BEIS consultation on Business Model for Low Carbon Hydrogen

https://www.gov.uk/government/consultations/design-of-a-business-model-for-low-carbon-hydrogen

Our key response related to a proposal of a support scheme for green hydrogen injection into the gas grid.

Executive Summary

As our analysis suggests, the production and injection of green hydrogen without tariff support is not economically viable. The grid, however, provides great potential for the rapid rollout of low-carbon hydrogen however due to its storage capabilities and blending with natural gas. We propose that a GGSS tariff for H2 injection is adjusted based on the relative carbon savings (i.e.: if biomethane receives 5.5 p/kWh to achieve a 65% overall CO_2 saving, then H_2 should receive 8.5 p/kWh [5.5*100/65]). Such a scheme could be employed over the next 3-years to simulate the uptake of electrolysers for the purpose of green hydrogen production/grid injection.

Proposal for GGSS support for Green H2 into the NTS

Injection of Green H2

Injecting green, electrolysis-produced hydrogen into the gas grid to displace natural gas and selling it at the wholesale price [p/kWh] of natural gas will not provide a viable business case on its own. Green hydrogen injection into the gas grid requires a financial support mechanism similar to the current Green Gas Support Scheme (GGSS). This scheme could be adapted to include support for injection of clean green hydrogen based on the equivalent CO2 emissions savings compared to biomethane. For example, if the GGSS tariff is effectively paying for a 65% overall reduction in CO2 emissions (compared to natural gas), then green hydrogen, which offers a 100% saving, should be eligible for a proportional tariff.

Supply chain development

In practice, injected green H2 would blend in the gas grid close to the injection point but the green certificates associated with each kWh of H2 injected could be linked to I&C customers who are aiming to reduce natural gas use. The combination of H2 commodity value, GGSS support and Green Gas Certificate value could make the injection of H2 into an economic option which would help to develop the supply chain in 2022-25 in the same way the original RHI was successful in creating the biomethane supply chain in 2012-16.

Indicative Support Tariff

One option could be to provide additional funding within a GGSS Green H2 scheme that is sufficient to stimulate 5 – 10 projects over the first 3 years, with each producing ~3 MWe of electrolysis equivalent (equivalent to 670 Nm3/h of H2 into the grid or 17,750,000 kWh/annum assuming an 80% load factor). If the support level was same as GGSS (5.5 p/kWh) but increased to around 8.5 p/kWh to reflect the 100% GHG saving, then the total cost of 5 such projects would be around £7,500,000 per annum (based on the 80% load factor).

Green H2 as Renewable Electricity Storage and Renewable Tariffs

The green H2 injected into the gas grid and used to displace natural gas should also be considered a H2 storage project, with the kWh of H2 stored as blended natural gas. As such, we believe the renewable electricity project support charges that apply to electricity loads (funding ROCs, FITs etc) should not apply to electrolysis for H2 injection into the gas grid in the same way that they do not apply to electricity going into battery storage. If the H2 is made in July and stored as natural gas, it will be used to produce electricity in January at a low wind time, so the electricity surcharges will be paid at that time by the electricity consumer. There is no net cost to this policy change but it would help to make green H2 injection into the gas grid an economic proposition. There is also an element of bypassing the engineering challenges associated with H2 storage.

Benefits of Injection into the NTS

For injection directly into the National Transmission System, there is no need to enrich with propane as the flow weighted calorific value regime does not apply. The advantage of injecting green H2 into the gas grid is that, on day one, all the H2 can find a consumer in the market (e.g. the I&C customer). Producing green H2 to use as a bus fuel, for example, requires the buses to be available on day one and load matching. This does not happen in practice as it is more likely to require a 3-year build up. Having a green H2 ‘sink’ in the gas grid, this can facilitate the use of green H2 by trucks and buses.

John.baldwin@cngservices.co.uk

Managing Director, CNG Services Ltd

07831 241217