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What role will hydrogen fuel play in the UK’s net zero goals?

**Clean fuel has been subject to a number of false starts, but following the government’s UK Hydrogen Strategy in August 2021, mirroring the EU’s sentiments towards hydrogen, there seems to be genuine hope that it will take off in the UK and form a useful part of the UK’s path to net zero.**

The UK has committed to achieving net zero by 2050 and a 78% reduction in emissions from 1990 to 2035. Achieving this will be likely to require a small but powerful arsenal of low carbon fuel options. The government’s analysis suggests that 20-35% of the UK’s energy consumption could be driven by hydrogen by 2050. Demand for hydrogen has grown more than threefold since 1975. This will inevitably grow further in coming years and raises questions such as how hydrogen will be produced sustainably? How will the UK create a ‘hydrogen economy’? What legal considerations must those looking to produce or harness power take into account?

How will hydrogen be produced and used?

**There are two key methods for the production of hydrogen that the government will support:**

* Green hydrogen is produced by splitting water using electrolysers. The process is carbon-neutral, using renewable energy, but it is very expensive and will unlikely show significant decreases in expense in the foreseeable future; and
* Blue hydrogen is produced by splitting natural gases. It is quite similar to a process called grey hydrogen, but uses carbon capture technology to store excess CO₂ underground, making this process suitable for use in achieving the UK’s net zero goals.

Beyond these two, there are methods known as brown hydrogen, which uses lignite coal, and black hydrogen, which uses bituminous coal. It is clear that neither of these will be suitable for the use in the UK’s net zero strategy.

Hydrogen power will be most useful in the immediate future in areas that are not easy to ‘electrify’. One example of this is the transport sector. Cars are easily electrified and we are seeing a clear policy shift in this direction, however, airplanes and ships remain large sources of carbon emissions but are not so easily electrified. For these forms of travel, hydrogen-based fuels may prove to be the missing link to achieving net zero.

Another area which the government has committed significant resource to is trialling hydrogen for heating homes and cooking. In the November 2020, the Prime Minister’s Ten Point Plan for a green industrial revolution included the creation of a hydrogen-powered neighbourhood by 2023, village by 2025 and a town by 2030.

UK Hydrogen Strategy

The UK’s current capacity to produce hydrogen power is relatively scarce – this expected to change in the 2020s. The UK Hydrogen Strategy sets out how the UK will overcome the technological barriers to effective hydrogen power production. The Strategy includes a £240 fund for investment into production capacity, plans for private sector investment, business models and revenue mechanisms, as well as plans for improvements to public and consumer awareness.

The UK’s commitments to using hydrogen power have started to be mirrored in the private sector. Budweiser Brewing Group has announced its brewery in Monmouthshire, Wales will become the first brewery to be powered by hydrogen. It is expected to cost £100m and create approximately 30,000 jobs. JCB has also announced a £100m project to equip its vehicles with hydrogen engines. Commenting on the project, Lord Bamford, the group’s chairman, said that, “[w]e are investing in hydrogen as we don't see electric being the all-round solution, particularly not for our industry because it can only be used to power smaller machines.”

The ’Hydrogen Economy’

The UK’s hydrogen strategy rests on the creation of a hydrogen economy. The term is not a new one but one that will be used more and more in coming years, so it is important to ask what it means and how it will be achieved.

A hydrogen economy could merely be defined as an economy that utilises hydrogen power and its commercial advantages to its full benefits. Achieving this, however, presents significant barriers. The UK’s hydrogen strategy lists these as:

* Cost;
* Technological uncertainty;
* Policy and regulatory uncertainty;
* Need for enabling infrastructure;
* Need for supply and demand coordination; and
* Investment and deployment.

Public sector investment can go some of the way to overcoming these hurdles, however, real long term growth and the creation of a hydrogen economy requires the commercialisation of hydrogen power to stimulate significant private sector investment, as well as regulatory frameworks that drives, not inhibits, growth. More specifically, the government has committed to co-invest and de-risk ‘first-of-a-kind’ projects through the Net Zero Hydrogen Fund and create long term revenue support through the Hydrogen Business Model. These will work alongside demand-side intervention, such as established carbon pricing strategies (such as the UK Emissions Trading Scheme), the creation of a Low Carbon Hydrogen Standard to provide confidence in the sustainability of hydrogen to end users and sector-specific policies that promote low carbon energy sources.

Creating a strong domestic hydrogen economy will mean that the UK can avoid over-reliance on hydrogen imports, which would be particularly problematic if other countries do not invest in hydrogen power and there is no mature global market for hydrogen for years to come. Domestically, benefits include growth in sustainable and high-quality jobs, affordable use of hydrogen power across suitable sectors and a valuable contribution to the wider economy. If the UK acts quickly to become a hub for hydrogen production, it leaves UK hydrogen producers well-placed in international markets to become high value exporters when international demands takes off.

The UK’s headline 5GW promise (5GW of low carbon hydrogen production capacity by 2030) could mean in excess of 9,000 jobs and £900m gross value added by 2030. Under the government’s assessment, a high hydrogen scenario could yield up to 100,000 jobs and £13 billion gross value added by 2050.

Legal Considerations

There is currently little hydrogen-specific regulation, however, this may change in coming years. Currently, those generating or transporting hydrogen power must do so within the confines of the current regulatory framework. Anyone engaging in gas supply, shipping or transportation must be licenced to do so under the Gas Act 1986. To be licenced under this regime, the provider must have plans in plans to begin licensed activities and permit a risk assessment by Ofgem. Further to this, a licencee, must comply with the relevant industry codes such as the Uniform Network Code, the Independent Gas Transporter Uniform Network Code, the Supply Point Administration Agreement and the Retail Energy Code.

Health and safety regulations should also be considered under the Gas Safety (Management) Regulations 1996, Pipeline Safety Regulations (1996), The Planning (Hazardous Substances) Regulations 2015 and/or the Control of Major Accident Hazards Regulations 2015, the Hazardous Substances Regulations and The Dangerous Substances and Explosive Atmosphere Regulations 2002. Gasses are evidently a heavily regulated area so particular care should be taken in ensuring compliance.

Property and planning considerations will undoubtedly be important when either harnessing or generating hydrogen power. If using hydrogen on a site, access rights will be an important issue so that hydrogen can be transported on and off the site and so that any necessary equipment/infrastructure can be established on or off site. Depending on the size of the project, a development consent order will be required under the Planning Act 2008 or the Town and Planning Act 1980. For larger projects, procurement methodologies/property structures may be used in its development. These can be complex but also highly useful ways of de-risking projects, which is particularly important in this emerging market.

Competition regulations may also be an issue for those using or generating hydrogen power. Subsidiary control (the post-Brexit inception of state aid) may be a consideration should a government grant be used. The government has also commented that further competition regulation may be required to ensure a level playing field.

Planning for your future

If you would like advice in relation to any of the aspects discussed in this article, please do not hesitate to get in touch.

**Get in touch**

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