The Hydrogen Energy Association's response to the Department for Energy Security and Net Zero: '**Hydrogen Blending into the GB Gas Transmission Network**'

September 2025

The Hydrogen Energy Association (HEA) is the leading pan-UK trade body in the hydrogen energy sector, with a mission to support the growth of our members and the sector, and to ensure that the right policy framework is in place. Our 100 plus member companies represent over 200,000 employees globally, with combined revenues over £400 billion, and cover the entire value chain from raw material sourcing, to supply chain and components, financing, professional services, B2B and consumer facing solutions.

Question 1:

a. **Do you agree with the assessment of the impacts of blending up to 2%, 5% and 20% hydrogen by volume on NTS end users?**
   The members of the HEA broadly agree with the assessments of the impacts on blending from a technical viewpoint. We agree that up to 2% blending is feasible with negligible impact on the majority of end users.[1] 5% blending may be viable with limited modifications as we understand that most natural gas equipment remains reliable up to 10% without adjustments.[2] However, we acknowledge that blends of 20% or higher could introduce significant challenges. Challenges with metallurgy changes may lead to hazardous area certification issues, and metering impacts, particularly for volumetric customers. When considering the effects of hydrogen on metals, it is necessary to understand the type of metal and the pressure in the pipe, as well as the percentage blend. This means that a blend of 20% hydrogen in one pipe might not cause embrittlement, but in a different pipe, at a different pressure, it might do. The HEA recommends asset surveys to establish actual conditions on specific assets and minimise the risk of assumptions.[3] We recommend engagement with projects, like SGN's LTS futures[4], that have been testing hydrogen compatibility with existing pipelines to understand the impacts further. Overall, we see significant benefits for the hydrogen industry to allow for a higher blending percentage but acknowledge that these come with complications for end users.

b. **Are there any further operational and/or financial impacts on end users we should consider? Please provide evidence to support your response.**

   The HEA recognise a number of financial and operational impacts that should be adequately considered for the blending of hydrogen.

[1] https//assets.publishing.service.gov.uk/media/687f6d5228f29c99778a743c/national-transmission-system-hydrogen-blending-study.pdf
[2] https://docs.nrel.gov/docs/fy23osti/81704.pdf
[3]https://www.energy.gov/sites/prod/files/2014/03/f12/webinarslides_h2_compatibility_materials_081313.pdf
[4] https://www.sgn.co.uk/about-us/future-of-gas/lts-futures-0

The association has considered the system-wide financial benefits of blending. We understand hydrogen blending as an offtaker of last resort to be a positive enabler for hydrogen production projects to support operations should suitable primary offtakers (transport, heat, industrial) are not available. Furthermore, this reduces perceived project risk which can lower Weighted Average Cost of Capital (WACC) and strike prices under the Hydrogen Production Business Model (HPBM). Lowering the HPBM strike prices this directly lowers the Gas Shipper Obligation, which in turn is passed on to all end users.

The HEA have also considered the impacts on calorific value for volumetric metering. In the case of large offtakers with a network operators billing point and a gas metering point/chromatograph are unlikely to be affected as they will be able to pay for their BTU equivalent. For smaller or medium-sized customers with volumetric metering, impacts are marginal and expected to fall within existing calorific value tolerance ranges already applied in the distribution networks. We therefore do not expect a material adverse financial effect for most end users.

The HEA would also like to stress the importance of market management when blending hydrogen into the existing gas network. Caution must to be taken to ensure blending does not surge out primary offtakers. The experience with biogas blending demonstrates this risk: once the grid became the major offtaker, biogas was less available for other markets. A similar outcome for hydrogen could limit supply for sectors such as transport or high-temperature industry. The HEA would require further details on how DESNZ intend to manage demand (e.g. pricing) to comment on if this would effectively mitigate this risk.

Blending could also provide value as a temporary measure for projects seeking to connect to future large-scale hydrogen infrastructure such as the Scottish leg of Project Union.[5] In this context, blending can help projects bridge the gap until dedicated transmission routes are available, supporting early deployment while maintaining alignment with long-term market structures.

Finally, the HEA sees the importance of Hydrogen blending in supporting the deployment of renewable energy. By providing a low-cost market for surplus renewable generation, electricity that might otherwise be curtailed can be converted into hydrogen, stored, and blended into the gas network. This not only helps manage intermittency and maintain grid stability but also creates a demand-risk management tool that facilitates investment in new renewable and electrolyser capacity.

Question 2: **Do you agree that if transmission blending is enabled and commercially supported by government, the most appropriate mechanism would be via the HPBM? Please provide evidence to support your response.**

The HEA supports the use of the HPBM as an appropriate mechanism for enabling transmission blending. We feel that introducing new separate mechanism for blending will add complexity and administrative burden to an already difficult to navigate policy landscape. By following the existing framework, this reduces possibility of duplication and provides a known and testing route to support

[5] https://www.nationalgas.com/future-energy/hydrogen/project-union

blending. We see that blending can serve as an "offtaker of last resort", which can act in the interim before 100% Hydrogen pipelines to stabilise investment in hydrogen production by mitigating demand risk. Blending can also deliver a reduction on operating costs for electrolysers by allowing them to operate in accordance of both the wider energy system and the traditional hydrogen offtakers. In conclusion, we support the use of the HPBM, as it provides simplicity, cost-effectiveness, and investor confidence with tangible system benefits.

Question 3: **Do you agree with our minded to position to allow both the gas transmission network operator and gas shippers to purchase hydrogen produced for blending? Please provide evidence to support your response.**

The HEA agree that both network operators and gas shippers should be allowed to purchase hydrogen for blending. In this case changes to the Low Carbon Hydrogen Agreement (LCHA) will be required to make offtaker entities allowable Risk Taking Intermediaries (RTIs).

Question 4: **Do you agree that working within the current gas billing arrangements will not result in an increase in billable usage and gas bills for end users connected to the NTS, should transmission level blending be enabled by government? Please provide evidence to support your response.**

The HEA broadly agrees with the assessment that working within the current gas billing arrangements should not increase billable usage or gas bills for most end users connected to the NTS, particularly at the proposed 2% blending level. As noted in our response to Question 1, the impact on calorific value for volumetric customers is marginal and falls within existing tolerances, while larger offtakers with calorific metering are unaffected.

We also note the wider financial benefit blending provides through its effect on the Hydrogen Production Business Model (HPBM). By acting as an offtaker of last resort, blending reduces demand risk for hydrogen producers, which can lower strike prices and ultimately reduce the Gas Shipper Obligation passed through to consumers. This positive system-wide effect should be weighed alongside any operational costs.

However, the HEA have identified some potential network operator costs that require careful consideration. Firstly, transmission and distribution operators may need to invest in modifications, monitoring, and maintenance to accommodate higher blends. The allocation of these costs remains unclear: should they fall to bill-payers through network charges, or should hydrogen producers contribute via a fee to reflect the benefit of access? Without clarity, there is a risk that these additional costs could be indirectly passed on to consumers through general price rises, even if headline billing arrangements remain unchanged. To provide transparency, the HEA recommends scenario modelling, informed by up-to-date NTS asset data, to quantify potential network operator costs and test different cost allocation mechanisms. This would help ensure that consumer bills are not inadvertently affected by hidden or indirect cost transfers.

On balance, the HEA agrees that current billing arrangements are fit for purpose at low blend levels, but Government must also address the question of network cost recovery to ensure confidence that bills for end users will not rise indirectly as a result of blending.

Question 5:

a. **Do you agree with our minded to position to only consider further whether to support and enable transmission blending of up to 2% hydrogen by volume? Please provide evidence to support your response.**

The HEA would encourage government to consider adopting blending of 5% as the "minded to position". This blend level provides a more robust offtake of last resort and allows more volume production. This could enable significant economic benefits, especially in the case of the Project Union electrolysers in Scotland with blending of up to 5% could unlock a potential 1.2GWe of hydrogen energy by 2035 capacity compared to around 500MWe with a 2% blend limit.[6]

We agree with the assessment that a 5% blend would require some marginal changes to the existing network, but we believe that the NTS operator(s) have the capability and skills to understand the conditions of their assets and the chemistry involved in these changes. This means they should have the ability to set their own safety limits for blends within the overall guidance set out in the Health and Safety At Work Act, industry best practice, and their own network codes.

The HEA acknowledges that blending of up to 2% of hydrogen has minimal impact on end users and would accept this as a starting position to enable further transition. However, the sector would prefer to see a higher blend limit.

b. **Do you have any further concerns on enabling blending up to 2% hydrogen by volume into the NTS? Please provide evidence to support your response.**
The HEA firmly agrees that coordination with European standards is an important factor to consider when ensuring interconnector compatibility and bidirectional flows. We also would like to reiterate our previous point from Q1b, that management of the market must be carefully considered to avoid the pipelines becoming the main offtaker and impacting the availability of hydrogen for primary offtakers (transport, heat, industrial), as has been the case for biogas blending.

c. **Is there a maximum level of blend that would be feasible with minimum modifications for sites connected to the NTS? Please provide evidence to support your response**
The HEA believe that 2% is appropriate with minimal modifications to the NTS but the sector would welcome higher blends.

Question 6:

a. **We welcome feedback on the economic assessment presented and any further analysis on the costs and benefits of transmission blending.**

The HEA would like to stress the importance of fair assessment when conducting the economic assessment. The economic modelling estimated figure of £300 million for grid connectors does not reflect that fact that not all hydrogen sites will choose to blend. More realistically, most sites will not choose to blend, thus the total figure of connector cost will be reduced.

Additionally, our previous points for Q1b and Q5a, recognise the economic benefits of hydrogen blending by encouraging higher electrolyser capacity and blending as a "offtake of last resort" lowering WACC and strike prices. Electrolyser deployment means that blending

[6] Calculations in Annex A

can unlock earlier deployment of capacity by providing a reliable interim market, enabling higher build-out ahead of dedicated hydrogen infrastructure. Allowing blending now will help build electrolyser capacity, particularly in Scotland, in advance of the full Project Union transmission pipeline. By bridging the timing gap, blending supports the staged development of the UK hydrogen backbone while ensuring assets and skills are ready when large-scale transport becomes available.

Annex A:

Question 5a Calculations

Blend percentage	2%	5%	Unit
2035 potential volumes	3,000,000	7,500,000	MWH HHV
Potential MW H2	342	856	MWth HHV
Potential MWe	489	1,223	MWe

2035 potential volumes based off *Figure 3: Potential volumes of blended hydrogen between 2025 and 2050 (TWh)* from consultation document.

No adjustment for capacity factor as assumed projects would likely want to be blending at the same time.

High level assumption of 70% electrolyser efficiency.