

Hydrogen in the UK: Working from the Future

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Policy Context: The UK government is seeking to establish a hydrogen energy sector to support its net zero mandate.

Key research findings: The UK has the geological and technological potential to scale fossil hydrogen paired with carbon capture and storage (CCS) relatively quickly to reduce carbon emissions, but ambitions hinge on social acceptability. Developing a renewable-based hydrogen sector is more acceptable and offers greater export potential, but all facets of the value chain need to be advanced simultaneously.

Key policy recommendations: Pair hydrogen policy with domestic communication and engagement campaigns presented to local communities. Fossil hydrogen should solely be dedicated as a briefly used precursor to renewable hydrogen.

Key research findings

Dr. Szabo's [research](#) analyses the political economics of hydrogen in the UK's energy transition. It suggests that **hydrogen has a key role to play, but this must be renewable energy-based and engage the broader public.**

- > **'Fossil hydrogen' paired with CCS can accelerate the adoption of the hydrogen economy** by delivering ample supply in a relatively narrow timeframe (first projects are slated for 2027). Oil and gas companies are overcoming the technological barriers to CCS, but its political acceptability is low amongst the general population which limits its application to industry.
- > **Renewable energy-based hydrogen has a central role to play in the UK's low carbon future**, but the government and other public institutions need to develop the entire supply chain that includes renewable electricity output, electrolyser manufacturing, hydrogen transit and storage capacities, and demand. Without the holistic development of the sector, it will not scale as planned.
- > **Hydrogen in heating is a contentious issue** since it offers a seemingly straightforward technology to decarbonise household heating, but without communication, local engagement, and locally produced green hydrogen, it will not be socially palatable.
- > **The skewed structure of financial incentives in the energy system needs to be corrected to facilitate the energy transition.** Pertinent issues include, levies on electricity need to be reduced to support heat pumps and regulations applicable to hydrogen need to be simplified.

Policy recommendations

- > **Fossil hydrogen projects paired with CCS need to be scaled quickly, but their specific applications clearly identified beforehand.** Fossil hydrogen paired with CCS should substitute existing forms of hydrogen demand and decarbonise industry. For this to make progress, there is a need to move from a strong focus on production and transit to demand.
- > **Hydrogen is not natural gas and it should be treated accordingly.** Respective strategy, regulations, subsidies, infrastructure, value chains need to be developed as if it were a fundamentally new commodity. Regulations need to be curtailed to allow for actors to experiment within the confines of government decarbonisation strategy and infrastructure development plans should move from relying on a natural gas-to-hydrogen transition to focusing on its specific applications – it may not need an extensive network, especially early on.
- > **Renewable energy-based hydrogen should be approached in a holistic manner.** Government policy needs to simultaneously support renewable energy supply chains and their deployment as well as electrolyser supply chains and the hydrogen ecosystem. Energy and industrial policy are closely interwoven, underpinning decarbonisation and economic activity.
- > **An inclusive and educative dialogue is essential to enable the heating sector's energy transition.** Hydrogen may seem to offer the less socially challenging low carbon alternative to the current natural gas dominated heating system, but implementing a transition will be trying if the transition is not undertaken with the thorough engagement of local communities. Effective communication is essential to highlight the reasons for the shift in technologies, and local communities need to be offered alternatives to tailor their participation and technology choices to their preferences.

Work with John Szabo

John Szabo completed this work as a British Academy Visiting Scholar at Brunel University London, where he was hosted by Gareth Dale. John is a Research Fellow at the Centre for Economic and Regional Sciences, Budapest. His work revolves around the energy-society nexus with an emphasis on gaseous energy carriers and their transitions.

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