Written Evidence Submitted by OGUK
(HNZ0084)

OGUK is the leading representative organisation for the UK offshore oil and gas industry. Our membership includes over 400 organisations with an interest in the UK's upstream oil and gas and other energy sectors. As the champions of industry, we work to inform understanding with facts and evidence, engage on a range of key issues and support the broader value of this industry in a changing energy landscape. From exploration through to decommissioning and located across the length and breadth of the UK, our members are critical to safely providing security of energy supply, while supporting around 270,000 jobs and contributing billions of pounds to the economy each year.

We are now in discussion with the UK Government on the terms of a transformational sector deal that will support industry to become a net zero basin, including a plan to accelerate the industrialisation of Hydrogen production, which requires innovation driven by the development of new technology and new business processes to address real business and commercial challenges.

Please find below OGUK's response to the specific questions posed in the call for evidence of this inquiry.

1. The suitability of the Government's announced plans for "Driving the Growth of Low Carbon Hydrogen", including:

- ***the focus, scale and timescales of the proposed measures;***

Hydrogen will emerge as a key resource within the energy mix provided the right policy and economic choices are made now in support of its long-term development. Each of the main uses of energy in the economy – transport, power generation, space heating, and industrial combustion – can benefit from the use of hydrogen as a means to support decarbonisation.

Although the extent of hydrogen use will vary dependent on the application, it is one of the key resources that must be developed at scale in order to meet the UK's net zero objectives. In the Sixth Carbon Budget, the CCC estimates that as much as 5.7-6.6Mt of low-carbon hydrogen will be required by 2050, up to 375TWh under some circumstances. With this in mind, an objective of 50TWh of Hydrogen for use in the energy sector by 2030 is a suitable ambition.

The oil and gas sector and its existing supply chain has significant potential to support this aspect of the energy transition which will deliver significant investment and jobs.

- ***how the proposed measures—and any other recommended measures—could best be co-ordinated;***

A number of elements are needed to make the development of the Hydrogen sector a reality and provide certainty to investors in the new sector:

1) **Large scale production of blue and green hydrogen**, with effective storage, transportation, and distribution,

2) **A competitive and functioning hydrogen market**, integrated with the existing natural gas system that allows equal and technology neutral access to all types of low carbon hydrogen (and other decarb gases) reflective of their contribution to decarbonisation,

3) **Effective coordination across industry on hydrogen demonstration/R&D activity:** supported by matched R&D funding for hydrogen technologies. This will include work towards asset design standards and procedures,

4) **A supportive and engaged public** creating a latent demand for hydrogen applications

- ***the dependency of the Government's proposed plans on carbon capture and storage, any risks associated with this and how any risks should be mitigated;***

  Current hydrogen production is through the reformation of methane with the resulting CO_2 emissions being released to the atmosphere. Pairing this technology with carbon capture enables the production of low-carbon hydrogen. This is the main way that hydrogen can be deployed at scale by 2030.

  Alternatively, electrolysis allows for water to be split into hydrogen and oxygen. To the extent that the electricity being used is already low carbon and renewable and does not displace other uses such as electric vehicles, the subsequent hydrogen production is also capable of significantly reducing overall carbon emissions.

  The Energy White Paper envisages CCUS and Hydrogen sectors being developed in parallel over the period to 2030, while hydrogen from electrolysis is also being supported and progressively becomes more prominent as large renewable electricity resources are developed.

- ***Potential business models that could attract private investment and stimulate widespread adoption of hydrogen as a Net Zero fuel;***

  Government policy is needed to redesign the current market for gas production and supply through the introduction of a contract for difference (CfD) mechanism, similar to that already successfully used in the development of renewable electricity generation.

  Alongside this, measures are needed to evolve the gas market arrangement so that decarbonised gases can effectively compete and fully participate both within a national system and at a local level, through legislative and regulatory adaptions. This will need to support fuel switching to Hydrogen by industrial users, the development of localities where Hydrogen is the main heating source, and the arrangement needed for blending residual surpluses of hydrogen into transmission and distribution networks. Mandating "hydrogen-ready" boilers is part of a suite of actions that should be taken to advance the implementation of a Net Zero 2050.

2. The progress of recent and ongoing trials of hydrogen in the UK and abroad, and the next steps to most effectively build on this progress;

N/A

3. The engineering and commercial challenges associated with using hydrogen as a fuel, including production, storage, distribution and metrology, and how the Government could best address these;

Low-carbon hydrogen production routes are expensive when compared to natural gas, but these production methods have much in common with processes currently being undertaken by oil and gas companies. Hydrogen production whether from electrolysis or methane reformation is likely to be linked to either offshore facilities or existing gas processing terminals, again building on current capabilities developed through the oil and gas sector. Developing these production resources in a scalable and standardised way with the application of improved techniques, will achieve considerable cost reduction in hydrogen production over time.

Measures related to safety are also important and work with the HSE and others such as IGEM to facilitate the effective dissemination of evolving hydrogen equipment and gas handling safety standards through the workforce.

Finally, regulatory change is required to establish gas quality and billing standards that allow for incorporation of hydrogen into the domestic gas mix. This will require changes to GS(M)R and COTER Regulations and the UNC network code to allow comparable levels of hydrogen in the network. As well as promoting the use of 100% hydrogen for some applications, this work should also encourage initial blending of hydrogen into the network up to 20%.

4. The infrastructure that hydrogen as a Net Zero fuel will require in the short- and longer-term, and any associated risks and opportunities;

The investment levels implied by hydrogen production will be significant as will the contribution the hydrogen economy will make to the continuity of UK hydrocarbon production.

The iron mains replacement programme, mandated by the HSE to improve the safety of the natural gas distribution networks, is a critical component of the deployment of hydrogen, particularly for domestic and commercial consumption. This is because while the installation of PE pipes addresses the original safety problems caused by aging iron infrastructure, they also are suitable for the distribution of hydrogen, allowing the decarbonisation of some of the harder to reach greenhouse gas emissions.

Other new infrastructure will also be needed in terms of dedicated Hydrogen pipelines, storage facilities and the means to distribute hydrogen to users in the transport sector.

5. Cost-benefit analysis of using hydrogen to meet Net Zero as well as the potential environmental impact of technologies required for its widespread use;

The Hydrogen economy is one where dynamic market failures are possible, providing multiple outcomes. As such, there is some requirement for government to make a degree of strategic commitment to overcome the numerous coordination issues associated with a structural shift to a new technology paradigm.

However low-carbon hydrogen deployment at scale for many of these applications show some advantages in terms of being lower cost, less disruptive to switch fuels and meeting the needs and expectations of existing gas consumers. In addition, hydrogen is an important technology option for decarbonisation at scale.

6. The relative advantages and disadvantages of hydrogen compared to other low-carbon options (such as electrification or heat networks), the applications for which hydrogen should be prioritised and why, and how any uncertainty in the optimal technology should be managed.

The UK is starting from a position of a developed gas infrastructure and familiarity of consumers and businesses with gas supply. For example, 50.9mtoe of oil and gas was consumed by industrial, service, and residential sectors in 2019, of which 96% was used for heating. 85% of this energy demand was provided by natural gas, making hydrogen an attractive route to decarbonise heat requirements in terms of the degree of potential disruption. There is also considerable potential in the transport sector for hydrogen, especially for heavy freight and marine transport.

Hydrogen may not be the ideal solution to all these segments of energy demand and in some case alternatives such as electrification may be preferable. However low-carbon hydrogen deployment at scale for many of these applications show some advantages in terms of being lower cost, less disruptive to switch fuels and meeting the needs and expectations of existing gas consumers.

An Energy Networks Association report in 2019 found that the alternatives to decarbonised gases would cost an additional £13 billion per annum out to 2050[1]. Indeed, for some industrial high-grade heat applications and process emissions hydrogen may be the only economically viable option without jeopardising UK businesses competitiveness.

(January 2021)

[1] *Pathways to Net Zero: Decarbonising the Gas Networks in Great Britain*, Navigant/ENA, October 2019