



Department for
Business, Energy
& Industrial Strategy

Hydrogen BECCS Innovation Programme: Phase 1

An SBRI Competition: TRN 5192/07/2021
Competition Guidance Notes Version 2

This document replaces the original version published on the [Contracts Finder notice](#) and the [competition web page](#) on 12 January 2022.

This version was updated on 7 February 2022 to amend exclusion criterion (g) in section 4.5. No other changes to this document have been made.

February 2022



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Contents

1. BEIS Hydrogen BECCS Innovation Programme - Overview.....	5
2. Competition Context and Objectives	6
2.1 Context.....	6
2.2 Objectives	6
3. Competition Structure	7
3.1 Phase 1 - Feasibility.....	7
3.2 Phase 2 - Demonstration	8
4. Technology Scope	9
4.1 Feedstock pre-processing.....	9
4.2 Gasification components.....	9
4.3 Novel biohydrogen technologies.....	10
4.4 Innovation and Technology Readiness.....	10
4.5 Technology Exclusions	11
5. Deliverables	12
5.1 Phase 1: Feasibility	12
5.2 Phase 2: Demonstration	13
5.3 Testing Requirements.....	14
5.3.1 Purpose.....	14
5.3.2 Functional testing.....	15
5.3.3 Performance testing.....	15
5.3.4 Test Parameters.....	16
6. Competition Timetable, Application and Assessment Process.....	18
6.1 Competition Timeline Overview	18
6.2 Competition Timeline and Process	19
6.2.1 Stage 1: Application	19
6.2.2 Stage 2: Assessment	22
6.2.3 Stage 3: Contract Award.....	23
7. Assessment Criteria and Scoring	25
7.1 Assessment Criteria	25
7.2 Scoring Guidance.....	30
8. Eligibility for Funding	31
8.1 Innovation and technology readiness	31
8.2 Technology scope	31
8.3 Exclusions	31
8.4 Project status	31
8.5 Project lead	32

8.6	Project Location	32
8.7	Additionality	32
8.8	Contract size	32
8.9	Eligible project costs	33
8.10	Project end date	33
8.11	Risk-Benefit sharing	33
8.12	Delivering multiple projects	34
8.13	Multiple applications	34
9.	Contract Size and Restrictions on Funding	35
9.1	Competition Budget and Availability	35
9.1.1	<i>Phase 1</i>	35
9.1.2	<i>Phase 2</i>	35
9.2	Eligible Costs	36
9.3	Decommissioning Costs	36
9.4	Financial Information	37
9.5	Financial viability checks	37
9.6	General BEIS procurement conditions	38
10.	Notification and Publication of Results	39
10.1	Notification	39
10.2	Publication of results	39
11.	Reporting, Knowledge Sharing, Evaluation and Intellectual Property Requirements	41
11.1	Reporting, Knowledge Sharing and Evaluation Requirements	41
11.1.1	<i>Reporting</i>	41
11.1.2	<i>Monitoring</i>	41
11.1.3	<i>Evaluation</i>	41
11.1.4	<i>Knowledge Sharing</i>	42
11.2	Intellectual Property	42
11.3	Ownership of Demonstration Devices	43
12.	Feedback, Re-application and Right of Appeal	44
13.	Confidentiality and Freedom of Information	45
14.	Further Instructions to Applicants	46
	Appendix 1 – Technology Readiness Levels (TRLs)	47
	Appendix 2 - Eligible and Ineligible Costs	48
1.	<i>Eligible Costs</i>	48
2.	<i>Ineligible Costs</i>	48
	Appendix 3 – Net Zero Innovation portfolio Key Performance Indicators	50
	Appendix 4 – Environmental Considerations and Regulations	52

1. BEIS Hydrogen BECCS Innovation Programme - Overview

The Hydrogen BECCS Innovation Programme forms part of BEIS' £1 billion Net Zero Innovation Portfolio, which aims to accelerate the commercialisation of innovative clean energy technologies and processes through the 2020s and 2030s. Hydrogen BECCS for the purpose of this programme refers to generating hydrogen from biogenic feedstocks via gasification or other bioenergy conversion routes, combined with carbon capture and storage.

Low carbon hydrogen will be critical for meeting the UK's legally binding commitment to achieve net zero by 2050, and hydrogen generated via bioenergy has the potential to deliver negative emissions required to offset emissions from hard to decarbonise sectors.

The overall objective of the Hydrogen BECCS Innovation Programme is to support development of technologies which will enable the commercialisation and deployment of Hydrogen BECCS at scale to achieve negative emission and hydrogen production targets as outlined in the UK's Sixth Carbon Budget covering greenhouse gas emissions for the period 2033-2037.

The programme will be split into two phases. Phase 1 (total budget £5m) will support multiple projects to scope and develop a feasible prototype demonstration project to be run in Phase 2. Phase 2 will select the most promising projects from Phase 1 and support the proposed physical demonstration of their innovation. **Only those applicants who are successful in securing Phase 1 funding and have completed their Phase 1 deliverables may enter into Phase 2.**

This ITT (Invitation to Tender) is for Phase 1. The Competition Guidance Notes for the Hydrogen BECCS Innovation Programme Phase 1 Competition are provided within this document. A Small Business Research Initiative (SBRI) pre-commercial procurement process will be used to deliver this competition. Thus, this competition will **only support projects where the core technology being developed has not been previously operated widely or in a commercial environment.**

In both phases of the competition the development of technologies within three categories will be supported:

- Category 1: Feedstock pre-processing
- Category 2: Gasification components
- Category 3: Novel biohydrogen technologies

2. Competition Context and Objectives

2.1 Context

The UK has legislated for a net zero emissions target by 2050. Analysis by BEIS, the Climate Change Committee (CCC) the Intergovernmental Panel on Climate Change (IPCC) and other climate institutions show that Hydrogen BECCS will be essential to realising this target, due to its potential to deliver negative greenhouse gas emissions, and the opportunity it presents to support the decarbonisation of ‘hard-to-treat’ sectors (e.g. industry and heat).

As part of the previous Energy Innovation Portfolio funding scheme, BEIS commissioned a review and benchmarking study of Advanced Gasification Technologies, which are expected to play a significant role in the UK’s net zero transition. This study has fed into the development of the Hydrogen BECCS Innovation Programme, and can be downloaded here: [Advanced gasification technologies: review and benchmarking](#).

2.2 Objectives

The overall objective of the Hydrogen BECCS Innovation Programme is to support development of technologies which will enable the commercialisation and deployment of Hydrogen BECCS at scale to achieve negative emission and hydrogen production targets.

Specific objectives include:

1. Reduce the levelised cost of hydrogen (LCOH) production and improve efficiencies associated with Hydrogen BECCS technologies.
2. Develop feedstock pre-processing technologies which will reduce costs and improve gasification process performance.
3. Improve syngas treatment technologies to effectively control contaminant concentrations to improve gasification process performance.
4. Develop syngas upgrading technologies, which can be combined with Carbon Capture and Storage (CCS), to improve the levelised cost of hydrogen production.
5. Progress Technology Readiness Levels of novel biohydrogen conversion technologies, which can be combined with CCS.

3. Competition Structure

The Competition funding will be awarded using the Small Business Research Initiative (SBRI) approach. SBRI is a well-established pre-commercial procurement process that enables the development of innovative products and services in response to specific challenges faced by government departments and public sector bodies. Successful applicants receive finance to develop their innovative ideas, generating new business opportunities and routes to market. This competition and the SBRI process are **not** limited to small and medium sized organisations.

The Competition will be delivered in two consecutive phases; Phase 1 (total budget £5m) will support multiple projects to scope and develop a feasible prototype demonstration project to be run in Phase 2. Phase 2 takes the most promising projects from Phase 1 and supports the proposed physical demonstration of their innovation.

For each phase the competition will be split into three categories:

- Category 1: Feedstock pre-processing
- Category 2: Gasification components
- Category 3: Novel biohydrogen technologies

An SBRI will fund 100% of eligible project costs (See Appendix 2) in Phase 1 and Phase 2. Applicants cannot provide match funding, 100% of eligible project costs must be covered by the SBRI contract.

3.1 Phase 1 - Feasibility

During Phase 1, projects will complete a feasibility study which will allow applicants to demonstrate the feasibility of their proposed technology. For the purpose of this competition the scope of work expected in the feasibility study includes developing:

- a) the Hydrogen BECCS technology concept,
- b) an engineering design for Phase 2 (including an approach to testing the technology)
- c) a costed project plan for Phase 2 and
- d) a commercialisation plan.

Please refer to Section 5 for more details on expected Phase 1 deliverables.

Phase 1 will run for 7.5 months (6 months for project delivery plus 1.5 months for approval of deliverables by BEIS and project closure). There will be a total budget of £5m available for Phase 1 with minimum £50,000 and maximum £250,000 for each project (see Section 9 for contract size detail). A public report detailing the key findings will be provided by each project team and published on the gov.uk website at the end of Phase 1.

3.2 Phase 2 - Demonstration

Before the end of Phase 1, a separate application form will be released to all teams undertaking Phase 1 projects to complete if they wish to bid for Phase 2 demonstration funding. Phase 2 will support the physical demonstration of the Hydrogen BECCS technology, including build, trial, decommissioning (if appropriate), market assessment, and knowledge dissemination. The demonstration project should demonstrate the Hydrogen BECCS technology and test its effectiveness. Companies will also develop technical and business plans for market deployment beyond Phase 2.

Phase 2 will launch in early 2023 and end on 31st March 2025. BEIS intends to fund at least two demonstration projects in each category. Each category will have a maximum budget for funding Phase 2 projects, and a maximum cost per project (excluding VAT) as follows:

- Category 1: Feedstock pre-processing: £2.5m
- Category 2: Gasification components: £5m
- Category 3: Novel biohydrogen technologies: £5m

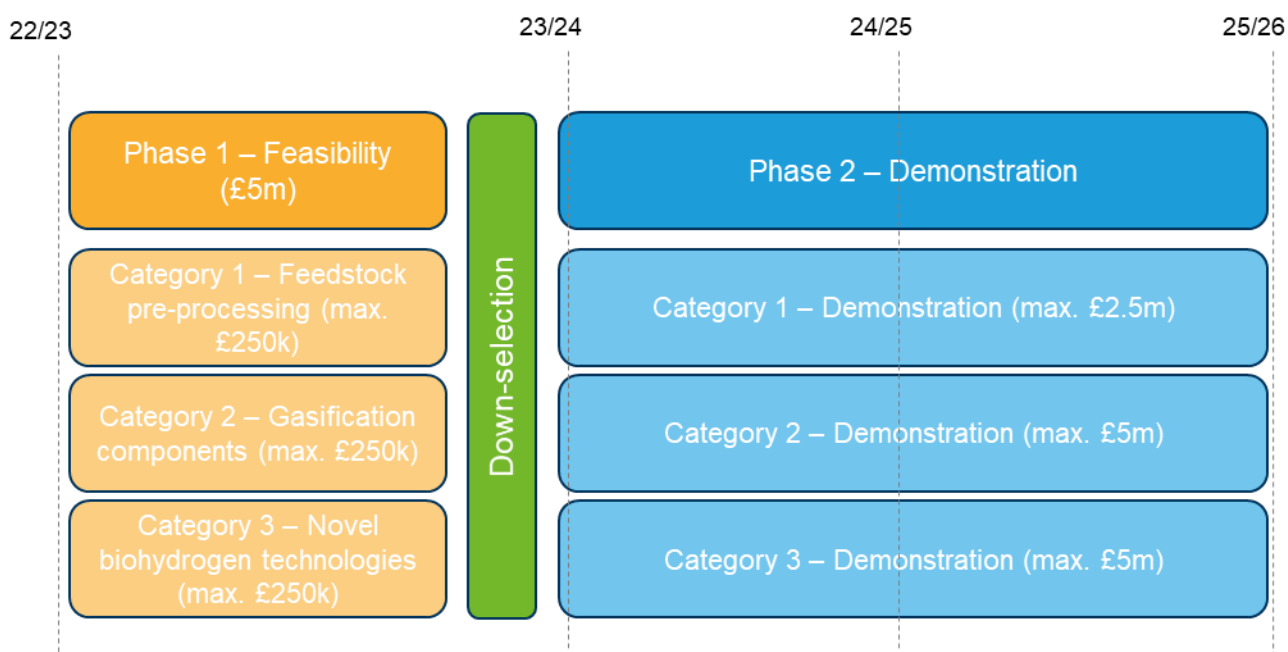


Figure 1: Competition structure and timeline

4. Technology Scope

In each phase the competition will be split into three categories:

- Category 1: Feedstock pre-processing
- Category 2: Gasification components
- Category 3: Novel biohydrogen technologies

Any individual application must only be submitted to **one category**. Any application submitted to multiple categories will not be eligible. Please see Section 8 for a full list of eligibility criteria.

This section describes the types of technologies that will be considered within scope for each of the three categories.

For the purpose of this innovation programme, the term **Advanced Gasification Technologies** 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. This programme is primarily concerned with improving Advanced Gasification Technologies for hydrogen generation.

4.1 Feedstock pre-processing

The scope for this category covers the development of low cost and energy efficient pre-processing technologies which will optimise biomass and waste feedstocks for use in Advanced Gasification Technologies, with a preference for reducing costs and improving gasification process performance.

Example technologies for innovation:

- a) Pelletising
- b) Mechanical sorting
- c) Thermal treatments such as torrefaction

Please refer to Section 4.5 for details on types of feedstocks which will be considered within scope.

4.2 Gasification components

The scope for this category covers the development of Advanced Gasification Technology **components** focusing on improving syngas quality (See Section 5.3.4) and upgrading for generation of hydrogen.

Where CO₂ is produced (for example in syngas upgrading) applicants must demonstrate that the innovation is compatible with carbon capture. This category will not fund the

development and demonstration of standalone carbon capture systems. Innovations that intrinsically link carbon capture with the hydrogen production process will be eligible.

Example technologies:

- a) Systems which control and contribute to improve syngas quality such as real time measurement capability.
- b) Syngas treatment:
 - i) Physical removal systems including wet scrubbers, gas cyclone separators, baffle filters, fabric filters and electrostatic precipitators.
 - ii) Chemical removal systems
 - iii) Catalytic and thermal tar removal
- c) Syngas upgrading (Technologies that separate and extract Hydrogen & CO₂ from the syngas such as pressure swing adsorption).
- d) Gasifier-integrated technologies and design that prevent the formation of contaminants and enable more effective downstream processing.

4.3 Novel biohydrogen technologies

The scope for this category covers the development of novel biohydrogen technologies producing hydrogen from biogenic feedstocks where the core conversion technology is not gasification, and which can be combined with carbon capture. Where CO₂ is produced, applicants must demonstrate that the innovation is compatible with carbon capture.

Example technologies:

- a) Dark fermentation (anaerobic digestion) to produce hydrogen
- b) Photo fermentation to produce hydrogen
- c) Wastewater treatment (e.g. recovery of ammonia and conversion to hydrogen)
- d) Steam Methane Reforming of biogas from AD for biohydrogen generation
- e) Pyrolysis

4.4 Innovation and Technology Readiness

This competition will support proposals that can develop and demonstrate Hydrogen BECCS technologies in the timescales indicated. BEIS requires applications to show that technologies are currently between TRL 4-6 and that by the end of Phase 2 the technology

readiness levels will have advanced considerably towards commercialisation depending on the initial state of maturity.

4.5 Technology Exclusions

The following technologies will be classified as out of scope and are not eligible to received funding via this innovation programme:

- a) Technologies currently outside of Technology Readiness Levels (TRL) 4-6.
- b) Non-innovative technologies or technologies that have previously been operated widely or in a commercial environment (in the UK or internationally).
- c) CCUS technologies which aren't intrinsically linked to the hydrogen production process.
- d) Innovations using waste feedstocks with less than 25% content, by energy, of biogenic waste.
- e) The use of biomass feedstocks which are not sustainably sourced as outlined in the 2021 BEIS Biomass policy statement¹. Feedstocks in scope include perennial energy crops (Miscanthus and short rotation coppice), short rotation forestry and wastes, products (incl. forest derived products), agricultural residues, forest residues, and residues from processing, as well as marine-based and novel feedstocks.
- f) Technologies generating hydrogen from non-biologically derived sources.
- g) **[This criterion is an updated version published on 7 February 2022.]**
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.
- h) Technologies which generate power or generation of any fuel other than hydrogen as the primary product.

¹ For more information, see Chapter 1 of the Biomass Policy Statement:
<https://www.gov.uk/government/publications/biomass-policy-statement-a-strategic-view-on-the-role-of-sustainable-biomass-for-net-zero>

5. Deliverables

It should be noted that SBRI contracts require that project outputs are shared publicly – therefore all information apart from Commercial-in-confidence information will be required to be shared.

5.1 Phase 1: Feasibility

Projects will be expected to deliver a report at the end of Phase 1 containing:

- a) A detailed technical description of the science and engineering underpinning the proposed Hydrogen BECCS innovation, providing confidence that what is proposed is well founded in relevant scientific and engineering principles. Detail must also be given on how the innovation will support Hydrogen BECCS commercialisation.
- b) Carbon life cycle assessment of technology, including detailed assessment of the biomass feedstock and uncertainty associated with direct and indirect land use change emissions.
- 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
- d) A detailed approach to testing the innovation during the demonstration project (with reference to expectations outlined in Section 5.3.4)
- e) A detailed and costed project plan setting out how and where the Hydrogen BECCS solution will be demonstrated if selected for Phase 2 funding including:
 - i) Timelines for deliverables.
 - ii) Project management (including project team and key suppliers)
 - iii) Risks and risk management.
 - iv) Quality assurance.
 - v) Project oversight and governance.
 - vi) Reporting plans.
 - vii) Plans for disseminating the demonstration results and key learnings to relevant industry sectors.
 - viii) Any other relevant material to demonstrate good practice in project delivery

- f) A **commercialisation plan** informed by information gained during Phase 1, detailing how the Hydrogen BECCS innovation could continue to be developed beyond the end of the demonstration phase, should the demonstration phase be funded. The commercialisation plan should include:
 - i) A description of the target market for the innovation detailing its size and nature.
 - ii) The intended scale and deployment locations of your innovation for commercial viability.
 - iii) How the innovation will be commercially deployed at scale beyond Phase 2 to deliver maximum biohydrogen production and biogenic carbon removal, and how this aligns with the UK Government's legal commitment to achieve Net Zero greenhouse gas emissions by 2050.
 - iv) How the commercialised solution will integrate with and benefit the Hydrogen BECCS process.

Applicants will also be required to provide a version of the Phase 1 report that can be published (if there are aspects of the main Phase 1 report that are commercially confidential).

Alongside the report, suppliers will need to deliver appropriate explanations of the analysis undertaken and the raw data used. The report will require a log of assumptions made when conducting the feasibility study, along with an assessment of the impact that gaps in the data may have on the viability of the Hydrogen BECCS innovation.

BEIS will appoint a monitoring officer² to support the delivery of the feasibility study and approve materials for publication. Projects will need to include sufficient time for the approval process to enable delivery of a final report.

BEIS requires the project teams to support the evaluation of their projects by providing data on key performance indicators. Details of key performance indicators and evaluation requirements are located in Section 11.1.3.

Applicants will retain ownership of the intellectual property generated during the project subject to the Contract Terms and Conditions. See Section 11 and the Contract Terms and Conditions published with this ITT for further details.

5.2 Phase 2: Demonstration

The final deliverables for Phase 2 will be agreed prior to Phase 2 contracts being signed, but are envisioned to include:

² In some instances, the monitoring services will be provided by an external organisation. External organisations will be subject to a confidentiality agreement.

- a) Physical demonstration of the innovation including functional and performance testing.
- b) An evidence-based final project report for BEIS (and other government departments) detailing the design and development of the solution, demonstration and testing results in line with the testing plan, key successes, lessons learned, plans to address any performance issues identified, and next steps. The report should also include an updated commercialisation plan detailing how the innovation will continue to be developed after the Phase 2 ends.
- c) A version of the Phase 2 project report that can be published.
- d) Any other dissemination activity as outlined in project's dissemination plan.

Detailed requirements for Phase 2 reports will be drawn up once Phase 1 projects are completed. Similar to Phase 1, applicants will retain ownership of the intellectual property and physical assets generated from the project, subject to the Contract Terms and Conditions. See Section 11.2 and the Contract Terms and Conditions for further details.

5.3 Testing Requirements

5.3.1 Purpose

Performance testing is crucial for ensuring the long-term success of the innovations in this competition. This section provides guidance to applicants about testing that should be considered by project teams when outlining the preliminary approach to testing the innovation in Assessment Criterion 5a.

Effective testing of the technologies during demonstration in Phase 2 of this competition will provide assurance for further development of the innovations and validate or update key design assumptions. The key areas for testing are the following:

- a) Performance: The technology achieves its desired outcome (e.g., tar clean-up, drying, conversion to hydrogen) effectively and to the designed level.
- b) Quality: The end product is delivered to the quality criteria required for use, downstream processing etc.
- c) Viability
- d) Rating: Understanding the impact of changes in production load on the technology
- e) Other: Environmental compliance, efficiency

Testing should consist of a short functional test and long-duration performance/reliability test.

5.3.2 Functional testing

Functional testing will evaluate the technology's viability and efficiency, feedstock characteristics' impact on performance, product characteristics and quality, emissions and waste outputs.

Functional testing is expected to be conducted before and after the long duration performance testing to also determine any deterioration in performance over the performance period.

5.3.3 Performance testing

Long-duration, continuous performance testing will provide assurance for viability of commercial operation, cumulative impacts of long-term operations, reliability, maintainability and plant cycling. Additional considerations can include scale-up challenges such as effective heat and mass transfer, changes in geometry, dynamic operations impact, etc.

Performance testing is expected to last a minimum of 1,000 hours unless a shorter duration can be fully justified. Performance testing durations longer than 1,000 hours should be considered if bidders believe this is what is necessary to provide assurance for potential future customers/investors. During this period data should be collated that may include:

- a) Operating Hours
- b) Downtime due to planned maintenance
- c) Downtime due to unplanned maintenance
- d) Equipment and / or component failures, including root cause analysis
- e) Gas leaks
- f) Consumables used such as oils and greases
- g) Energy consumed
- h) Water consumed
- i) Daily log of activities such as:
 - i. throughput of material e.g. feedstock, syngas
 - ii. quality and volume of product output
 - iii. CO₂ separated
 - iv. adjustments to operations, staff

v. influencing factors

Effective testing can inform decisions for commercial scale-up such as material selection, mitigations for identified issues, practicality of commercial operation, operating condition optimisation. For testing to be effective, it needs to be carried out under realistic conditions that will be present during commercial operation, for instance realistic syngas composition post-gasification. It is also important that testing is used to improve design and not just as a pass/fail test, which necessitates adequate time for decisions to include testing results in their considerations. Whilst testing can be done in-house, independent analysis can provide assurance for the testing results and additional certainty for the ensuing scale-up steps.

5.3.4 Test Parameters

For each of the technology categories testing should aim to demonstrate the following:

Category 1

Feedstock pre-processing innovations should aim to achieve higher quality fuels by::

- a) Reducing moisture
- b) Improving the homogeneity of the fuel particle size and reducing variability
- c) Minimising sulphur and chlorine
- d) Minimising contaminants
- e) Minimising ash/silicates

Category 2

Syngas quality improvement should aim to achieve part or all of the IGEM Hydrogen Gas Quality Specification³ or equivalent standard based on end use requirements.

Category 3

Novel Biohydrogen Technologies should aim to reduce the cost of hydrogen production through one or more of the following methods:

- a) Maximising hydrogen production
- b) Reducing energy penalty of CO₂ removal/transport
- c) Maximising biogenic CO₂ content

³ <https://www.igem.org.uk/technical-services/technical-gas-standards/hydrogen/igem-h-1-reference-standard-for-low-pressure-hydrogen-utilisation/>

- d) Minimising input energy requirements
- e) Reducing equipment capital costs or improving scalability
- f) Reducing the costs of input fuels
- g) Improving plant efficiency/availability/reliability

See Levelised Cost of Hydrogen workbook spreadsheet published with this ITT for further details on cost reduction.

6. Competition Timetable, Application and Assessment Process

6.1 Competition Timeline Overview

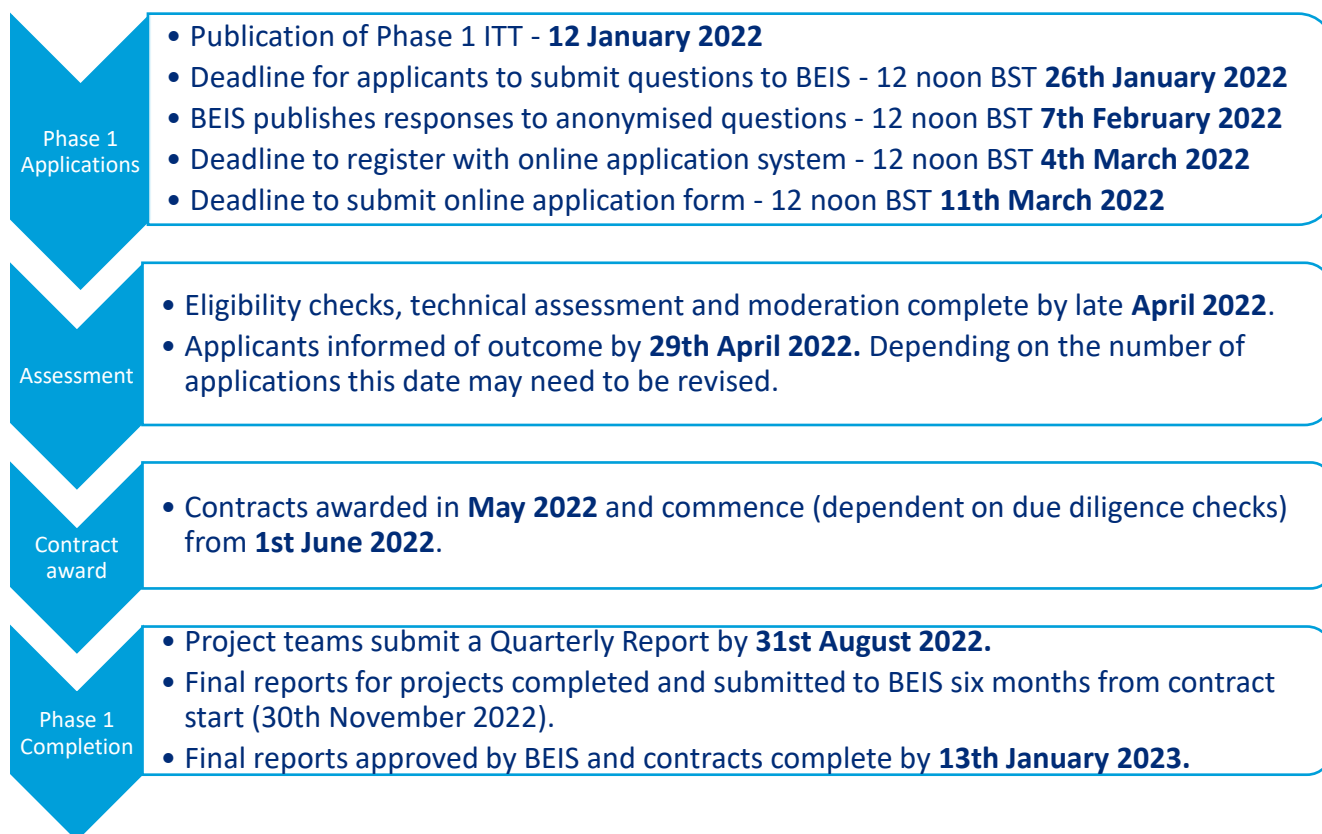


Figure 2: Phase 1 Competition Timetable (Launch to Completion). Please note dates may vary.

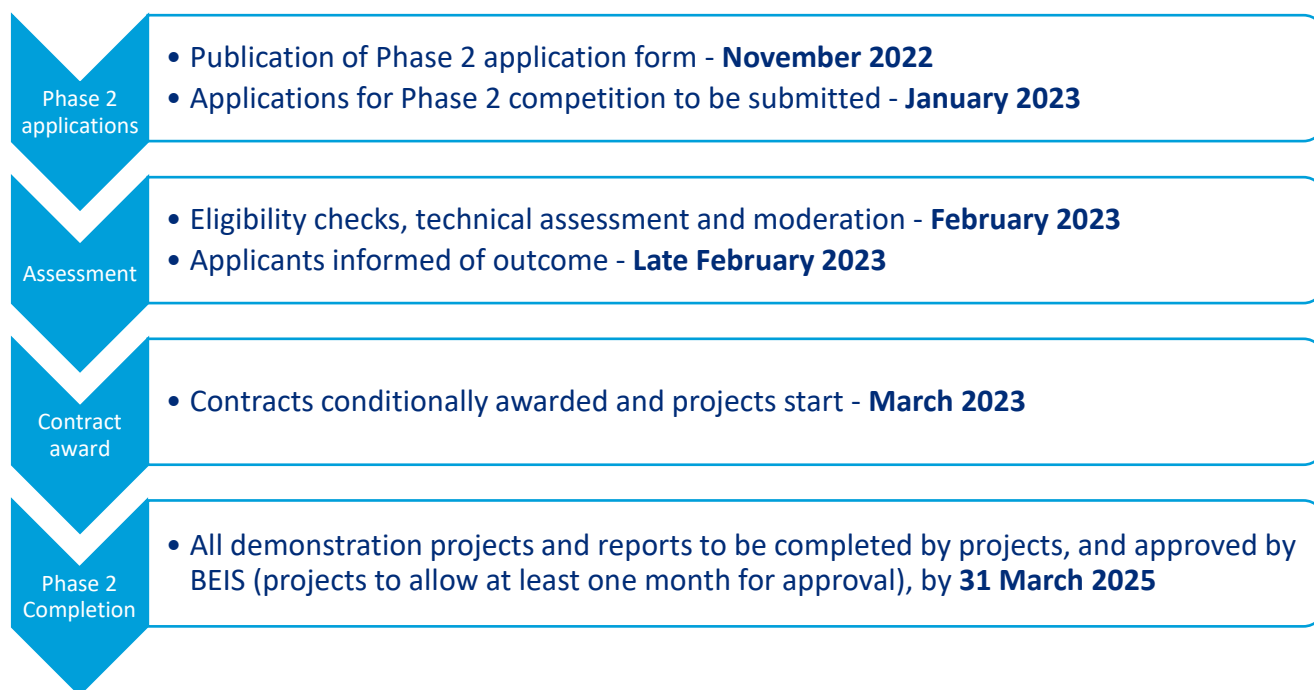


Figure 3: Phase 2 Competition Timetable (Launch to Completion). Please note dates may vary.

The application process for Phase 1 is outlined below. A separate application process for Phase 2 is due to be published in **November 2022**.

6.2 Competition Timeline and Process

6.2.1 Stage 1: Application

Applicants are asked to submit an online competition application form, with supporting information by **12 noon BST, 11th March 2022**. They should address the assessment criteria, explain their proposed Hydrogen BECCS approach, indicate the applicable Category, and outline their proposed project. The notes below explain the details of the application process:

- 1) **Questions about the Competition:** If you have any questions on the competition process or require clarifications on the eligibility criteria after reading these Competition Guidance Notes, please submit queries to **h2beccs@beis.gov.uk**. All questions should be submitted **by 12 noon BST, 26th January 2022**. Questions submitted after this date may not be answered. We will reply to any queries which, in our judgement, are of material significance through an anonymised Q&A sheet published on our [website](#) and on Contracts Finder **by 7th February 2022**, so there is sufficient time for applicants to consider the responses when drafting their applications. Please see Section 14 for further instructions on amendments to the competition documents. All applicants should take these replies into consideration when preparing their own applications and we will evaluate applications on the assumption that they have done so.

- 2) **Online Registration Form:** You must first register via the online [registration form](#) to gain access to the application process for the Hydrogen BECCS Phase 1 Competition. Once the registration form is submitted you will receive a password to the online application form. Those applicants that do not register will not be able to access the online application form and hence will not be able to apply/enter the application/assessment process. Previous correspondence relating to Expressions of Interest or attendance at the Hydrogen BECCS Stakeholder Engagement event does not result in an automatic registration. **You must register by 12 noon BST, 4th March 2022**, the online registration form will be closed after this time. There is no obligation on you to submit an application if you register.
- a) **Submission of Application:** The full application for the Competition must be submitted online by the deadline: **12 noon BST, 11th March 2022**. The online [application form](#) will be closed for submissions after this time.
 - b) **Application documents:** All application documents must be submitted via the online application form. In the form there are opportunities to upload relevant supporting documents. In some sections we specify the supporting information we would like to see uploaded.
- 3) **Submission Content:** Each online application must include the following:
- a) Completed Application Form (the online application form can be found [here](#)).
 - b) Completed 'Levelised Cost Of Hydrogen Workbook' (this should be uploaded alongside the answer to Assessment Criterion 2a).
 - c) Completed 'Hydrogen BECCS Finance Form' (this should be uploaded alongside the answer to Assessment Criterion 4).
 - d) Completed high level project Gantt chart or project plan for the Phase 1 project (this should be uploaded alongside the answer to Assessment Criterion 5a).
 - e) Completed risk register for the proposed project (this should be uploaded alongside the answer to Assessment Criterion 5a).
 - f) An organogram outlining the key roles of each partner and of team members (this should be uploaded alongside the answer to Assessment Criterion 5b).
 - g) Brief CVs of key individuals within the project (this should be uploaded alongside the answer to Assessment Criterion 5b).
 - h) Completed Declarations: 1. Statement of non-collusion, 2. Form of Tender, 3. Conflict of Interest, 4. Standard Selection Questionnaire, 5. Code of Practice, 6. GDPR Assurance Questionnaire. These should be downloaded, signed and uploaded into the [application form](#).

You should endeavour to answer all the questions on the application in full. Some questions will be 'required fields' in the form and you will not be able to proceed to the next section until these questions are complete. The assessment of each application will be based on the information contained in the above list of specified Submission Content. Applicants who wish to support their responses with figures where prompted (e.g. illustrations/PFDs/graphs/charts/schematics) may attach these as part of a Referenced

Figures single attachment (max. 20MB allowance provided) in the Further Information section of the application form. Applicants must clearly label the figures in the attachment and reference the figures in their response within the text box to ensure they are assessed. Any further text submitted within the Referenced Figures single attachment will not be assessed or cross-referenced as part of the assessment process. Incomplete applications and any containing incorrect information may be rejected. However, BEIS may, at its discretion, request clarification before making a final decision. Any applications or supporting documentation received after the application deadline will not be considered. Applicants are advised to use the downloadable Word document version when working on a draft application, and to ensure they leave sufficient time to copy their application to an online version and answer all the compulsory questions. Applicants are also advised to make an early start on the application process as it may take considerable time, and to use the Q&A process to clarify anything they are unsure about.

- 4) **Submission Costs:** You will **not** be entitled to claim from the Department any costs or expenses that you may incur in preparing your application for either Phase 1 or Phase 2, whether or not your application is successful.
- 5) **Consortium Applications:** Applications from consortia are welcome. **Only one submission should be submitted for each separate project application**, but all consortium partners are required to sign the completed application form for their project(s) (see Declarations published with this ITT).
 - a) If a consortium is not proposing to form a separate corporate entity, the project partners will need to complete a Consortium Agreement (once a contract has been awarded) and nominate a lead organisation who we will contract with. Please note that BEIS reserves the right to require a successful consortium to form a single legal entity in accordance with Clause 19(6) of the Public Contracts Regulations 2015.
 - b) BEIS recognises that arrangements in relation to consortia and sub-contractors may (within limits) be subject to future change. Applicants should therefore respond in the light of the arrangements as currently envisaged and are reminded that any future proposed changes in relation to consortia and sub-contractors must be submitted in writing to BEIS for consideration on a case-by-case basis.
- 6) **Multiple Applications:** Lead organisations may only enter one application into each category as the project lead. Consortium members/Subcontractors may be part of multiple applications; however, it is the duty of the lead organisation to manage any arrangements with regards to conflict of interests with sub-contractors/consortium members where those sub-contractors/consortium members are part of other applications. Where consortium members are part of multiple applications, the lead organisation must provide assurance that the consortium members have sufficient resources to successfully deliver all work packages. The lead organisation must also ensure that funding is not requested more than once across separate applications for the same piece of work.

- a) Lead organisations must also ensure that for a particular technology/solution, only one application is submitted by the technology provider/OEM or a consortia that includes that provider per category. It is the duty of all applicants to ensure that for a particular solution requiring development, only one application is submitted to the competition per category when applicants are part of multiple applications.
- 7) **Tender Validity:** Phase 1 applications shall be valid for a minimum of 180 calendar days from the submission deadline (**12 noon BST, 11th March 2022**).
- 8) **Phase 2 Submissions:** For Phase 2, a separate application form will be published prior to the completion of Phase 1 and **only** the response to the Phase 2 application form will be used to assess and select the projects to be funded. The assessment criteria for the Phase 2 application are envisioned to be similar to those for Phase 1. It is expected that work completed during Phase 1 will provide the applicant with a more substantial evidence base to include in the Phase 2 application. Only successful Phase 1 applicants, that have completed their Phase 1 project (with the final report submitted by project teams, and approved by BEIS), are eligible to apply to Phase 2.

6.2.2 Stage 2: Assessment

Applications will initially be assessed against the Eligibility Criteria in Section 8.

Applications which fail the Eligibility Criteria will not be assessed further, so it is essential to ensure that your project meets these criteria before you submit your application.

Eligible applications will be scored against the assessment criteria described in Section 7 (Assessment Process and Criteria), by three reviewers, including reviewers external to BEIS operating under the Technical Third Party Support (TTPS) contracts. All reviewers, internal and external, will be required to consider and identify any conflicts of interest in advance of the assessment process. Reviews will only proceed once BEIS is in receipt of reviewers' declared Conflict of Interest forms.

Reviews and scores will be moderated to determine an overall ranking list that will be used to allocate the funding for the Competition. To be eligible to receive funding, an application must also achieve a minimum total score of 60% against these assessment criteria and must not receive a score of '1' in any criterion. The projects will be funded in ranked order until budget for that Category runs out or all successful applications have been funded (whichever happens first). If there is remaining budget in a Category (due to not enough applications or applications failing to score above the 60% threshold), this will be transferred to a central pot, where all remaining/unfunded projects across the Categories will be combined and ranked in order of merit. Funding will be assigned against order of merit to projects (with a minimum 60% threshold mark) until the central pot of money runs out.

After the assessment stage, all applicants will receive a short summary of key feedback regarding their applications irrespective of whether they are successful or not. Feedback

will be given at the same time as the successful/unsuccessful letters are sent to applicants.

Please note, this programme is being run with internal resource by BEIS, with some additional support from the Technical Third-Party Support (TTPS) contract procured by BEIS to assist with the delivery of the Net Zero Innovation Portfolio (NZIP). For this programme, TTPS has provided support in the development of the Competition Guidance Notes, and will support in assessing bids and monitoring funded projects.

TTPS consists of five contracts (Lots) to provide a breadth of technical expertise, with services provided by:

- Lot 1: Pricewaterhouse Coopers LLP (technical coordination)
- Lot 2: Technopolis (social research and evaluation)
- Lot 3: Mott MacDonald (carbon control and storage)
- Lot 4: AECOM (energy consumption)
- Lot 5: Frazer-Nash Consultancy (energy generation and distribution)

Lot 3 of TTPS has been used for developing the Competition Guidance Notes, and it has not yet been determined which of the TTPS Lots will support bid assessment and project monitoring. In the event that any of the Lot providers involved in this competition submit a bid for a contract in this competition, they will be excluded from the appraisal of bids process to ensure transparency and avoid any conflict of interest. In addition, they will be required to declare and mitigate any actual or perceived conflict of interest in the same way as any other bidder. BEIS reserves the right to exclude any proposals where the bidder has an actual or perceived conflict of interest that cannot be mitigated to the satisfaction of BEIS.

6.2.3 Stage 3: Contract Award

Phase 1 contracts are expected to be issued in May and commence from **June 2022 and run for 7.5 months⁴ with project teams submitting their final reports six months from contract start date**. Please note the supplier is expected to attend a kick-off meeting taking place in June 2022 after the contract has been signed. Phase 2 contracts are expected to be awarded in **March 2023**. Please note that BEIS will not back date the start date of contracts.

Contract terms: For both Phase 1 and 2, the contracts will be based on the BEIS pre-commercial procurement contract. The Contract Terms and Conditions for the Phase 1 contract are published with this ITT. These terms and conditions are final and non-negotiable. For this contract (Phase 1), clause 18.7 of the terms and conditions stipulates that liability is limited to twice the contract value, for Phase 2 this will be increased to £4m or twice the contract value, whichever is greater.

⁴ Start dates may vary depending on number of applications received.

All applicants should review Conditions 27 and 28 of the Contract Terms and Conditions which contain important provisions relating to arising intellectual property and its exploitation.

Consortium applications: with consortium applications, the lead company (project co-ordinator) will be the recipient of the contract (the supplier) and will be responsible for managing payment to the other project partners. If a consortium is not proposing to form a separate corporate entity, the project partners will need to complete a Consortium Agreement. Funding will not be provided by BEIS until a signed consortium agreement has been finalised between all of its members. Consortium members/Subcontractors may be part of multiple applications; however, it is the duty of the lead organisation to manage any arrangements with regards to conflicts of interest with sub-contractors/consortium members where those sub-contractors/consortium members are part of other applications. Where consortium members are part of multiple applications, the lead organisation must ensure that the consortium member has sufficient resources to successfully deliver multiple applications/work packages. The lead organisation must also ensure that funding is not requested more than once across separate applications for the same piece of work.

7. Assessment Criteria and Scoring

7.1 Assessment Criteria

There are five assessment criteria for the Hydrogen BECCS Phase 1 Competition which are based on the competition's objectives and the likelihood of effective project delivery. Each criterion (including sub criteria where applicable) will be scored independently and will be given a score between 1-5.

In assessing applications to the Phase 2 competition, the assessment criteria are envisioned to be similar to Phase 1, but may be subject to minor modification. In particular, BEIS expects the work carried out during Phase 1 to enable assessment of Phase 2 applications on more precise and more quantitative grounds.

These guidance notes are designed to inform applicants of the information which should be provided in the application. The bullets listed under "applicants are expected to" in each criteria are there to provide applicants with BEIS's expectation of what should be covered when answering the assessment criteria. Each bullet has equal importance and applicants should try to cover each point where relevant and reasonable for the proposed innovation.

Criteria	Weighting
1. Innovative Hydrogen BECCS solution	30% Split into 1a 20%, 1b 10%
2. Cost reduction, emissions and environmental impact	20% split into 2a 10%, 2b 10%
3. Social Value	10%
4. Project Costs	15%
5. Project Delivery	25% Split into 5a 15%, 5b 10%

The scoring guidance and the criterion weighting is summarised in the table below.

Criterion 1	Innovative Hydrogen BECCS solution
Weighting	30% Split into 1a 20%, 1b 10%
Guidance	This criterion will be used to assess the merits of the innovation, its technical feasibility, scalability and the commercial opportunity that exists.
Criterion 1a	Technical feasibility and merits
Weighting	20%
Guidance	Maximum word count for responses: 1,500. Applicants are expected to:

	<ul style="list-style-type: none"> Describe the innovation, with appropriate explanation of any relevant technical, mechanical or scientific evidence to demonstrate its technical feasibility and merits. Explain how the innovation is novel and how its performance compares to other state of the art solutions on the market. Describe how the innovation will be compatible with Carbon Capture & Storage. Describe the technology development status with reference to the Technology Readiness Level at the start of the project, and at the end of the project (following Phase 2 demonstration). Describe how the Phase 1 feasibility study will further validate the estimated performance of the commercialised solution. Please note to be eligible for this competition your technology must have a TRL of 4-6. Outline the project expected to be carried out in Phase 2, including what is expected to be physically demonstrated and the benefits of carrying out the demonstration. Refer to the scale of the unit to be demonstrated.
Criterion 1b	Scalability and commercial opportunity
Weighting	10%
Guidance	<p>Maximum word count for responses: 1,000.</p> <p>Applicants are expected to:</p> <ul style="list-style-type: none"> Describe the target market for the innovation detailing its size and nature. Describe the intended scale of your innovation for commercial viability. Describe how the innovation will be commercially deployed at scale beyond Phase 2 to deliver maximum biohydrogen production and biogenic carbon removal, and how this aligns with the UK Government's legal commitment to achieve Net Zero greenhouse gas emissions by 2050. Describe how the commercialised solution will integrate with and benefit the Hydrogen BECCS process chain.

Criterion 2	Cost reduction, emissions and environmental impact
Weighting	20% split into 2a 10%, 2b 10%
Guidance	<p>This criterion will be used to assess how the development of the innovation will contribute to a reduced Levelised Cost of Hydrogen (LCOH) and reduced emissions and environmental impact in the Hydrogen BECCS process chain.</p> <p>Note that the purpose of Phase 1 feasibility studies is to address these points in greater detail and therefore, for entry into Phase 1, we only expect high level responses.</p> <p>Please refer to Appendix 4 – Environmental Considerations and Regulations which contains guidance provided to BEIS on behalf of the Environment Agency to assist applicants with considering the environmental impact of their technology and the regulations which must be adhered to.</p>
Criterion 2a	Cost reduction
Weighting	10%
Guidance	Maximum word count for responses: 1,000.

	<p>This criterion will assess the potential for the innovation to reduce costs in the Hydrogen BECCS process chain.</p> <p>Applicants are expected to:</p> <ul style="list-style-type: none"> • Complete the Excel document 'Levelised Cost of Hydrogen workbook': <ul style="list-style-type: none"> ○ Outline what specific cost reductions this innovation will deliver (e.g. Impact on Opex, Capex, Material Costs, etc.) ○ Estimate the overall reduction in LCOH that will be delivered by this innovation. • Explain how the cost reductions will be achieved. • Provide calculations to support claims and justify any assumptions made.
Criterion 2b	Greenhouse gas emissions and Environmental impact
Weighting	10%
Guidance	<p>Maximum word count for responses: 1,000.</p> <p>This criterion will assess the potential environmental benefits and risks of the proposed innovation.</p> <p>Applicants are expected to:</p> <ul style="list-style-type: none"> • Provide an initial assessment of the potential environmental benefits and risks of the proposed innovation (to be further described and quantified during Phase 2). Where significant environmental risks are identified, appropriate mitigation actions must be described. <p>Depending on the project, relevant considerations may include:</p> <ul style="list-style-type: none"> ○ Greenhouse gas emissions ○ Energy demand ○ Water demand ○ Water quality impacts ○ Air quality impacts ○ Biodiversity impacts ○ Land impacts

Criterion 3	Social Value
Weighting	10%
Guidance	<p>Maximum word count for responses: 750.</p> <p>This criterion will be used to assess the potential for the proposed Phase 1 project to generate social value.</p> <p>Describe the commitment your organisation will make to ensure that opportunities under the contract deliver the Policy Outcome of <i>Creating new businesses, new jobs and new skills</i>, specifically any/all of the following benefits:</p> <ul style="list-style-type: none"> • Create opportunities for entrepreneurship and help new organisations to grow, supporting economic growth and business creation, or • Create employment and training opportunities particularly for those who face barriers to employment and/or who are located in deprived areas, and for people in industries with known skills shortages or in high growth sectors, or

	<ul style="list-style-type: none"> Support educational attainment relevant to the contract, including training schemes that address skills gaps and result in recognised qualifications. <p>Also provide information about how you will monitor, measure and report on your commitments and the social value impact of your project.</p>
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Criterion 4	Project Costs
Weighting	15%
Guidance	<p>Maximum word count for responses: 1,500.</p> <p>This criterion will be used to assess:</p> <ul style="list-style-type: none"> Phase 1 feasibility study project costs, to ensure that all costs are eligible and represent a fair market value. Robustness of the Phase 1 feasibility study project costs, i.e., whether the proposed eligible project costs are realistic and justified in terms of the proposed project plans, <u>and</u> sufficient to provide the deliverables sought. <p>Please note, overheads must not amount to more than 50% of the value of the contract, and as a guide, BEIS would not expect overheads to amount to more than 20% of the value of the contract unless fully justified. There must also be no element of profit in the eligible project costs.</p> <p>Applicants are expected to:</p> <p>Fill in and attach the 'Hydrogen BECCS Finance Form' for Phase 1 project costs and provide a description of the costs as detailed in the Finance Form, addressing the following:</p> <ul style="list-style-type: none"> Describe the basis of the project costs for Phase 1 with reference to delivery of the milestones in the project plan. Justify that the proposed Phase 1 costs meet the competition's Eligibility Criteria, are realistic in terms of the project plan and are sufficient to yield the proposed deliverables. The full list of eligible project costs is set out in Appendix 2 of the Competition Guidance Notes. Justify personnel including actual labour costs, material costs and depreciation of capital items. Describe why the application represents good value for money for HM Government, including how the availability of public funding makes a material difference to the actuality and pace of moving the solution towards commercialisation. Provide evidence for the additionality achieved with this funding.

	<ul style="list-style-type: none"> • In recognition of the fact that the risks of the project development are shared with HM Government, but the applicant stands to gain all of the benefits occurring after completion of the project, explain where cost savings, from the point of view of HM Government, will be provided. • Provide an initial estimated outline of costs for the proposed Phase 2 demonstration project.
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Criterion 5	Project Delivery
Weighting	25% Split into 5a 15%, 5b 10%
Guidance	This criterion will be used to assess the proposed approach to delivering the Phase 1 project.
Criterion 5a	Project Plan
Weighting	15%
Guidance	<p>Maximum word count for responses: 1,500.</p> <p>This criterion will assess the proposed project plan for Phase 1 by looking at a range of factors.</p> <p>Applicants are expected to:</p> <ul style="list-style-type: none"> • Complete and attach a project delivery plan Gantt Chart and detailed Risk Register (including technical, commercial, financial risks and consideration of health and safety and other regulatory requirements) for the Phase 1 project. • Provide a comprehensive delivery plan for the Phase 1 project, including the scope of work, key work packages, deliverables and milestones. • Describe the approach to quality assurance, data quality, oversight and governance of the project. • Outline preliminary approach/plan for testing the innovation during Phase 2 (including parameters to be tested, duration of testing and the potential partners for executing testing, if appropriate). Describe the work which will be carried out in Phase 1 to produce a robust testing plan to be executed in Phase 2 if successful in securing funding. Please refer to Section 5.3.4 for details on BEIS's expectations for testing innovations.
Criterion 5b	Project Team and Organisation
Weighting	10%
Guidance	<p>Maximum word count for responses: 1,000.</p> <p>Applicants are expected to:</p> <ul style="list-style-type: none"> • Provide an organogram and outline the key roles for each partner and the proposed governance arrangements between the partners to ensure effective project delivery. • List any external parties responsible for delivering goods or services worth more than 10% of the total project value and explain what contractual relationship will be in place (e.g. subcontractor or

	<p>consortium member, etc.) and how they will ensure that these parts of the project do not give rise to delays in the delivery of the project.</p> <ul style="list-style-type: none"> • Provide details of the relevant skills, qualifications, and experience of the project team members, and their capability to successfully deliver the Phase 1 project. Include descriptions and evidence of previous relevant work carried out. • Provide brief CVs of key individuals within the project (CVs should be no longer than 2 pages each). <p>Applicants involved in multiple applications to the Hydrogen BECCS Phase 1 competition should detail how they will ensure they have capacity to deliver if more than one of their applications is awarded a contract.</p>
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7.2 Scoring Guidance

We will select projects that offer the best value for money overall based on their assessment against the criteria outlined in Section 7.1. Each criterion will be scored using the five scoring descriptors set out below in table below.

Score	Description
1	Not Satisfactory: Proposal contains significant shortcomings and does not meet the required standard.
2	Partially Satisfactory: Proposal partially meets the required standard, with one or more moderate weaknesses or gaps.
3	Satisfactory: Proposal mostly meets the required standard, with one or more minor weaknesses or gaps.
4	Good: Proposal meets the required standard, with moderate levels of assurance.
5	Excellent: Proposal fully meets the required standard with high levels of assurance.

8. Eligibility for Funding

Competition Eligibility Criteria (Phase 1)

To be eligible for funding, proposed projects must meet all the following eligibility criteria:

8.1 Innovation and technology readiness

This Competition is to support the development of innovative Hydrogen BECCS projects. It is to support the development of technologies that are not yet commercial from **Technology Readiness Levels (TRLs) 4 to 6 at the start of the project.** (Further information on TRLs can be found in the Competition Guidance Notes Appendix 1).

Eligibility question: Will your technology / system be at TRL 4 – 6 at the start of the project? YES/ NO

8.2 Technology scope

The technology must be in scope for the category applied for as per the guidance provided in the Competition Guidance Notes, Section 4.

Eligibility question: is the technology in scope? YES/NO

8.3 Exclusions

Funding will not be provided for projects where the technology development focuses on any of the out-of-scope technologies as described in the Competition Guidance Notes Section 4.5.

Eligibility question: Does your application exclude costing/budget for any of the technology exclusions listed in the Competition Guidance Notes Section 4.5? YES/NO

8.4 Project status

BEIS is unable to fund retrospective work on projects.

Eligibility question: Can you confirm that your application does not seek funding for retrospective work on this project? YES/ NO

8.5 Project lead

The project lead must be a UK registered company, academic, research, public, third sector or community organisation.

Eligibility question: Can you confirm that the project lead meets the eligible organisation requirements? YES/NO

8.6 Project Location

Phase 1 and Phase 2 activities funded in the Competition 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).

Eligibility question: Can you confirm that over 50% of the eligible project activity (resources and goods) for phases 1 and 2 will be incurred in the UK? YES/NO

8.7 Additionality

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.

Eligibility question: Can you confirm that this project would not be taken forward (or would progress at a much slower rate) without public sector funding? YES/ NO

8.8 Contract size

Contracts will be awarded in this Competition in two phases:

Phase 1 – Feasibility study (SBRI): Split into Category 1, Category 2 and Category 3 with a total allocation across all categories of £5m. The maximum funding available per feasibility study is £250k and the full project cost must be a minimum of £50k (this must cover 100% of project costs).

Phase 2 – Demonstration phase (SBRI): The total budget for Phase 2 to is to be confirmed however BEIS intends to fund at least two demonstration projects in each category. Each category will have a maximum budget for funding Phase 2 projects, and a maximum cost per project (excluding VAT) as follows:

Category 1: £2.5m

Category 2: £5m

Category 3: £5m

Eligibility question: Can you confirm the funding you are requesting for your Phase 1 project cost is between £50k - £250k (excluding VAT)? YES/NO

Eligibility question: Can you confirm the funding you intend to request for your Phase 2 project will be equal to or below £2.5m (excluding VAT) if applying to Category 1 or equal to or below £5m (excluding VAT) if applying for Categories 2 and 3? YES/NO

8.9 Eligible project costs

SBRI is aimed at organisations working on research and development (R&D) of an innovative process, material, device, product, or service prior to commercialisation. Funding is available for R&D activities only, including related dissemination activity. Projects requesting funding for commercialisation activities are not eligible.

The full list of eligible project costs is set out in Appendix 2 of the Competition Guidance Notes. BEIS must fund **100% of eligible project costs**, no match or in-kind funding is allowed.

Eligibility question: Can you confirm that requested funding is for eligible costs only and you require BEIS to fund 100% of those costs? YES/ NO

8.10 Project end date

The Phase 1 project and final report must be completed and the report submitted to BEIS by **12 noon BST, 30 November 2022**, and approved by BEIS by **12 noon BST, 13 January 2023**. Before submitting the final report to BEIS, projects should allow time for their monitoring officer to review a draft report and for project teams to make any necessary changes based on monitoring officer feedback. This process can take up to a month and should be included in your project plan. Phase 2 demonstration projects and final deliverables must be completed and approved by **31 March 2025**. Projects should allow at least a month for BEIS approval of the final deliverables.

Eligibility question: Can you confirm that the project will meet the specified project end dates? YES/ NO

8.11 Risk-Benefit sharing

The sharing of *risks and benefits* is an important aspect to the SBRI approach. Projects receive financial support and retain any intellectual property generated, with certain rights of use retained by BEIS. Project outputs are also expected to be shared widely and

publicly and project teams are not permitted to include profit in the eligible project costs (for Phase 1 or Phase 2).

Eligibility Question: Do you agree to this approach? YES/NO

8.12 Delivering multiple projects

If project consortium member(s) are part of multiple successful applications, they must be able to deliver on them and they must not have applied for funding for the same piece of work more than once.

Eligibility question: If you or your consortium are part of multiple successful applications, would you be able to successfully deliver all projects if necessary? YES/NO/ N/A

Eligibility question: If you or your consortium are part of multiple applications to this competition, please confirm that you have not submitted the same application, or applied for funding for the same piece of work, more than once? YES/NO/ N/A

8.13 Multiple applications

If you intend to submit multiple applications, you must comply with the following limits of entry into the competition:

- a. Lead organisations may only enter **one** application into each Category as the project lead.
- b. A technology provider/OEM are limited to **one** application for a particular technology/solution requiring development per Category.

Eligibility question: Can you confirm the lead organisation has only submitted one application per Category as the project lead? YES/NO

Eligibility question: If you are a technology provider or OEM, and you or your consortium are part of multiple applications, could you confirm that only one application per technology has been submitted per Category? YES/NO/ N/A

9. Contract Size and Restrictions on Funding

9.1 Competition Budget and Availability

BEIS reserves the right to allocate more or less than the total budget depending on the number and quality of applications received and budget availability.

9.1.1 Phase 1

A maximum of £5m will be available for Phase 1 feasibility studies, with a maximum expected value of £250k (excluding VAT) per project. BEIS reserves the right to allocate more or less than the total budget depending on the number and quality of applications received and budget availability.

Funding will be split equally between categories and assigned to projects ranked in order of merit and scoring above the pass rate (60%). Any remaining budget in a category will be transferred to a central pot, where all remaining/unfunded projects across the Categories will be combined and ranked in order of merit, funding will be assigned against order of merit to projects (with a minimum 60% threshold mark) until the central pot of money runs out.

9.1.2 Phase 2

The maximum funding available per project in Phase 2 depends on the category which is applied to:

- Category 1 (feedstock pre-processing) £2.5m (excluding VAT)
- Category 2 (gasification components) £5m (excluding VAT)
- Category 3 (novel biohydrogen technologies) £5m (excluding VAT)

All project activities, including reporting and payments, need to be completed by **31st March 2025**. All costs should be provided excluding VAT, though where VAT applies, applicants should specify the amount. Your total costs excluding VAT should not exceed the maximum allowable budget per project. Any costs incurred by the project that is greater than the agreed total project costs will not be covered by BEIS.

Note: Nothing in this funding call requires BEIS to award any applicant a contract of any particular amount or on any particular terms. BEIS reserves the right not to award any contracts, in particular if BEIS is not satisfied by the applications received or if the funding assigned to the scheme is required for other, unforeseen, purposes. BEIS will not, under any circumstances, make any contribution to the costs of preparing applications and applicants accept the risk that they may not be awarded a contract. Projects cannot change the category they have applied to between Phase 1 and Phase 2.

9.2 Eligible Costs

Applicants are instructed that the project costs quoted must reflect actual costs at a 'fair market value' and for this Competition, **profit must not be included**, including within labour costs which should include salary plus employer costs only.

Applicants **must** ensure all your project costs are eligible (See Appendix 2). At any stage of the competition BEIS can ask for any ineligible cost to be removed from the project costs.

Applicants must justify all costs in their application.

All eligible project costs must be **100% funded by BEIS**. Projects which have higher costs than the maximum allowed in each Phase (Phase 1 £250k excluding VAT and Phase 2 £2.5m - £5m excluding VAT) are ineligible, even if the project team are providing the additional/in-kind funding.

Please note this does not exclude projects from covering any ineligible costs at their own expense, however they will not be included in the assessment of the project or form part of the contract.

To note, if an individual sub-contractor costs are more than 20% of the total project costs, BEIS requires a high-level breakdown of the sub-contractor costs in the application's Finance Form, under the 'Project Delivery' assessment criterion (guidance provided in the Finance Form).

In Phase 1, eligible costs (those directly associated with preparation of the feasibility study) will be considered. However, an indication of the potential costs involved in participating in Phase 2 is also required when applying for Phase 1.

In Phase 2, eligible costs are those directly associated with the development, implementation, monitoring, and decommissioning (if necessary – see Section 9.3) of the Hydrogen BECCS demonstration projects.

Further details of eligible and ineligible costs are provided in Appendix 2. Applicants must complete the Competition [Finance Form](#) (separate spreadsheet) to provide the necessary cost information for the assessment process; further itemisation of costs and methods of calculation may be requested to support the application.

9.3 Decommissioning Costs

Where the Hydrogen BECCS innovation includes a physical asset, the chosen suppliers will have responsibility for decommissioning demonstration equipment when the project has been completed if it is not feasible to continue to operate/develop the equipment.

When applying, suppliers need to include any decommissioning costs, at fair market value, in the total estimated costs for the Phase 2 demonstration project.

9.4 Financial Information

Applicants are requested to provide a fixed price quotation for the work. A detailed cost breakdown is required to enable assessment of value for money.

Financial information should include costs for Phase 1 of the project, detailing labour (including manpower rates), material and capital equipment costs, and any travel and subsistence requirements. Applicants are required to complete a detailed financial summary template (the Finance Form) as part of the application process.

Estimated project costs should also be provided for the Phase 2 demonstration study in the response to Assessment Criterion 4.

9.5 Financial viability checks

BEIS will undertake financial viability checks on all successful applicants. These will include looking at the latest independently audited accounts filed on the Companies House database. BEIS reserves the right to also verify the financial viability of all members of the consortium and key sub-contractors.

Where a business is not required to file accounts with Companies House, other financial information may be requested to enable an appropriate financial viability review to be undertaken. We will be looking for evidence of your ability to resource the cashflow for the project appropriately, so the information we request will be focused on understanding how your business operates in this respect.

Before your project starts, BEIS will ask for evidence that you have the funding mechanisms in place to manage your cash flow across the life of your project. This could include letters of credit or other such mechanisms.

BEIS will not make payments in advance of need and typically makes contract payments in arrears on satisfactory completion of agreed milestones and deliverables. BEIS understands, however, the difficulties which small businesses may face when financing this type of project. BEIS will explore cash flow issues with the applicant as part of developing the financial and milestone profile during the Contract Award process. BEIS will offer flexibility in terms of profiles and payments, within the confines of the requirements for use of public money within which it operates.

9.6 General BEIS procurement conditions

There are six declaration forms which must be completed by each applicant, covering issues such as: conflict of interest, non-collusion, bribery, corruption and fraud, GDPR assurance and overall agreement to the terms of this pre-commercial procurement process.

These declarations are provided on the competition [website](#). These should be downloaded, signed and uploaded into the [application form](#).

Conflicts of interest: The BEIS standard terms and conditions of contract include reference to conflict of interest and require contractors to declare any potential conflict of interest to the Secretary of State.

For research and analysis, conflict of interest is defined as the presence of an interest or involvement of the contractor, subcontractor (or consortium member) which could affect the actual or perceived impartiality of the research or analysis.

Where there may be a potential conflict of interest, it is suggested that the consortium or organisation designs working arrangements such that the findings cannot be influenced (or perceived to be influenced) by the organisation that owns a potential conflict of interest. For example, consideration should be given to the different roles which organisations play in the research or analysis, and how these can be structured to ensure an impartial approach to the project is maintained.

This is managed in the procurement process as follows:

- During the application process, organisations may contact BEIS to discuss whether or not their proposed arrangement is likely to yield a conflict of interest.
- **Contractors are asked to sign and return Declaration 3** to indicate whether or not any conflict of interest may be, or be perceived to be, an issue. If this is the case, the contractor or consortium should give a full account of the actions or processes that it will use to ensure that conflict of interest is avoided. In any statement of mitigating actions, contractors are expected to outline how they propose to achieve a robust, impartial and credible approach to the research.
- When tenders are scored, this declaration will be subject to a pass/fail score, according to whether, on the basis of the information in the application and declaration, there remains a conflict of interest which may affect the impartiality of the research.

Failure to declare or avoid conflict of interest, or perceived conflict of interest, at this or a later stage may result in exclusion from the procurement competition, or in BEIS exercising its right to terminate any contract awarded.

10. Notification and Publication of Results

10.1 Notification

Applicants will be informed by email whether their application has been successful, subject to compliance with the terms and conditions of the Conditional Contract Offer (conditional on successfully passing due diligence).

BEIS may wish to publicise the results of the scheme, which may involve engagement with the media. At the end of the application and assessment process, BEIS may issue a press release or publish a notice on its website. These public documents may, for example, outline the overall results of competitions and describe some of the projects to be funded.

Some organisations may want their activities to remain confidential and you will be given a chance to opt out of any involvement in media relations activity and further case study coverage of projects, should you see this as being necessary. However, the public description of the project you provide in your application will be made available in the public domain if your application is successful, and you are not able to opt out of the project description being published, as such, you must provide a short description (<400 words) of your proposed hydrogen supply solution. In addition, all funded projects must include reporting and dissemination milestones – agreed with BEIS – as part of their project deliverables. Information about all contracts awarded will also be published on [Contracts Finder](#) as legally required under The Public Contracts Regulations 2015.

Any organisation that wishes to publicise its project, at any stage, must contact the Competition Project Manager or their Project Monitoring Officer at BEIS for approval.

10.2 Publication of results

SBRI involves a high degree of risk–benefit sharing. In return for provision of funding and non-financial support during demonstration activities, BEIS expects to be able to use and share the results and outputs of the demonstration activities with other government departments and on the government website (gov.uk).

BEIS also wishes to publicise details of the award recipients. Therefore, on or after issuing a SBRI contract, BEIS will publish the following information:

- Identity of the participant and its partners
- Project summary information including aims and expected outcomes of the project and technology area
- Total award value

Following completion of the funded projects, BEIS will publish on its website a summary of the funded activities and the outcomes achieved. This will include a final summary report from each project detailing technical approach, and key achievements. BEIS may also revisit projects at a later date and publish an evaluation report for the competition as a whole.

BEIS recognises the need to maintain confidentiality of commercially sensitive information. We will consult applicants regarding the nature of information to be published, to protect commercially sensitive information. The notice of the award on [Contracts Finder](#) will also include the value of the contract.

11. Reporting, Knowledge Sharing, Evaluation and Intellectual Property Requirements

11.1 Reporting, Knowledge Sharing and Evaluation Requirements

There will be several requirements on contractors during the project, including after the final payment milestone:

11.1.1 Reporting

To track project progress and ensure payments are made according to a schedule of milestones to be agreed with selected projects. This reporting will be in confidence to BEIS and its technical advisers and will not be published. Any changes to schedules or project plans will need to be discussed with BEIS and applicants should expect significant interaction with the team during the project.

11.1.2 Monitoring

Regular project monitoring and reporting will take two forms:

1. Project teams will be required to meet with their Monitoring Officer⁵ at least once per month to discuss project progress and highlight successes, issues, and risks.
2. Projects will be required to submit a project progress report every quarter (only one quarterly report will need to be submitted in Phase 1). We expect this report to cover, as a minimum:
 - a. progress against the project delivery plan and project milestones
 - b. upcoming work over the next quarter
 - c. financial information (including budget spend so far and budget forecast)
 - d. an updated risk register (including flagging where risk ratings have changed, or new risks/issue have emerged)
 - e. any key lessons learnt during delivery
 - f. progress against relevant programme KPIs, if relevant for that quarter

11.1.3 Evaluation

BEIS requires all funded projects under the Net Zero Innovation Portfolio (NZIP) to report on key performance indicators (referred to as NZIP KPIs) to provide a consistent approach to reporting evidence, and to track and measure key outputs, outcomes and impacts. The evidence collected is used to demonstrate the impact of the NZIP on achieving the government's Net Zero ambitions and is necessary to be able to run future competitions.

⁵ Please note, in some instances the monitoring services will be provided by a third party organisation. Third party organisations will be subject to a confidentiality agreement.

Project lead organisations will be required to report on KPIs at various intervals for each project, including at the start of the project, during project delivery, at project closure and for three years after project closure. BEIS will supply funded projects with a reporting template to complete at set intervals, and recipients are expected to return the template to their Monitoring Officer upon completion, who will review and quality assure it. At project start, your BEIS Monitoring Officer will provide further details about the calculation of these KPIs and assist with the initial completion and measurement. Details of the KPIs which will be collected are provided in Appendix 3 – Net Zero Innovation portfolio Key Performance Indicators.

Please note that it may at times be necessary to make changes to the NZIP KPIs, data collection modes or frequencies. We will endeavour to keep all changes to a minimum and communicate any implications to you via the Monitoring Officers in advance of collection.

Beyond these NZIP KPIs, BEIS conducts independent evaluations of many of its programmes. The funded project organisation will be required to collaborate in reasonable evaluation activities, including, but not limited to, providing programme-specific KPIs, completing questionnaires or surveys, participating in interviews and workshops, communicating the learnings from the project, providing costs/sales data and elaboration of any of the measures covered in the NZIP KPIs.

By submitting a bid, you agree that BEIS can hold your contact details for evaluation purposes for the duration of the competition, even if your bid is not successful. BEIS may, within that time, contact you to request your participation in an evaluation, exploring issues such as the application process or the development of your technology in the absence of BEIS funding. You are not required to participate in such an evaluation.

11.1.4 Knowledge Sharing

Knowledge sharing: effective dissemination and knowledge sharing are key requirements in this competition. Throughout the programme, BEIS will be exploring opportunities to facilitate knowledge sharing by funded projects, to ensure that the learnings from the programme are shared with relevant stakeholders.

11.2 Intellectual Property

The proposed arrangements for Intellectual Property Rights (IPR) and exploitation of IPR are set out in the Contract Terms and Conditions published with this competition ITT.

Subject to the requirements of Conditions 27(3), 28(5) and 28(7) of the pre-commercial terms and conditions (Contract Terms and Conditions), applicants will retain ownership of the intellectual property generated from the project. Applicants are required to identify and record any such intellectual property and to protect patentable knowledge in accordance with Condition 28 of the Contract Terms and Conditions. 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 licence the Arising Intellectual Property to third parties nominated by BEIS.

For further information please refer to the Contract Terms and Conditions, notably Conditions 27 and 28.

11.3 Ownership of Demonstration Devices

Subject to the terms and conditions applicable to intellectual property within the terms and conditions, suppliers will retain responsibility and ownership for the technologies and demonstration devices developed. Suppliers will retain responsibility and ownership for the technologies and related equipment developed and used during the delivery of the contracts.

12. Feedback, Re-application and Right of Appeal

A short summary of key feedback regarding the applications will be provided to all applicants. This feedback will be based on the comments of technical assessors. No additional feedback will be provided and there will be no further discussion on the application.

The feedback from the assessors is intended to be constructive. Comments are not a checklist of points which must be answered or argued in a resubmitted application as the assessors/requirements may be different and it is your decision as to whether you act on the suggestions made.

13. Confidentiality and Freedom of Information

Where any request is made to BEIS under the Freedom of Information Act 2000 (“FOIA”) for the release of information relating to any project or applicant, which would otherwise be reasonably regarded as confidential information, BEIS will notify you of the request as soon as we become aware of it. An applicant must acknowledge that any lists or schedules provided by it outlining information it deems confidential or commercially sensitive are of indicative value only and that BEIS may nevertheless be obliged to disclose information which the applicant considers confidential.

As part of the application process all applicants are asked to submit a public description of the project. This should be a public facing form of words that adequately describes the project but that does not disclose any information that may impact on Intellectual Property (IP), is confidential or commercially sensitive. The titles of successful projects, names of organisations, amounts awarded, and the description of the project may be published once the award is confirmed as final.

All reviewers, internal and external, used during the assessment of applications and project monitoring officers will be required to consider and identify any conflicts of interest. Reviews and project monitoring arrangements will only proceed once BEIS is in receipt of reviewers’ declared Conflict of Interest forms.

14. Further Instructions to Applicants

Please refer to the Hydrogen BECCS Innovation Programme Competition Q&A document, published on the competition [website](#) for responses to questions raised at the Virtual Supplier Engagement Workshop held on the 23rd of November 2021.

The Department reserves the right to amend the enclosed Competition documents at any time prior to **12 noon BST, 7th February 2022**. Any changes are most likely to correct editorial errors and may include further FAQs on the Competition Guidance Notes asked by stakeholders **before 12 noon BST, 26th January 2022**. Any such amendment will be numbered, dated and issued on the competition [website](#). Where amendments are significant, the Department may, at its discretion, extend the deadline for receipt of tenders.

The Department reserves the right to withdraw this contract opportunity without notice and will not be liable for any costs incurred by contractors during any stage of the process. Contractors should also note that, in the event an application is considered to be fundamentally unacceptable on a key issue, regardless of its other merits, that application may be rejected. By issuing this Competition document, the Department is not bound in any way and does not have to accept the lowest cost, or any application and reserves the right to accept a portion of any application unless the tenderer expressly stipulates otherwise.

Appendix 1 – Technology Readiness Levels (TRLs)

Technology readiness levels are an indication of the maturity stage of development of a technology on its way to being developed for an application or product. The table below defines TRLs 1 to 9.

TRL 1 – Basic Research	Scientific research begins to be translated into applied research and development.
TRL 2 – Applied Research	Basic physical principles are observed, practical applications of those characteristics can be 'invented' or identified. At this level, the application is still speculative: there is not experimental proof or detailed analysis to support the conjecture.
Applied research and development	
TRL 3 – Critical Function or Proof of Concept Established	Active research and development is initiated. This includes analytical and laboratory studies to physically validate analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative.
TRL 4 – Laboratory Testing/Validation of Component(s)/Process(es)	Basic technological components are integrated to establish that the pieces will work together.
TRL 5 – Laboratory Testing of Integrated/Semi-Integrated System	The basic technological components are integrated with reasonably realistic supporting elements so it can be tested in a simulated environment.
Demonstration	
TRL 6 – Prototype System Verified	Representative model or prototype system is tested in a relevant environment.
TRL 7 – Integrated Pilot System Demonstrated	Prototype near or at planned operational system, requiring demonstration of an actual system prototype in an operational environment.
Pre-commercial deployment	
TRL 8 – System Incorporated in Commercial Design	Technology is proven to work - actual technology completed and qualified through test and demonstration.
TRL 9 – System Proven and Ready for Full Commercial Deployment	Actual application of technology is in its final form - technology proven through successful operations.

Appendix 2 - Eligible and Ineligible Costs

1. Eligible Costs

Directly incurred costs:

These are costs that are specific to the project that will be charged to the project as the amount spent, fully supported by an audit record justification of a claim. They comprise:

- a) Labour costs for all those contributing to the project, broken down by individual salary and employer costs.
- b) Material costs (including consumables specific to the project)
- c) Capital equipment costs
- d) Sub-contract costs
- e) Travel and subsistence

Indirect costs:

Indirect costs should be charged in proportion to the amount of effort deployed on the project. Applicants should document the methodology they have applied to calculate them, using their own cost rates. They may include:

- f) General office and basic laboratory consumables
- g) Library services / learning resources
- h) Typing / secretarial
- i) Finance, personnel, public relations and departmental services
- j) Central and distributed computing
- k) Overheads (Overheads must not amount to more than 50% of the value of the contract, and as a guide, BEIS would not expect overheads to amount to more than 20% of the value of the contract unless fully justified.)

2. Ineligible Costs

Under no circumstances can costs for the following items be claimed:

- l) Commercialisation activities
- m) Profit (i.e. applicants should not include profit for themselves or the other project team members, including within indirect costs or as a separate project cost)
- n) Contingency sums
- o) Protection of IPR

- p) For activities of a political or exclusively religious nature
- q) In respect of costs reimbursed or to be reimbursed by funding from other public authorities or from the private sector
- r) In connection with the receipt of contributions in kind (a contribution in goods or services as opposed to money)
- s) To cover interest payments (including service charge payments for finance leases)
- t) For the giving of gifts to individuals, other than promotional items with a value no more than £10 a year to any one individual
- u) For entertaining (entertaining for this purpose means anything that would be a taxable benefit to the person being entertained, according to current UK tax regulations)
- v) To pay statutory fines, criminal fines or penalties
- w) In respect of VAT that you are able to claim from HM Revenue and Customs.
- x) Costs associated with preparing and/or submitting an application for Phase 1 and/or Phase 2.

Appendix 3 – Net Zero Innovation portfolio Key Performance Indicators

BEIS will be collecting the following KPIs, with data provided by Monitoring Officers marked in *italics*. Not all data will be collected annually.

KPI	KPI description	Metrics
KPI 1	<i>Number of NZIP projects supported</i>	<ul style="list-style-type: none"> • <i>Project start and completion.</i>
KPI 2	<i>Number of NZIP projects that have met objectives</i>	<ul style="list-style-type: none"> • <i>Extent to which project objectives have been met to date</i> • <i>Change in objectives and reasons for change</i>
KPI 3	<i>Number of organisations supported to deliver the project</i>	<ul style="list-style-type: none"> • <i>Lead partner delivering the project: name, organisation size and number of jobs supported within the organisation to deliver the project.</i> • <i>Other partner organisations involved in delivering the project as named on the Contract or Grant: name, organisation size and number of jobs supported within the organisation(s) to deliver the project.</i>
KPI 4	Number of active contractual and non-contractual business relationships supported	<ul style="list-style-type: none"> • Number of contractual relationships: name and type of contractual relationship. • Number of formal non-contractual business relationships: name and type of non-contractual relationship • Extent to which your organisation expanded its network of business relationships as a result of the project
KPI 5	Technology Advancement	<ul style="list-style-type: none"> • Technology Readiness Levels (current and anticipated) • Other technology improvement indicators: patents applied for or granted; academic, technical or non-technical publications generated and knowledge exchange events attended (such as conferences)
KPI 6i	<i>Initial Financial Leverage to deliver project</i>	<ul style="list-style-type: none"> • <i>Project funding structure: Amount in £m of BEIS, Other Public Sector and Private Funding.</i>

6ii	Follow-on Funding secured	<ul style="list-style-type: none"> • Amount of follow-on funding raised and the source (public or private).
KPI 7i	Reduction in energy costs	<ul style="list-style-type: none"> • Scope and scale of impact on reducing energy costs • Route to reducing energy costs
7ii	Increased energy efficiency/ Reduced energy demand	<ul style="list-style-type: none"> • Scope and scale of impact on reducing energy demand/ increasing energy efficiency
7iii	Increase in energy system flexibility	<ul style="list-style-type: none"> • Scope and scale of impact on energy system flexibility • Route to increasing energy system flexibility
KPI 8	Commercialisation advancement	<ul style="list-style-type: none"> • Commercial readiness levels (current and anticipated) • Steps towards commercialisation incl. licensing agreements, commercial partnerships, product certifications etc.; national/ international standards passed • UK and International sales secured and their value (£m)
KPI 9	CO ₂ emissions reductions	<ul style="list-style-type: none"> • Scope and scale of project impact on carbon emissions • Route to achieving carbon emissions reductions
KPI 10	Policy impact	<ul style="list-style-type: none"> • Whether, how, and to what effect evidence from the project has informed policy development • Whether projects have engaged in activities with industry or civil society

Appendix 4 – Environmental Considerations and Regulations

The following guidance is provided by BEIS on behalf of the Environment Agency to assist applicants with considering the environmental impact of their technology and the regulations which must be adhered to.

The Environment Agency protects our air, land and water and enables a net zero nation that's resilient to climate change. We work with government, policy makers and developers to manage environmental risks at the earliest opportunity and help industries prepare for necessary regulation. We also aim to build public trust in our regulation of the key environmental risks.

If you are developing or implementing a greenhouse gas removal (GGR), hydrogen or bioenergy carbon capture and storage project, we strongly encourage you to consider, as early as possible, the potential associated environmental impacts of your project. This consideration is needed at every stage of technology development to ensure that the risks to the environment and human health are adequately understood. The project should seek to design out and minimise environmental risks and maximise wider environmental co-benefits.

Environmental Principles

It is important to assess comprehensively what environmental risks could be associated with the technology you are testing, and how you can reduce those risks. We outline three environmental principles that summarise how you should approach this.

We are supportive of technologies and approaches that:

1. **Consider environmental risks early and comprehensively.** This includes:
 - a. Building environmental considerations into decision making at the earliest stage – not as an afterthought
 - b. Providing robust evidence that allows the environmental risks to be effectively managed and regulated, and which considers risks of deployment at commercial scale
 - c. Assessing all impacts from cradle-to-grave - including harvesting feedstocks & raw materials, decommissioning, and safe long-term recovery or disposal of waste
 - d. Engaging the public so they understand the risks and benefits
2. **Minimise the impacts and risks to people and our environment** – air, land and water. This includes:
 - a. Maximising decarbonisation and greenhouse gas reduction within safe environmental limits

- b. Maximising resource, energy and water efficiency – wasted resources, energy and water represent harm without benefits
- c. Maximising co-benefits for people and the environment

3. **Are fit for the future**, including resilience to the impacts of climate change

Environmental Regulation

We are supportive of innovation and know that some of the technologies and approaches we'll need to achieve UK Net Zero by 2050 haven't yet been invented. We want to help innovators to design solutions to the climate emergency that are fit for the future and safe for people and wildlife. We also want to ensure that innovative Hydrogen BECCS technologies are subject to proportionate and risk-based regulation to provide the necessary level of environmental protection. This includes developing [Best Available Techniques](#) for new technologies and updating pre-existing BAT guidance, to prevent or minimise their emissions and impacts on the environment.

Please read and follow our regulatory guidance relevant to your technologies, some of which are listed below. Please note that we may charge for detailed pre-application and permitting advice. The scope and costs associated with this service will be discussed and agreed prior to providing detailed regulatory advice. Further details of our pre-application advice service [here](#).

If you have any further Hydrogen BECCS technology-specific queries then contact Ross Lowrie, Senior Advisor (Decarbonisation & Net Zero), at ross.lowrie@environment-agency.gov.uk.

Examples of guidance for specific Environment Agency regulation of relevance

Examples of guidance for specific Environment Agency regulation of relevance		
	Does your innovation project involve...	Regulations you may need to consider
	Planning Permission	<ul style="list-style-type: none"> • Environmental advice on planning proposals
	Getting an environmental permit	<ul style="list-style-type: none"> • Check if you need an environmental permit
	Control of Major Accident Hazards regulations (<i>Presence of Dangerous Substances</i>)	<ul style="list-style-type: none"> • COMAH

Air	Carbon Capture and Storage	<ul style="list-style-type: none"> • Carbon Capture and Storage Best Available Techniques • Environmental Risk Assessment for Carbon Capture and Storage
	Gasification	<ul style="list-style-type: none"> • Gasification, liquefaction and refining installations: guidance
	Anaerobic digestion	<ul style="list-style-type: none"> • Regulation Anaerobic Digestion (biogas-info.co.uk)
	Emissions to air	<ul style="list-style-type: none"> • Air quality in planning • Emissions Trading Scheme
Land	Waste management (Think very carefully about potential waste status of each output and check guidance)	<ul style="list-style-type: none"> • Check if your material is waste • Get an opinion from the definition of waste service • New waste management techniques • Waste and environmental impact • Register or renew waste exemptions • Incineration of waste (EPR5.01): guidance
	Spreading waste/ materials to land (e.g. biochar, enhanced weathering)	<ul style="list-style-type: none"> • Landspreading guidance • Storing and treating waste to make biochar: LRWP 60 • Storing and spreading biochar to benefit land: LRWP 61
Water	Water abstraction	<ul style="list-style-type: none"> • Fresh Water - Apply for a water abstraction or impoundment licence • Seawater - Do I need a marine licence Engage with Marine Maritime Organisation
	Effluent to water	<ul style="list-style-type: none"> • To Fresh Water and Sea water - engage with EA if novel, otherwise enhanced pre-application for Discharges to surface water and groundwater permit
	Farming	<ul style="list-style-type: none"> • Farming rules for water

Note: we are in the process of developing other guidance to support Hydrogen production and use (via both Blue or Steam Methane Reforming technology and Green techniques). Please refer to the GOV.UK EPR permitting guidance pages for our latest publications.

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