REA Policy Proposal – 'alternative' hydrogen pathways

Briefing for: DESNZ
Purpose: To propose policy support for alternative hydrogen production pathways
Date: May 2023

Key Points
The focus of hydrogen policy to date has been on electrolytic and methane reformation. The first allocation round for support for either capex or ongoing revenue support (Hydrogen Production Business Model - HPBM) was only open to electrolytic hydrogen, with the results published 30 March 2023. The Low Carbon Hydrogen Standard (LCHS) supports a wide range of production pathways for hydrogen, and DESNZ has expressed willingness to expand the technologies covered in future allocation round. This paper looks to support DESNZ in this aim, so that alternative hydrogen pathways are included in the second allocation round (due Q4 2023) onwards.

1. Introduction

The UK Government's Hydrogen Business Model (HBM) aims to achieve a net-zero economy by 2050 by supporting low-carbon hydrogen production pathways. Currently, the HPBM focuses on electrolytic or methane reformation (with CCS) hydrogen production only.

There is a risk that other pathways are overlooked. These are typically conversion technologies such as gasification, whose feedstocks can be biomass, waste or a mixture of the two.[1] A wide range of production technologies are also used, and the outputs produced can be used to make hydrogen for use as a fuel, as a precursor to other fuels (such as Sustainable Aviation Fuel) or for non-fuel purposes, such as inputs to chemical/manufacturing industries.

These pathways are termed 'alternative' production pathways for the purposes of this paper.

The REA has a number of member forums in this area. Our hydrogen group has a significant interest in these pathways, building on our longstanding gasification and pyrolysis group. We also have a number of members with existing waste to energy plants that are looking at ways in which they can invest in this area. We have engaged directly with BEIS/DESNZ on these pathways over the last two years and look forward to continued work – via the forthcoming HAR2 Market Engagement process and informally as needed.

[1] REA members are also interested in producing electrolytic hydrogen using electricity produced from combustion of bioenergy. This electricity is not counted as renewable for the purposes of GHG emissions, meaning this pathway is effectively ruled out. This pathway is not the subject of this paper, as to enable such hydrogen to be supported would require a change to the GHG methodology rather than an additional production pathway being supported under the Hydrogen Business Model – if the GHG methodology were changed such projects would be able to apply for support under the current electrolytic pathway.

2. The need for alternative pathways to be included in the HPBM

While the HPBM primarily focuses on electrolytic hydrogen production, there is a need to explore alternative production pathways. This process is a promising alternative to electrolytic hydrogen. A particular attraction of these technologies where the feedstock is wholly or partially biogenic is that they can produce hydrogen with negative emissions.

The longer development cycles of alternative production pathways for hydrogen as compared to electrolytic projects require longer lead times and conditional precedents. Therefore, the eligibility criteria for the allocation round and conditions precedent within the Low Carbon Hydrogen Agreement (LCHA) should be closer to those for methane reformation pathways rather than electrolytic.

3. Framework policy for alternative hydrogen production pathways

Since a very substantial amount of policy work has already been carried out by the government, we have considered the issue of inclusion of alternative production pathways on the basis of what changes would be needed to the existing framework.

We note the revision to the **Low Carbon Hydrogen Standard**[2] (LCHS) that was published 21 April 2023. We welcome the inclusion of a 'counterfactual' approach to accounting for emissions from fossil residual waste, building on the work carried out in this area by the Department for Transport. Although there will doubtless be further details to iron out (and a further revision is expected by the end of 2023) we do not see any fundamental issue with the LCHS in enabling alternative production pathways to be supported.[3]

We have also responded in detail to the recent consultation on development of a **Low Carbon Hydrogen Certification Scheme[4].** Through its subsidiary (Renewable Energy Assurance Limited), the REA owns the Green Gas Certification Scheme, which has over 10 years of experience in running the UK's guarantee of origin scheme for biomethane and expects to issue its first certificates for hydrogen later this year.

We note the government's intention to move to **competitive allocation** of support in the mid-2020s, with a call for evidence to be published in Q2 2023. The REA and its members have considerable experience in the policy development and outcomes of the auctions run under the power Contracts for Difference and look forward to contributing fully to this process. The auction process for power CfDs is well-understood and would make a good starting point for applying this approach to hydrogen production.

Although we have not engaged in detail with our members on this point, it is unlikely that the approach taken for alternative production pathways would need to differ significantly from other pathways. The key design consideration will most likely be around times required to build and commission and whether separate 'pots' need to be set up for different pathways.

The **conditions precedent** would need to be adjusted to a reasonable development period. Although timings will vary by project, we suggest around 1.5 years for design and development, a further 9

[2] UK Low Carbon Hydrogen Standard: emissions reporting and sustainability criteria - GOV.UK (www.gov.uk)
[3] See footnote 1 above on treatment of electricity generation from bioenergy
[4] UK Low Carbon Hydrogen Certification Scheme - GOV.UK (www.gov.uk)

months to finalise legal agreements to get to financial close and 3-4 years for detailed design, construction and commissioning.

We do not see any reason why the **contract length** would need to be different for alternative pathways. Similarly, **indexation** of prices to CPI should also be appropriate – these projects have a diverse cost base so a measure that reflects general inflation makes most sense.

4. Eligibility criteria for alternative production pathways participation in allocation rounds

We have considered the eligibility criteria used for the first allocation round.[5] In our view, these need only minimal adjustment to also be appropriate for alternative production pathways. We propose the following:

1. **Located in the UK:** The project plant must be located entirely in the UK and the project representative's business must be registered in the UK
2. **Commercial operation date of four to five years after the allocation date:** This expanded timeline reflects the longer periods required for both construction and commissioning compared to electrolytic hydrogen
3. **Core technology at TRL7:** Projects must use core technology that has been tested in a commercial environment and is at Technology Readiness Level (TRL) 7 or higher
4. **New build:** This criterion is to ensure that the funding is used to support the development of new low-carbon hydrogen production capacity rather than the retrofitting of existing hydrogen production facilities. New production at existing sites should be included within this, and the application of this criterion should be sufficiently flexible to allow for phased projects
5. **At least one qualifying offtaker:** This criterion is to ensure that the produced hydrogen will have a market.[6]
6. **Has selected technology for the plant:** This criterion is to ensure that the project is well-planned, has a clear pathway to implementation and reinforces criterion 3 relating to TRL
7. **Minimum production of 5MW:** This criterion is to ensure that the project has a sufficient scale to have an impact on decarbonisation efforts. It is likely in any case that most projects would be at least this size
8. **Meet the UK low carbon hydrogen standard:** This criterion is to ensure that the hydrogen has a positive impact on decarbonisation efforts. The version of LCHS that is to be used must be specified at the time the allocation round rules are published and must not be changed (or at least, not to the project's detriment) between this date and the signing of the relevant LCHA
9. **Demonstrated access to finance:** This criterion is to ensure that the project has a clear pathway to financial close and can be successfully implemented. DESNZ will wish to review the application of this criterion in the first allocation round and may wish to tighten their approach on how this is demonstrated in future
10. **Planning permission:** To be eligible for funding, alternative production pathway projects must have secured planning permission. This criterion was not included in the electrolytic round. Given the complexity of many alternative production pathways, and the long timeframes needed to submit and approve planning applications we believe this is needed – and is in keeping with the approach taken under other support schemes such as the electricity Contracts for Difference and Tariff Guarantees under the Green Gas Support Scheme.

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[5] Hydrogen Business Model and Net Zero Hydrogen Fund: Electrolytic Allocation Round: guidance for applicants (publishing.service.gov.uk)

[6] As previously discussed, the REA disagrees with the decision to disqualify sale to risk-taking intermediaries as qualifying offtakes, but this paper is concerned specifically with alternative production pathways rather than wider hydrogen policy