



Department for
Business, Energy
& Industrial Strategy

BEIS Hydrogen BECCS Innovation Programme: Phase 1 Competition - Questions and Answers

7th February 2022

This document answers questions sent via email to H2BECCS@beis.gov.uk by the 12 noon deadline on 26 January 2022, following the launch of the [Hydrogen BECCS Innovation Programme Phase 1 Competition](#) on 12 January 2022.

All questions have been anonymised.

OGL

© Crown copyright 2022

This publication is licensed under the terms of the Open Government Licence v3.0 except where otherwise stated. To view this licence, visit nationalarchives.gov.uk/doc/open-government-licence/version/3 or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or email: psi@nationalarchives.gsi.gov.uk.

Where we have identified any third-party copyright information you will need to obtain permission from the copyright holders concerned.

Any enquiries regarding this publication should be sent to us at: H2beccs@beis.gov.uk



Update to the Competition Guidance Notes

Exclusion criterion (g) in Section 4.5 of the Competition Guidance Notes published on 12 January 2022 excluded the following from the scope of this programme: Technologies which generate hydrogen via electrolysis even when electricity has been generated from a biological source.

This exclusion criterion has since been amended and an updated version of the Competition Guidance Notes (Version 2) has been published on the [competition web page](#) and [Contracts Finder notice](#). Exclusion criterion (g) now reads: *Technologies which generate hydrogen from a non-biological feedstock, such as electrolysis using Alkaline, Polymer Electrolyte Membrane (PEM) and Solid Oxide Electrolyser (SOE). Microbial Electrolysis Cells (MEC) and other bio-electrochemical systems are **not** excluded from this competition, providing they meet all other eligibility criteria.*



Category 1 – Feedstock Pre-Processing

- 1. With regards to the feedstock to be used, does the composition of the feedstock need to be specified within the application document?**

Answer: Regarding feedstock composition, applicants should provide assurance that their proposed feedstock meets the 25% minimum biogenic content requirement in line with exclusion criterion (d) (See Competition Guidance Notes, Section 4.5). Depending on the innovation, it may also be relevant to outline details of feedstock composition in relation to assessment criterion 2(b): Greenhouse gas emissions and Environmental impact (See Competition Guidance Notes, Section 7.1, and Appendix 4).

- 2. Has the feedstock eligibility information been sent out at this time? Could you please provide some information on which waste feedstocks are allowed?**

Answer: Please refer to the Competition Guidance Notes, Section 4.5, and in particular exclusion criterion (d).

- 3. We intend to develop an innovative pre-processing technology applied to a particular waste-based feedstock (i.e. having a defined EWC code), which could show a certain variability in composition. The Competition Guidance Notes mention that waste-based feedstock must have above 25% content of biogenic material, on an energy basis. What kind of evidence is required to show the compliance to this energy content criteria? Would a literature review and data analysis of existing published work (such as academic papers, sector studies, governmental reports), showing that the average of the reported biogenic energy content values are above the required criteria, be deemed sufficient?**

Answer: Yes, this would be sufficient as evidence to demonstrate the eligibility of the feedstock in relation to exclusion criterion (d) (See Competition Guidance Notes, Section 4.5).

- 4. Can it be clarified if the % biogenic energy content has to be intended as a % of the whole feedstock LHV (lower heating value) or HHV (higher heating value)?**

Answer: As outlined in other Government schemes, e.g., the 2018 Contracts for Difference Fuel Measurement and Sampling Process Guidance, the energy content should be measured on a Gross Calorific Value (GCV), also known as Higher Heating Value (HHV).

- 5. Would the adaptation of an existing material processing technology, currently operated commercially in sectors different from gasification, be deemed eligible for applications to Category 1?**

Answer: If it can be demonstrated that the technology being proposed is sufficiently different to the existing technology so as to be deemed innovative, then this could be eligible. Please also note eligibility criterion 1 (see Competition Guidance Notes,



Department for
Business, Energy
& Industrial Strategy

Section 8), which states that technologies must be at TRL 4 – 6 at the start of the project. Please also note eligibility criterion 7, which states that projects can only be funded where evidence can be provided that innovation would not be taken forwards (or would be taken forwards at a much slower rate) without public sector funding.

- 6. Within this biohydrogen funding round is it possible to include the establishment of trial plots of 2 new perennial non forestry, non-invasive biomass species which are currently not grown in the UK?**

Answer: Growing biomass feedstocks would not be considered within the scope of any of the technology categories in this competition. Please see the Competition Guidance Notes Section 4 for further details of the technologies considered within scope. The scope for Category 1 includes innovative pre-processing technologies which will optimise biomass and waste feedstocks for use in Advanced Gasification Technologies.

- 7. For Category 1, does the scope of the section include the delivery of the feed material to the gasifier or are only pre-processing operations considered within this category?**

Answer: Category 1 will only support pre-processing technologies which optimise biomass and waste feedstocks for use in Advanced Gasification Technologies (see Competition Guidance Notes, Section 4.1). Delivery of the feed to the gasifier would only be considered within scope if it has a direct and material role in optimising the feedstock.

Category 2 – Gasification Components

- 8. Does the syngas treatment system have to be connected to a syngas stream from a gasifier – or can it be any gaseous mixture that resembles syngas from gasification in its chemical composition?**

Answer: BEIS has a preference for syngas treatment to be demonstrated on real syngas generated by a biomass/waste-fed gasifier, so as to ensure solutions developed are fit for purpose. However, if the project can demonstrate that the pseudo-syngas composition is representative of real syngas, and the testing plan provides confidence that the treatment system will be fit for purpose when used with real biomass/waste-derived syngas then such projects will be considered. Particular attention should be given to the contaminants such as tars arising from biomass/waste-fed gasifiers.

Category 3 – Novel Biohydrogen Technologies

- 9. The company I work for has developed a unique, patented plasma process for transforming methane into hydrogen and graphene. We are planning to partner**



with a commercial AD operator, deploy a mobile reactor system and perform pilot studies to assess the commercial feasibility of using our technology to convert biogas/biomethane into hydrogen whilst capturing carbon as high value graphene. Would this approach fit the eligibility criteria for category 3: novel biohydrogen technologies of the competition?

Answer: This technology would be eligible to apply to Category 3 of the competition, providing none of the technology exclusions outlined in Section 4.5 of the Competition Guidance Notes are applicable to the technology. Applicants are also encouraged to review the eligibility criteria outlined in Section 8 of the Competition Guidance Notes.

10. I'm interested in submitting a proposal under the Novel Biohydrogen Technologies category. The technology involves a form of biohydrogen production using a novel gasification technique, so I wanted to check whether this would best fit under category 3 or category 2 please.

Answer: The scope for Category 3 covers the development of novel biohydrogen technologies where the core conversion technology is not gasification. For the purpose of this innovation programme, the term Advanced Gasification Technologies and the use of the term gasification refers to gasification as a thermal conversion technology used to convert biomass or waste feedstocks into a syngas which can be upgraded to produce bioenergy products. Any gasification technology that meets this definition would not be eligible for Category 3. For Category 2 eligibility, please refer to the technology scope as outlined in the Competition Guidance Notes Section 4.2.

11. Technologies which generate hydrogen via electrolysis have been deemed out of scope even when electricity has been generated from a biological source. Are microbial electrolysis cells (MEC), and other bioelectrochemical systems not eligible for funding via this innovation programme?

Answer: Exclusion criterion (g) in Section 4.5 of the Competition Guidance Notes published on 12 January 2022 excluded the following from the scope of this programme: Technologies which generate hydrogen via electrolysis even when electricity has been generated from a biological source. The intention behind exclusion criterion (g) is to exclude projects where the core technology focus is on the development of standalone conventional electrolysis technologies such as Alkaline, Polymer Electrolyte Membrane (PEM) and Solid Oxide Electrolyser (SOE) to generate hydrogen even if bioenergy-derived electricity is used as the source of energy. For this reason, we have decided to clarify exclusion criterion (g) and have updated the Competition Guidance Notes with the following wording: *Technologies which generate hydrogen from a non-biological feedstock, such as electrolysis using Alkaline, Polymer Electrolyte Membrane (PEM) and Solid Oxide Electrolyser (SOE). Microbial Electrolysis Cells (MEC) and other bio-electrochemical systems are **not** excluded from this competition, providing they meet all other eligibility criteria.*



Eligibility

12. Although the project and application would be led by a UK based company, can we include University colleagues from Portugal as part of the team? This is where most of the technology theory originates with the UK side bringing feedstock expertise.

Answer: Yes, this is permitted as long as the project lead is a UK registered company, academic, research, public, third sector or community organisation. Please also refer to eligibility criterion 6 around the location of activities funded in the competition (See Competition Guidance Notes, Section 8.5 & 8.6).

13. Must the Phase 2 pilot demonstration be located within UK, or can it be located within EU?

Answer: Please refer to eligibility criterion 6 (see Competition Guidance Notes, Section 8.5). This states that Phase 1 and Phase 2 activities must be conducted largely in the UK (and the majority, over 50% of the eligible activity (resources and goods) must be incurred in the UK). Therefore, it is unlikely that a demonstration located outside of the UK would be eligible.

14. Can a Public Limited Company (PLC) apply for this competition?

Answer: Yes.

Application Process

15. I note that there are 3 parts to the project - feedstock pre processing, gasification components and novel biohydrogen technologies. We are confident that we have both technology and novel feedstock opportunities that could be scaled up for biohydrogen opportunities in the UK but we struggle with which category we would need to submit an application within. To confirm feedstock suitability would need access to our proposed technology. The technology is both gasification and of a novel technology. If we submit one application to include all 3 aspects then the maximum sum available in phase 1 may be insufficient to complete the stage to the level needed to move on to phase 2. If we submit 3 individual projects then all 3 may not secure funding and one part is very reliant on the others. I would be grateful for your guidance in this matter.

Answer: Bids to any category must only include work to develop a technology within the scope of that category and each must be a standalone project. We expect applicants to consider the dependencies and risks associated with their project plans, and to offer assurance in their application that if the project is awarded funding, this will represent good value for money for HM Government (please refer to assessment criterion 4 in the Competition Guidance Notes, Section 7.1).



16. Does the Phase 2 pilot demonstration industrial or academic partner have to be identified at the time of the Phase 1 bid?

Answer: Applicants need to identify their key partners for their Phase 1 project in their Phase 1 application. Identification of Phase 2 partners can be a Phase 1 activity.

Technology Readiness Levels

17. Is the development of an innovative TRL 4/6 ‘component’ integrated into a TRL 8/9 ‘core technology’ for the specific purpose of enhancing hydrogen production, and reducing LCOH, within scope for the programme?

Answer: Yes, this would be eligible.

18. What are the ‘key’ criteria BEIS consider in determining whether the proposed innovation has reached TRL4/6?

Answer: Please refer to the Competition Guidance Notes, Appendix 1 for the definitions BEIS has provided. We expect applicants to assess and justify the TRL of their innovations using these definitions.

Commercial

19. Is matched funding in excess of £5m permitted for Phase 2? If not, why?

Answer: There is no matched funding permitted in either Phase 1 or Phase 2 of the Hydrogen BECCS Innovation Programme. This is because Phase 1 and Phase 2 funding will be awarded using the Small Business Research Initiative (SBRI), which must fund 100% of eligible project costs. The purpose of an SBRI relates to the pre-commercial nature of the procurement, which seeks to support innovation that would not be taken forwards (or would be taken forwards at a much slower rate) without public sector funding.

The key principle of an SBRI is that 100% funding is provided to deliver the scope/requirements of the competition and as such matched funding to deliver this work is not permitted.

20. Do successful applicants assign IP before commercialisation irrespective of if the applicant brings their technology to market within 5 years?

Answer: The Contract Terms and Conditions do not require suppliers to unconditionally “assign” their IP to BEIS. Please see Section 11.2 of the Competition Guidance Notes. Applicants will retain ownership of the intellectual property generated during both phases of the project subject to the Contract Terms and Conditions. Projects receive financial support and retain any intellectual property generated, with certain rights of use retained by BEIS. If within five years of its creation applicants have not commercially exploited intellectual property generated from the work (Arising Intellectual Property), then in line with clause 28(5) of the



Contract Terms and Conditions, BEIS **may** request the applicant to assign the Arising Intellectual Property to BEIS. In line with clause 28(7), under the same circumstances, or if applicants have established a monopoly position, BEIS **may** require the applicant to license the Arising Intellectual Property to third parties nominated by BEIS.

- 21. Does the H2 BECCS team recognise that private equity will not invest in the commercialisation of a technology where the IP has been preassigned (ie: rights over the technology has already been allocated to a 3rd party)? Essentially, successful participants are required to pre-assign IP in order to qualify for funding. This is incredibly risky unless BECCS clearly sets out how the participants can recover 100% of their IP to enable private equity to invest.**

Answer: Please see answer to Question 20 above.

General

- 22. Can the chemical outputs of a project funded by the Greenhouse Gas Reduction SBRI be the input of this H2 BECCS SBRI programme?**

Answer: This question refers to projects funded under the Direct Air Capture and other Greenhouse Gas Removal technologies competition which is part of BEIS' Net Zero Innovation Portfolio. Yes they can, provided that there is no sale or purchase of those products or outputs included in either project. Please also note that BEIS will not fund the same piece of work twice, and therefore it will need to be made clear in any bid that the use of outputs from other SBRI programmes does not duplicate work that BEIS has already funded.

- 23. Do the Phase 1 deliverables include: EITHER (i) the complete design 'ready to build' for the Phase 2 pilot demonstration OR (ii) the detailed conceptual design plus performance criteria against which the Phase 2 pilot demonstration design, construction and operation can be tendered?**

Answer: Section 3.1 of the Competition Guidance Notes summarises the deliverables anticipated with further clarifications in Section 5. This includes:

5.1 (c) A detailed engineering design for a demonstration project lasting 24 months that could be taken forward between 2023 and 2025 within the funding budget for Phase Two projects

Therefore option (i) the complete design 'ready to build' is most likely to comply with 5.1(c). If this is not feasible within the timescales, applicants should clearly outline the scope of work achievable during Phase 1 (Assessment Criterion 5(a)) and provide assurance that the project expected to be carried out in Phase 2 (Assessment Criterion 1(a)) will still be successful with outstanding design activities. Performance criteria are also applicable, see paragraph 5.1(d) of the Guidance Notes.



24. Within phase 1 can a project just be the theoretical and engineering demonstration of the process or does it require a laboratory scale prototype/demonstrator for proof of concept.

Answer: Applicants should provide assurance that their Phase 1 project will provide sufficient evidence through appropriate means, that the Phase 2 demonstration unit is likely to achieve the objectives of the competition.

The Phase 1 competition excludes innovations outside of Technology Readiness Levels 4-6 (See Competition Guidance Notes Section 4.4, and Appendix 1). This means that a technology needs to have at least completed Laboratory Testing/Validation of Component(s)/Process(es) to be eligible. Evidence provided in Phase 1 could therefore be a theoretical / desk-based demonstration of the process as long as the outputs provide sufficient information to support the Phase 2 activities.

25. Is there any preference for the pilot demonstration to be undertaken by an academic or industrial partner?

Answer: BEIS does not have a preference on this matter.