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Date: 27th October 2023
Letter Ref: EQ-L-0039

To:
DESNZ Hydrogen Transport and Storage Team
By Email: hydrogentransportandstorage@energysecurity.gov.uk

Dear Sir/Madam,

RE: Equilibrion Consultation Response on Hydrogen Blending into GB Gas Distribution Networks

Equilibrion is a new company, set up to realise the potential of nuclear energy for decarbonisation including for sectors where hydrogen is a viable long-term and sustainable fuel. Our specialism lies in hydrogen production and the role that nuclear electricity and heat inputs can play in producing large quantities of low-carbon hydrogen. By operating 24/7 and leveraging heat to produce hydrogen at high efficiency, nuclear provides a pathway to vital additional production potential.

Equilibrion is pleased to provide this response to the consultation, which concerns nuclear-enabled hydrogen production and we thank DESNZ for the opportunity to provide input.

Our Response

Question 3. Do you have any comments on our views of the strategic role of blending, as described in this chapter? Please provide evidence to support your response.

> *Our underlying message is that nuclear can play a key role in hydrogen production to support the transition of the gas network to 20% hydrogen blends and increase confidence levels that hydrogen will be available in the required quantities, when and where it is needed.*

Hydrogen blending to 20% requires the production of vast quantities of low-carbon hydrogen. The confidence that this capacity will be available when and where it is needed is key to determining future policy on blending.

Nuclear provides a qualifying production pathway to low-carbon hydrogen and offers a number of opportunities and advantages within a supportive policy environment (Annex A). Hydrogen produced from nuclear energy inputs could be used for blending but there is a risk of it being overlooked, in part due to omissions in past government publications including 2021 Hydrogen Production Costs report. That work does not assess nuclear-enabled hydrogen production costs, so there is a gap in the available data. This gap was partially filled by work referenced in the July 2022 update to the Hydrogen Strategy, which included a specific annex on nuclear-enabled hydrogen. The referenced work assessed that nuclear-enabled, heat-assisted hydrogen production could be the same or lower cost than renewable-produced hydrogen based on UK Government predictions of future nuclear costs.

Equilibrion believes that nuclear-enabled hydrogen provides an opportunity to unlock larger quantities of production through a diverse, secure route and that considering the technology could overcome some of the potential challenges in blending strategy. We believe this is important to robust decision-making and that fully considering dedicated nuclear-enabled heat-assisted hydrogen production could lead to the costs and challenges to blending being assessed as lower than in scenarios not considering nuclear.

We therefore encourage DESNZ to seek further information on nuclear-enabled hydrogen and include the technology fully as part of decision-making on blending. We would be pleased to engage further with the team if this would be of interest and provide various relevanet further information that we believe would be of interest.

We hope that our response is helpful and look forward to seeing the outcome from the consultation.

Yours sincerely,

Dr Philip Rogers

Director

Annex A

The UK benefits from progressive policy and world-leading capability on nuclear and this is assisted by cross-party support, majority public support and recognition that nuclear has a role to play in hydrogen production and the decarbonisation of many energy end-use sectors. Current relevant policy and progress on nuclear includes:

- An ambition for up to 24GW new nuclear by 2050;
- The recent initiation of Great British Nuclear (GBN), an arms-length government tasked with delivering the UK nuclear deployment programme. GBN is currently running a Small Modular Reactor (SMR) competition to select the best SMR technologies to deploy in the UK;
- An on-going new build project at Hinkley Point C and the ambition for at least one further Final Investment Decision (proposed to be at Sizewell C) by the end of the current parliament;
- Inclusion of nuclear as a qualifying route to low-carbon hydrogen in the UK Hydrogen Strategy and supporting work such as the Low Carbon Hydrogen Standard as electrolytic hydrogen and in the same policy category as renewables;
- Inclusion of nuclear as a qualifying route to hydrogen under the Renewable Transport Fuels Obligation;
- Proposed inclusion of nuclear as a route to low-carbon hydrogen for use in the production of Sustainable Aviation Fuel;
- A plan for an autumn 2023 consultation on nuclear siting policy, which could increase the number of available nuclear deployment sites.

What sets nuclear apart in its ability to support future hydrogen production is:

1. Ability to provide large quantities of electricity 24/7 in the same location that can be connected directly to hydrogen production;
2. Predictable operation that could reduce overall system costs and hydrogen storage requirements compared to a fully renewable system;
3. No reliance on fossil fuel inputs for operation;
4. Proven technology;
5. Ability to deploy production capacity according to requirements and in a variety of locations as determined by system needs;
6. Access to high-temperature heat alongside electricity production to deliver higher efficiency hydrogen production using solid-oxide electrolysis technology;
7. A carbon intensity lower than renewable and CCUS-enabled hydrogen pathways when considering lifecycle emissions associated with input materials, construction decommissioning and waste management. Note that the Low Carbon Hydrogen Standard suggests nuclear-enabled hydrogen has higher carbon intensity than wind-enabled hydrogen but this does not consider lifecycle emissions.