developments so that demand and supply can develop in tandem, reducing risk for all involved.

Such a Strategy will bring further benefits for the UK beyond net zero, including enhanced energy security and economic growth. Certainty regarding growth of the sector will give investors confidence to invest in new plant and projects.

Actions and Targets

As part of the Strategy, the UK HFCA recommends that the following Targets and Actions be developed so that all elements can be progressed.

Targets:

DfT should establish specific, quantifiable targets that drive forward hydrogen for transport. These should be focused on increasing the number of refuelling stations and vehicles in operation. EU nations have specific hydrogen LDV targets by 2030:

- France: 20,000-50,000 vehicles
- Germany: 86,000 vehicles across two regions
- Netherlands: 300,000 vehicles

In hydrogen heavy-duty vehicles there are also specific, quantifiable targets from EU member states:

- France: 800-2,000 by 2028
- Germany: 18,000 across two regions by 2030
- Netherlands: 3,000 by 2025

DfT should reverse its position on light duty vehicles (LDVs) for hydrogen and develop UK deployment targets that show true consideration of hydrogen's potential in the LDV sector. We recommend the following UK targets for 2030:

- 35,000 LDVs
- 15,000 HGVs (which represents 3% of HGVs on the road today[5]) by 2030.

For buses, the implementation of bus trials has been positive for the hydrogen sector. These trials should be scaled up in the coming years to 2030. We recommend the following UK target for 2030:

- 2,500 hydrogen buses by 2030 (which represents 7.7% of the current bus fleet in operation in England[6].

These vehicles require refuelling infrastructure, and so any targets for vehicles must be matched with a plan for refuelling. The EU has recently proposed to increase its target of 1 hydrogen refuelling station per 150km to 1 per 100km, and to bring forward the timing of this target from

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5 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/898747/domestic-road-freight-statistics-2019.pdf#:~:text=The%20latest%20vehicle%20licensing%20statistics%20show%20that%20at,as%20private%20HGVs%29%2C%20a%20small%20decrease%20from%202018.

6 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1030718/annual-bus-statistics-year-ending-march-2021.pdf

2030 to 2027. We recommend that equivalent targets are adopted for the UK, with an overall target of 500 stations by 2030.

Actions:

The Hydrogen for Transport Strategy will need to include a range of actions to deliver the growth needed. The UK HFCA recommends the following as starter considerations:

- The Government should commit to ensuring that at least 20% of its 40,000 strong fleet of vehicles transition to hydrogen by 2030. There are currently fewer than 300 hydrogen cars or vans on the roads in the UK and the Government's own plans to decarbonise its fleet would be a valuable source of early demand to encourage adoption as well as providing a strong signal of the Government's commitment to alternative fuels. Similar commitments should be established for other public sector bodies; taken together, these measures will help to deliver the targets above.

- As mentioned above, the Hydrogen for Transport Strategy will need to encompass both CAPEX and OPEX funding across all aspects of hydrogen as a transport fuel – vehicles, infrastructure etc. This is required for all aspects: LDV; Buses; HCV's; Rail; Maritime; and Aviation. The overall intent should be to bring the initial costs of hydrogen transport closer to cost parity with current fossil fuel solutions. DfT should consider setting CAPEX funding for refuelling infrastructure on a sliding scale based on hydrogen dispensed for use in vehicles, where funding increases based on potential off-take levels. If set at the correct level, CAPEX funding for 'vehicles', will stimulate demand, which will in turn stimulate demand for hydrogen fuel and reduce the need for funding for refuelling infrastructure. A carefully designed blend of support mechanisms will allow hydrogen for transport to develop seamlessly and in the most cost-effective way possible. Consideration should also be given to linkages across to wider energy system developments.

- For rail, subsidies for Red Diesel are a fossil fuel subsidy that have no place in any plan to reach net zero. As such they should be removed. This would make hydrogen trains more competitive, while providing an incentive to fleet owner/ operators to decarbonise. However, we are conscious of the need to avoid causing rail costs to increase, so some alternative scheme will be needed; ideally this will be designed to accelerate decarbonisation. Lessons can be learnt from the bus sector where historically fuel duty was rebated on a p/L metric, which has been amended for Scotland and Wales (and soon for England) to be on a per km basis so as not to disadvantage hydrogen or electric zero emission buses. For trains this rebate could be achieved either on a per km travelled or on a per KWh of fuel used basis.

- The UK HFCA supports the recommendations from the ATI's recent "Vision For Zero-Carbon Emission Air Travel": *"Consideration should be given to using incentives, pricing and taxation to influence passenger behaviour and shift demand to sustainable forms of aviation. Using aviation tax or levy receipts to support the development of a zero-carbon emission aircraft should also be explored".*

- Hydrogen combustion should qualify as a zero-emission transport option.
- To ensure that hydrogen for transport's progress is not delayed, immediate action is needed to guarantee that the correct codes, regulations and standards are in place. Government should establish an overarching body to lead on this. Such a body would have responsibility for ensuring the timely and appropriate development of codes and standards for hydrogen transport, including compliance. There are cross-mode learnings that can be built-up, as well as common safety features that can be applied. This new body could also provide a shared centre for knowledge on hydrogen to support industry and the wider policy and regulatory community.
- There is an ongoing need for support for R&D to optimise hydrogen for transport in heavy modes. This will help to improve balance of plant, system integration and supply chains, and further reduce cost and increase efficiency.

Concluding Comments

The UK HFCA calls on Government to establish a Hydrogen for Transport Strategy which sets medium-term targets for hydrogen across different modes and infrastructure, underpinned with support to enable a hydrogen transport network to flourish in the UK – thus meeting the targets and achieving our net zero goals. Conventional approaches to fuels will not work in getting the UK to net zero; we face a complete system transformation and require a Strategy that reflects this. There should be focus on building momentum and standing on a platform of hydrogen mobility.

We would welcome the opportunity to discuss our recommendations and look forward to the next steps in this process.

Yours faithfully

Celia Greaves
CEO