

Response from the Institution of Gas Engineers & Managers (IGEM) to the All Party Parliamentary Group on Hydrogen Inquiry: How the UK's Hydrogen sector can help support the UK's economic recovery

IGEM are strong advocates for hydrogen's potential role in the UK's green economic recovery and we support the UK gas network companies' commitment to develop the world's first zero carbon gas grid - investing £900m collectively to achieve that goal¹. As well as developing the first Hydrogen Technical Standards IGEM have been working closely with industry to support the feasibility and safety evidence base for scaling up low carbon gases and hydrogen into the existing UK gas network.

Incremental steps are being made in the right direction, and with effective and ambitious policy support and regulatory frameworks moving forward, the gas industry is poised, ready to implement a range of hydrogen development projects that will boost investment, create jobs and play a significant role in the UK achieving a more sustainable and greener economic recovery.

Hydrogen – An integral part of a decarbonised future

Hydrogen has an important role to play in the UK's decarbonisation transition, with the Committee on Climate Change stating that there is no realistic scenario which enables the UK to reach net zero by 2050 without clean hydrogen playing a key role in decarbonising heat, transport, power and industrial processes².

Hydrogen offers a solution for the 'hard to abate' sectors (heating, transport and industry) where electrification is ineffective, impractical or too costly. Repurposing gas network infrastructure for use with hydrogen can help decarbonise heating for homes, businesses and industrial processes – with gas appliances and equipment being used in broadly the same way by consumers and industry as they are now³.

This model can provide considerable flexibility to meet the variations in gas demand due to weather changes – meeting storage challenges through the network's capacity to store gas within the distribution system itself⁴. With the peaks and troughs of renewable electricity capacity, hydrogen can provide back up when wind and solar generation is insufficient, and any excess electricity used to produce hydrogen.

In terms of wider applications, it has also been acknowledged that hydrogen can play an important role in decarbonising transport, with compelling cases being made for use in heavy goods vehicles, buses and trains⁵.

Minimise the costs of decarbonisation

By leveraging existing gas infrastructure to transport low carbon gas such as hydrogen can reduce the costs associated with the UK energy transition. Analysis prepared for the National Infrastructure Commission indicated that re-purposing the gas grid to deliver low carbon hydrogen is the lowest cost option under most scenarios studied⁶. A more recent study produced by Navigant, on behalf of the Energy Networks Association, reports that in a 'Balanced Scenario' (where renewable and low-carbon gases are used in a balanced combination with low-carbon electricity), the cost is lower than a fully 'Electrified Scenario' by £13bn/year, equivalent to 12% of total energy system cost in 2050⁷.

¹ [Energy Network's Association](#), *Gas Goes Green 'Our zero carbon commitment'*, May 2020

² [Committee on Climate Change](#), *Net Zero: The UK's contribution to stopping global warming*, May 2019.

³ [PolicyConnect](#), *Next steps for the gas grid: Future gas series part 1*, September 2017

⁴ [Institution of Engineering & Technology](#), *Transitioning to hydrogen: assessing the engineering risks and uncertainties*, June 2019

⁵ [Cadent](#), *Network-supplied hydrogen unlocks low carbon transport opportunities*, June 2019

⁶ [Element Energy and E4tech](#), *Cost analysis of future heat infrastructure options*, March 2018

⁷ [Navigant](#), *Pathways to net-zero: Decarbonising the gas networks in GB*, October 2019

Lessons can be learned from the renewable electricity market and be replicated for hydrogen to reduce costs, create jobs and boost the economy whilst tackle carbon emissions. It is only through deployment of low carbon technologies at sufficient scale that a competitive supply chain develops, innovates, reduces costs and their potential is fully realised⁸. With sufficient scaling up and investment, the costs of low carbon and/or renewable hydrogen production can fall by as much as 60% over the next 10 years⁹.

The economic value of hydrogen

The transition to a hydrogen economy will require a significant level of capital investment, however if ambitious and targeted measures to scale up hydrogen production, storage and utilisation are implemented now, the economic value can be considerable. Through the Gas Goes Green programme of work, it has been indicated that transitioning to a hydrogen economy requires a £182bn investment – the return on which can be realised by 2045, including net benefits to customers of £89bn by 2050¹⁰.

Element Energy's recent analysis of the economic growth potential associated with Hydrogen, demonstrated how a world leading hydrogen economy in the UK could add up to £18bn Gross Value Added (GVA), were the UK to become a world-leading decarbonised economy (not only capable of decarbonising its own economy but also able to export low-carbon energy carriers such as hydrogen and electricity generated from hydrogen)¹¹.

Employment and upskilling opportunities

Hydrogen development has the potential to create upskilling opportunities and employment, ranging from craft skills, technicians, planning/design engineers, academic and industrial researchers through to project management and customer-facing roles⁴. Through a cross industry-academia coordinated strategy, the gas industry can successfully upskill existing staff and develop a range of education, training and apprenticeship programmes to attract new entrants and career changers to new roles.

Element Energy's same study on GVA also modelled how 221,000 jobs can be created by 2050, were the UK to become a world-leading decarbonised hydrogen economy¹¹. Recent research by Development Economics for National Grid found that to get the UK to net zero, the energy sector as a whole must recruit for 400,000 jobs by 2050¹².

What steps should the UK government be taking?

- Amend the Gas Safety Management Regulations (GSMR), to allow hydrogen blending into the existing gas networks – thus stimulating hydrogen production investment.
- Develop the commercial models and regulatory/funding mechanisms to unlock private sector investment in hydrogen and support growth of a hydrogen economy.
- Mandate the use of hydrogen-ready boilers as part of the Future Homes Standard 2025 – the first of which have already been developed.
- Take decisive action on the CCUS hub investment announced in the March Budget – to expedite the transition towards large scale clean hydrogen production.
- Commit to a much bigger role for hydrogen in transport decarbonisation by using the UK bus fleet as a testbed for scaling up deployment through 'All Hydrogen Bus Town' Projects – and leveraging the investment in hydrogen and gas infrastructure across both heat and transport.

⁸ [PolicyConnect](#), *Producing Low Carbon Gas: Future Gas Series Part 2*, July 2018

⁹ [Hydrogen Council](#), *Path to hydrogen competitiveness*, January 2020

¹⁰ [Energy Networks Association](#), *Gas Goes Green 'Hydrogen: Cost to consumer'*, May 2020

¹¹ [Element Energy](#), *Hydrogen for economic growth: Unlocking jobs and GVA whilst reducing emissions in the UK*, November 2019

¹² [National Grid](#), *Building the net zero energy workforce*, January 2020