Cluster Sequencing for Carbon Capture Usage and Storage Deployment: Track-1 Expansion

Greenhouse Gas Removal Project Plan



© Crown copyright 2023

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

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

Any enquiries regarding this publication should be sent to us at: ccust1x@energysecurity.gov.uk.

# Contents

[Contents 3](#_Toc153200478)

[Greenhouse Gas Removal Project Plan Introduction 4](#_Toc153200479)

[Important information regarding this process 6](#_Toc153200480)

[Disclosure of information 8](#_Toc153200481)

[Glossary of terms 9](#_Toc153200482)

[Definitions 11](#_Toc153200483)

[Units 14](#_Toc153200484)

[1. Applicant information 15](#_Toc153200485)

[2. Eligibility 15](#_Toc153200486)

[3. GGR Project Overview 21](#_Toc153200487)

[4. Deliverability 27](#_Toc153200488)

# Greenhouse Gas Removal Project Plan Introduction

Greenhouse Gas Removal (GGR) technologies are important for reaching net zero – balancing residual emissions from hard-to-decarbonise sectors while providing new economic opportunities. For a GGR technology to deliver a negative emission, it must remove more greenhouse gases from the atmosphere than are generated from the carbon removal process, i.e., the process is net negative. In the Net Zero Strategy, we set an ambition to deploy at least 5 MtCO2/yr of engineered removals by 2030, potentially rising to 23 MtCO2/yr by 2035 and 75 - 81 MtCO2/yr by 2050.

Engineered GGRs cover a wide range of technologies, some of which require access to a CO2 transport and storage network to permanently store the removed CO2. Government aims to support a mix of GGR technologies, noting significant removals at scale in the 2030s are likely to come from those technologies, including DACCS, which require geological storage of CO2.

In March, we published the Net Zero Growth Plan[[1]](#footnote-2), setting out the actions we have taken and our future plans to help achieve our domestic and international carbon targets, and Net Zero Strategy commitments. This included announcing that subject to criteria under development, the Government was minded to enable engineered GGRs to apply to Track-1 expansion and Track-2 of the CCUS Cluster Sequencing Process.

We have consulted on our preferred business models to incentivise early investment in GGRs, with consultations on both a technology neutral engineered GGR business model and a power BECCS specific model. Alongside this Track 1 expansion project plan, we have published a [business model update including an indicative Heads of Terms for the GGR Business Model](https://www.gov.uk/government/publications/greenhouse-gas-removals-ggr-business-model). We also published the Biomass Strategy[[2]](#footnote-3) in August, setting out the role biomass can play in reaching net zero, what government is doing to enable that objective and where further action is needed.

Government is now inviting applications from engineered GGR projects that can deploy in line with Track-1 Expansion of the Cluster Sequencing Programme.

This document sets out the questions that GGR projects should answer as part of their Track-1 Expansion submission. The information and relevant supporting evidence provided by capture projects within the completed Project Plan will, alongside Initial Cost Information Form (Annex B4) and Financial Statement Form (Annex C), and the Economic Benefits Form (Annex D), form the basis of the assessment to determine which capture projects are shortlisted. This document is an Annex to the Track-1 Expansion Guidance Document and should be read alongside it. Please see the Track-1 Expansion Guidance Document for further guidance on the assessment process, including how the information will be assessed and note that the caveats and reservations set out in Chapter 2 of that document apply equally here.

The Track-1 Expansion CCUS Cluster Sequencing Process will be run by the Department for Energy Security and Net Zero (DESNZ). If applicants have any general questions about the submission process or about filling in any part of the submission documentation, please email queries to ccust1x@energysecurity.gov.uk.

## Important information regarding this process

* **The deadline** for finalised Track-1 Expansion submissions is 23:59 on 28 March 2024.
* The assessment process will be run fairly, transparently, and objectively in accordance with the published Track-1 Expansion guidance.
* The information provided within this form will be used throughout the Track-1 Expansion process and the negotiations/due diligence phase. Entering a negotiation does not mean that a contract will be awarded. Any decision to award support would only be made subject to the successful completion of any negotiation and due diligence.
* Further timetable details for this process are set out in the Track-1 Expansion Guidance Document.
* DESNZ will not be responsible for any costs incurred in the preparation of any submission, irrespective of whether the capture project is successful in the Track-1 Expansion process.
* Projects will need to satisfy the eligibility criteria to be considered in the Deliverability Assessment.
* Cost and Economic Benefit information will also be collected. Cost information provided will inform shortlisting and value for money assessment. Economic benefits data will not be considered when assessing Projects against the eligibility criteria and will also not be considered as part of the deliverability assessment. However, capturing the economic benefits of Net Zero is an important priority for UK government and to do this we need to develop robust, resilient, UK supply chains. If Applicants are shortlisted to go through to negotiations and/or offered access to the T&S network, HMG may ask the Applicant to submit or publish more detailed plans on supply chains, skills and economic benefits.
* This document, the GGR Project Plan, is divided into four sections:
	+ Section 1, Applicant Information.
	+ Section 2, Eligibility, information submitted in this section will be used to determine the eligibility of the GGR Project.
	+ Section 3, GGR Project Overview, information submitted in this section will be used to improve DESNZ’s understanding of the Project and may also be used to inform the Deliverability assessment.
	+ Section 4, Deliverability, information submitted in this section will be used to assess the project against the Deliverability criteria set out in the Track-1 Expansion guidance document.
* Alongside the GGR Project Plan the assessment of the Project will be supported by the submission of several forms:
	+ Annex B4 – Initial Cost Information Form will be used to assess the cost of the GGR Project.
	+ Annex C - Financial Statement Form will be used to assess the financial and commercial health of participating companies within the Deliverability criterion. This form should be considered supplementary to the questions to assess the Project’s deliverability. The figures included in the form should be supported by relevant accounting notes and documentation.
	+ Annex D – Economic Benefits Form seeks to understand how key components and services required to deliver the Project will be sourced; how risks that may affect the supply of these key components may be mitigated; and how Projects are engaging with new entrants and small and medium-sized enterprises (SMEs).
* Across the assessment DESNZ will place significant emphasis on the credibility and consistency of information provided.
* Information provided in the Eligibility and Project Overview section will be used to inform the Deliverability assessment. This is to allow for consistency and credibility checks and not so answers can be continued in other sections. Any obvious continuation of answers will be removed.
* After the GGR Project submissions have been individually assessed, DESNZ will carry out a Shortlisting Process, which has been designed to enable us to ensure the overall outcome of the process meets the strategic objectives of the Track-1 Expansion process and Department as a whole. The process used for this step is described in Chapter 9 of the Track-1 Expansion Guidance Document.
* DESNZ reserves the right not to accept any submission and reserves the right to cancel the process before it has completed or at any time before any support has been awarded.
* DESNZ reserves the right not to consider a submission further if an applicant fails to disclose information requested.
* Each individual piece of supporting evidence can be referenced multiple times in the GGR Project Plan but should be uploaded only once to the portal.
* Please note that the word limit does not cover the references sections. This is so applicants can be specific as to where information can be found in any documents provided. If this section is used to continue answers, the words will be removed before the assessment.
* Any information provided above the word limits will be removed before information is provided to assessors and will not count towards the score. We will remove words exceeding the count from the end of the relevant question or section. This will be completed before the documentation is provided to assessors.

## Disclosure of information

Reasons for decisions on submissions will be recorded at all stages for good administration and to ensure that there is a clear audit trail for all decisions. Administrative records will be maintained for all submissions irrespective of whether they are successful or not.

Please refer to Chapter 2.2 (Entry Process) of the Track-1 Expansion Guidance Document for additional detail on entry into non-disclosure agreements and Chapter 3 (Further Considerations) for additional detail on parties involved in the Track-1 Expansion process.

All information provided by applicants may be disclosed in accordance with DESNZ’s legal obligations (including under the Freedom of Information Act 2000 (FOIA), the Data Protection Act 2018, General Data Protection Regulation (GDPR) and the Environmental Information Regulations 2004 (EIR) in the event that a request for information is received). More information on the FOIA, Data Protection Act 2018, GDPR and EIR (including information on exemptions) can be found at: <https://ico.org.uk/for-organisations/>

To help DESNZ deal with information requests and without prejudice to the paragraph above, in the box below, please set out the reasons why you consider any specific information should not be disclosed, including (if possible) by reference to the specific exemption contained in the relevant legislation (for example, because disclosure of the information would prejudice your commercial interests under section 43 of the FOIA), explaining why this is the case.

Where appropriate, please also state whether you consider the reason(s) information should not be disclosed by DESNZ only apply for a particular time period. If we receive an information request, we will consider your views as stated on the submission form. However, DESNZ will ultimately decide how to respond to an information request and whether any information should be withheld, subject to the Information Commissioner's Office decision in the event of the requestor appealing the decision.

|  |
| --- |
| Please detail what specific information, if any, within this submission should not be disclosed and the reasons why. Please include (if possible) reference to the specific exemption contained in the relevant legislation. |
|  |

## Glossary of terms

Table – Acronyms

|  |  |
| --- | --- |
| Acronym | Definition |
| BAT | Best Available Technique |
| BECCS | Bioenergy with Carbon Capture & Storage |
| CapEx | Capital Expenditure |
| CfD | Contract for Difference |
| CO₂ | Carbon Dioxide  |
| COD | Commercial Operation Date  |
| DACCS | Direct Air Carbon Capture & Storage |
| DevEx | Development Expenditure |
| DESNZ | Department for Energy Security and Net Zero (formerly a part of BEIS) |
| DPA 2018 | Data Protection Act 2018 |
| EA | Environment Agency |
| ECC | East Coast Cluster |
| EIR | The Environmental Information Regulations 2004 |
| EOI | Expression of Interest |
| ERR | Economic Regulatory Regime |
| FEED | Front-End Engineering Design |
| FID | Final Investment Decision |
| FOIA 2000 | The Freedom of Information Act 2000 |
| GDPR | General Data Protection Regulation |
| GGR | Greenhouse Gas Removal |
| GHG  | Greenhouse Gas |
| HMG | His Majesty’s Government |
| ICC | Industrial Carbon Capture |
| ICVCM | Integrity Council for Voluntary Carbon Markets |
| IPA | Infrastructure Project Authority |
| ktpa | Kilo-tonnes per annum |
| LCA | Lifecycle Analysis |
| MCDA | Multi-Criteria Decision Analysis |
| MoU | Memorandum of Understanding |
| MRV | Monitoring, Reporting and Verification |
| MtCO₂ | Megatonnes of CO₂ |
| Mtpa | Megatonnes per annum |
| MWh or MW | Mega-Watts per hour or Mega-Watts |
| NDA | Non-Disclosure Agreement |
| OpEx | Operating Expenditure |
| OCP | Operational Conditions Precedent |
| pBECCS | Power Bioenergy with Carbon Capture and Storage |
| RAG | Red, Amber or Green (RAG rating) |
| RED | Renewable Energy Directive |
| RO | Renewables Obligation |
| SMEs | Small and Medium-Sized Enterprises |
| T1 | Track-1 |
| T1x | Track-1 Expansion |
| T&S | Transport and Storage Network |
| T&S Co | Transport and Storage Company is a licensed company operating and maintaining a T&S Network (T&S Operator) |
| tpa | Tonnes per annum |
| TRL  | Technology Readiness Level  |
| UKGI | United Kingdom Government Investments |
| UKIB | United Kingdom Investment Bank |

## Definitions

Table – Definitions

|  |  |
| --- | --- |
| Term | Definition |
| Applicant | Legal entity that intends to apply for support, and will be taken through to negotiations if successful (see also Project Representative).  |
| Battery Limit | The geographic boundaries identifying scope of works for process units or the Project. |
| Business Model(s) | Contract mechanisms to support the implementation and operation of CCUS Clusters. |
| Capture as a Service (CaaS) | Service provided by a third party to capture emissions on behalf of an industrial emitter(s).  |
| CCS or CCUS | Carbon Capture and Storage or Carbon Capture, Usage and Storage |
| Cluster | T&S Network (incorporating the onshore and offshore network and offshore storage facility) and associated capture Projects. |
| Commercial Operation Date (COD) | The date the plant is confirmed to meet the Operational Conditions Precedent (OCP) and the Project begins operating and transporting captured CO₂ emissions to permanent storage. |
| Cross Chain | All elements of the cluster including development, delivery and operation of all Emitters as well as Onshore, Offshore and storage infrastructure. |
| Direct Economic Benefits | Benefits relating directly to the developer’s own activity, and/or the activity of primary contractors. |
| Engineered Greenhouse Gas Removal (GGR) | Projects that ultimately achieve atmospheric CO₂ removal and require geological storage (CCS) to do so (achieving ‘negative emissions’). For the purpose of the Application Guidance, this includes Projects such as DACCS and BECCS, and excludes engineered GGR Projects that do not require CCS access, such as enhanced weathering. |
| Final Investment Decision (FID) | FID is the point in the project planning process when the decision to make major financial commitments is taken and contracts are signed for engineering, procurement, and construction. |
| gCO2e/MJLHV | Units of carbon dioxide equivalents per megajoule of hydrogen using lower heating values. |
| Hydrogen Production | CCUS-enabled hydrogen production. |
| Offtaker (hydrogen) | In the context of the Track-1 Expansion process, an offtaker is both the end user of low carbon hydrogen and, where relevant, any intermediary party who may purchase and resell hydrogen to end users. Where there is an intermediary party or where end users do not purchase hydrogen directly from producers, information and evidence of both end users and the intermediary need to be included in the submission form. |
| Onshore | The onshore element of the CO₂ transportation network which may include intermediate CO₂ storage for T&S operational purposes. Note this excludes non-pipeline transportation. |
| Operational Conditions Precedent | The Operational Conditions Precedent (OCPs) are a set of requirements a Project must demonstrate to the appropriate counterparty to prove that they have commissioned their facility and are ready for commercial operations. The OCP requirements are outlined in the relevant business model Terms and Conditions. |
| Project | Power CCUS, ICC including Waste ICC, Hydrogen, GGRs or pBECCS production facility – including carbon dioxide emission source(s) targeted for abatement – development and its associated CO₂ capture facilities, that will be assessed in the Track-1 Expansion process. |
| Project Representative | Legal entity responsible for accessing the submission Portal and submitting the Project Plan and associated Annexes to DESNZ. The Project Representative is expected to be from the primary, or partner, organisation responsible for Project development. For Capture-as-a-Service (CaaS) this must be a CaaS Group Lead. Project Representative may be the same person as the Applicant. |
| Storage | Geological store for the captured CO₂ from the end of the injection well. |
| Submission | The total submission submitted by the Project including the Project Plan and associated Annexes. |
| Technology Readiness Level | 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 section below defines TRLs 1 to 9. **Research and development** 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 are 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. 18.3 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. |
| Transport & Storage Network (T&S Network) | The network consisting (wholly or mainly) of:• pipelines used for the transportation of captured carbon dioxide from one capture plant to a storage facility or to or from any T&S Network; or• routes used for the transportation of captured carbon dioxide from one capture plant to a storage site or to or from any T&S Network; and• storage site for the geological storage of carbon dioxide. |
| Unsupported Project | This has the meaning given to it in Chapter 3.3 of the T1x HyNet Process – Application Guidance.  |

## Units

Where possible please use units of measurement defined by the International System of Units (SI) within your answers. For example:

* Electrical energy or Power: MWh or MW.
* Thermal energy or Power: MWh or MW.
* Gas energy or Power: MWh or MW – Gross Calorific Value basis.
* Gas calorific value: MJ/kg – Gross Calorific Value basis.
* CO2 flow rate: mass basis – tonnes per annum, (tpa, ktpa or Mtpa) for annual average or total annual flow rate. Instantaneous or peak flow rates should be provided in tonnes per hour (tph).

## Applicant information

Contact information will be collected through the Expression of Interest process. Completed versions of this document, GGR Initial Cost Information Form (Annex B4), Financial Statement Form (Annex C), and Economic Benefits Form (Annex D) are to be uploaded to the individual sharepoint site alongside any supporting evidence.

## Eligibility

Eligibility Criteria are fully described in the Track-1 Expansion Guidance Document.

Eligibility will be checked against the evidence submitted within this section, Section 3, and Section 4. Applicants will be notified via email on whether they have met the eligibility criteria. Only eligible Projects will progress to the next stage where they will progress to the Deliverability Assessment.

Please confirm and evidence how the GGR Project meets the Eligibility Criteria and provide appropriate supporting evidence for the following requirements.

**The Applicant must be incorporated and registered in the UK. (250 words)**

Supporting evidence is expected to include a UK company registration number demonstrating that the Applicant is incorporated and registered in the UK.

|  |
| --- |
|  |

**Evidence:**

|  |  |  |
| --- | --- | --- |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

**Must be able to demonstrate direct, onshore, pipeline access to the HyNet T&S Network, with no intermediate non-pipeline transportation of CO2. (250 words)**

Evidence of access to a T&S Network should include as a minimum:

* an MOU with the T&S Co.
* a high-level pipeline connection study including routing of intermediate pipelines or pipework to connect to the T&S Network.

The connection study need not be detailed for this eligibility criteria but must identify onshore, direct, pipeline route options between the project site and connection point to the T&S Network. Further detail, if available, would be beneficial for the Deliverability assessment question 4.6.

|  |
| --- |
|  |

**Evidence:**

|  |  |  |
| --- | --- | --- |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

**Must be able to be operational no later than the end of December 2030. (250 words)**

Supporting evidence is expected to include a project schedule.

|  |
| --- |
|  |

**Evidence:**

|  |  |  |
| --- | --- | --- |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

**BECCS projects that produce electricity must be located onshore in Great Britain. (250 words)**

Supporting evidence could include a site layout or map and proof that the facility is located above mean low tide (with the exemption of jetties or loading facilities).

|  |
| --- |
|  |

**Evidence:**

|  |  |  |
| --- | --- | --- |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

**Must provide net negative emissions.  (750 words)**

Projects must achieve permanent atmospheric CO₂ removal through geological storage. For a project to be considered ‘net-negative’ it must remove more greenhouse gases (GHGs) from the atmosphere than it creates throughout its entire supply chain (both domestic and international).

Supporting evidence is expected to include a life cycle analysis and a monitoring, reporting and verification methodology. Further details on what is expected in of a life cycle analysis and for monitoring, reporting and verification can be found in section 3.2. This evidence can be cross referenced or summarised here.

|  |
| --- |
|  |

**Evidence:**

|  |  |  |
| --- | --- | --- |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

**Must have a minimum net negative contribution of 0.05 Mtpa CO2 to storage. (250 words)**

Through the GGR business model we are initially aiming to bring forward projects that can make a significant contribution towards our policy ambition of delivering at least 5 Mtpa of engineered removals by 2030, potentially rising to approximately 23 Mtpa by 2035. To maximise the potential for achieving these ambitions, projects must therefore meet a minimum scale to be considered.

Supporting evidence could include a basis of design, heat and mass balance, life cycle analysis, performance guarantee, or engineering study.

|  |
| --- |
|  |

**Evidence:**

|  |  |  |
| --- | --- | --- |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

**Must not have applied for and cannot receive support under another carbon capture business model in this application window (applies to all GGR technologies, including DACCS). (250 words)**

In this application window, the Project must not have applied for or be in receipt of support under another carbon capture Business Model or support scheme to support the costs of building and operating a carbon capture plant; for example, under the pBECCS Business Model, Industrial Carbon Capture Business Model, or Waste ICC Business Model.

Projects in, or expecting to be in, receipt of government subsidy for other aspects of their operation (e.g., renewables obligation or renewable transport fuels obligation) may apply for the GGR business model, but will be subject to a subsidy control assessment to avoid double subsidisation.

|  |
| --- |
|  |

**Evidence:**

|  |  |  |
| --- | --- | --- |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

### Additional eligibility requirements for BECCS projects only

If the GGR Project is a BECCS Project, the project must meet the following requirements.

**Must have a minimum project capture rate of 90%. (250 words)**

The BECCS project must be designed to achieve a minimum capture rate of 90% when the plant is operating at full load.

Capture rate (%) is defined as:

$$Capture rate \left(\%\right)=\frac{CO\_{2exp}}{CO\_{2gen}}$$

Where:

$CO\_{2exp}$ = total flow of CO₂ into the T&S network during an hour of operation at full load.

$CO\_{2gen}$ = total flow of CO₂ in streams intended to be routed to the capture plant during an hour of operation at full load

Supporting evidence could include a basis of design, heat and mass balance, performance guarantee, or engineering study.

|  |
| --- |
|  |

**Evidence:**

|  |  |  |
| --- | --- | --- |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

**Must use eligible feedstock (minimum 90% biogenic CO2 generation). (250 words)**

Projects must demonstrate that a minimum of 90% of the CO2 generated from the feedstock shall be of biogenic origin and to be eligible it must meet relevant sustainability requirements. This is consistent with definition of “biomass” used in previous subsidy schemes such as the Renewables Obligation.

Supporting evidence could include supply chain reports, supply agreements, or feedstock analysis.

|  |
| --- |
|  |

**Evidence:**

|  |  |  |
| --- | --- | --- |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

**Must have an efficiently produced, valuable co-product (250 words)**

For BECCS, net-negative emissions are associated with the conversion of biogenic feedstock to a valuable product, e.g., electrical power, hydrogen, ammonia, methanol, aviation fuel, steam, or other low carbon fuel. The applicant must demonstrate how it maximises production efficiency (including the host plant, the capture plant and all associated facilities). This will not be assessed against a set threshold.

|  |
| --- |
|  |

**Evidence:**

|  |  |  |
| --- | --- | --- |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

### Additional eligibility requirements for hydrogen BECCS projects only

If the GGR Project is a hydrogen BECCS Project, the project must meet the following requirements.

**Demonstrate compliance with the Low Carbon Hydrogen Standard. (250 words)**

This should be evidenced through completion and submission of the Hydrogen Emissions Calculator[[3]](#footnote-4)

|  |
| --- |
|  |

**Evidence:**

|  |  |  |
| --- | --- | --- |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

**Must provide details of their proposed offtakers and provide an agreement or evidence of progress towards an agreement with potential qualifying offtakers.** **(250 words)**

This could be shown, for example, by a memorandum of understanding (MoU) or letter of intent between the hydrogen producer and proposed offtaker if available.

|  |
| --- |
|  |

**Evidence:**

|  |  |  |
| --- | --- | --- |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

## GGR Project Overview

### Project Overview

### GGR Project Description (2000 words)

The description of the GGR Project should include reference to appropriate supporting information to include, but not limited to the following:

1. Map showing potential identified or actual site location. Any agreements in place for ownership or lease of the proposed site/location.
2. A clear diagram / schematic of the proposed Project.
3. The project’s current stage of development (e.g., Feasibility, Pre-FEED etc) with evidence of engineering work completed.
4. A process description of the proposed CO₂ capture technology, including details of power and thermal energy requirements.
5. Details of any potential negative emissions and/or BECCS co-product offtake agreements
6. For new build projects, a high-level description on the degree of flexibility to adjust the scale of network access required
7. The design life of the Project, including the capture facility and overall plant life for any pre-existing plants.
8. Mass flow rate of CO2 capture per hour, month and annually.
9. Anticipated project downtime for maintenance (monthly/annually) and project start-up/shut down times.
10. For DACCS Projects
	1. Utility supply requirements and agreements where available, including power and thermal energy requirements, water and other utilities with proposed route to supply.
	2. Details of the type of facility, proposed method of CO2 capture, CO₂ treatment, any storage, compression facilities.
11. For BECCS Projects:
	1. Details of the co-product(s) generation (e.g., power, hydrogen etc.)
	2. Biomass supply chain details, including third party agreements where available, qualifying offtakers and compliance with the Low Carbon Hydrogen Standard
	3. Utility supply requirements and agreements where available e.g., water supply, power supply
	4. Details of the type of plant, the source of the CO₂ stream for capture, proposed capture plant, CO₂ treatment, any storage, compression facilities

|  |
| --- |
|  |

|  |
| --- |
| References to supporting documentation for Section 3.1 |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

### Methodology including LCA and MRV (2000 words)

GGR projects must be net negative and deliver a minimum of 0.05 Mtpa net negative emissions to be eligible to apply. Projects must provide a lifecycle analysis[[4]](#footnote-5) (LCA) and a proposed methodology including a monitoring, reporting and verification (MRV) plan as evidence for this criterion. As part of the recent GGR Business Model Update a research study conducted by E4tech and Element Energy (both now part of ERM) has also been published[[5]](#footnote-6) that includes life cycle mapping and information on existing methodologies for different GGR technologies. This can be used for examples of best practice.

**Lifecycle Analysis**

A lifecycle analysis (LCA) of the proposed project shall be provided showing the expected GHG capture rate, associated GHG lifecycle emissions and the net GHG capture. The LCA should consider all materials and substances required, and all energy and fuel requirements. For this application, GHG emissions will be assessed and reported following Integrity Council for Voluntary Carbon Markets[[6]](#footnote-7) (ICVCM) Assessment Framework guidance and calculation principles of the Greenhouse Gas Protocol[[7]](#footnote-8). Key assumptions should be stated and justified and sources of uncertainty identified, estimated and mitigated with conservative assumptions. Where LCA is verified through a third party, please also detail the arrangements.

Greenhouse emissions included within the LCA boundary are expected to at least cover the following:

* Emissions associated with energy inputs during operation including, but not limited to, electricity inputs, heat/steam inputs, any fossil fuels burned in the process.
* Other emissions related to operation including, but not limited to, those associated with chemicals, water, maintenance, waste disposal.
* Emissions related to the transport and storage of CO2. If the T&S operator is not able to provide emissions related to its operations, then conservative assumptions should be provided and justified.
* Supply chain-related emissions such as biomass cultivation, harvesting and transportation if the biomass is grown for CO2 removal purposes only. If not purpose grown, only project specific emissions need to be included such as transportation of a residue to the GGR plant. For plants which produce energy or other products as well as GGRs, supply chain emissions can be allocated in accordance with the Greenhouse Gas Protocol framework for reporting emissions.
* Sources of leakage such as upstream/downstream emissions (including direct and indirect land use change), activity shifting, ecological leakage and market leakage should be identified and assessed for materiality. If likely to be material, they should be estimated where possible, and qualitatively assessed where quantification is not possible at this stage of the project. Planned mitigations of potential leakage, if any, should be identified.
* Emissions from materials and construction for equipment and facilities built for CO2 removal purposes shall be included.
* The emissions associated with shared equipment and facilities built for CO2 removal purposes, such as the T&S facilities, should be allocated in accordance with the Greenhouse Gas Protocol framework for reporting emissions. If the T&S operator is not able to provide emissions related to its infrastructure, then conservative assumptions should be provided and justified. Figures or assumptions provided for T&S Network construction will not be compared across projects, but the department reserves the right to consider these for deliverability assessment.
* Emissions that are less than 1% of total emissions should be listed when known but do not require precise quantification.

**Monitoring, Reporting and Verification Protocol**

A Monitoring, Reporting and Verification (MRV) protocol should be provided, detailing an understanding of the procedures for measuring and calculating the GHG capture over the project lifetime. Existing methodologies from the voluntary carbon markets can be referenced, with justification for their selection. This need only cover the project up to the point of entry to the T&S network. We will be looking for evidence of best practices such as ICVCM Core Carbon Principles and Assessment Framework and with reference to the report from E4tech and Element Energy (both now part of ERM)[[8]](#footnote-9).

|  |
| --- |
|  |

|  |
| --- |
| References to supporting documentation for Section 3.2 |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

### GGR Project status and key metrics (250 words)

Please fill in the metrics within the table below. Any additional graphs to summarise the captured CO₂ profile would be beneficial. Please also refer to Annex B4 Initial Cost Information Form. Where metrics are repeated across annexes it is expected that the same figures and methodologies should be used.

|  |  |
| --- | --- |
| Metric | Value |
| Final Investment Decision date |  |
| Commercial Operation Date |  |
| Net Negative Emissions (Mtpa) |  |
| Annual CO2 export to the T&S (Mtpa) |  |
| Overall capital costs (£m) |  |
| Overall operational costs to end of 2050 (£m) |  |
| Capture Rate (%) |  |

|  |
| --- |
| References to supporting documentation for Section 3.3 |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

### Expansion Phases

This section is to describe whether there is planned follow on development of GGR projects at the site beyond the currently described project. Such projects would be assessed outside of this current Track-1 Expansion process, but it is useful to understand the context and intentions for the site.

### Expansion of GGR Project (500 words)

Please provide a concise description of additional stages of development of the GGR Project, where relevant. Please include a description of the uncertainty around these future phases in terms of execution, offtake market, CO2 mass flow to the T&S, costs and capture efficiency.

|  |
| --- |
|  |

|  |
| --- |
| References to supporting documentation for Section 3.4.1 |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

## Deliverability

### Organisational and Technical Maturity

### Organisational structure – company level (750 words)

What is the company structure? Please provide a chart which positions the project vehicle within any wider company structure highlighting the following information for each entity within the structure:

1. Primary activity and location
2. Ownership (including details of any stock market listings)
3. Where within the company/group structure will key investment decisions be taken.
4. If a new legal entity is to be created for the purpose of this Project, where in the company/group structure this will sit and the expected timing of its incorporation.

Please provide a capability statement, which includes relevant corporate experience and identifies personnel with key roles and responsibilities. Please also provide brief details of the company’s approach to ensuring Corporate Governance best practice.

Please provide details of the ultimate beneficial owner of the corporate group, as well as the details of any shareholder (or group of related shareholders) owning more than 5% of the group’s equity capital.

|  |
| --- |
|  |

|  |
| --- |
| References to supporting documentation for Section 4.1.1 |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

### Organisational structure and governance – project level (750 words)

Please describe the organisational structure at a project level including how the delivery of the Project will be managed and the experience of key personnel. Please describe the status of any commercial agreements between parties within the delivery structure alongside plans to progress future agreements, including key milestones and any dependencies.

Please also provide details of any new legal entity to be created for the purpose of this Project. Where relevant please include any anticipated joint venture arrangements or agreements alongside the activities and associated timeline to finalise any joint venture arrangements.

Please describe the capability of the project developers and governance arrangements.

|  |
| --- |
|  |

|  |
| --- |
| References to supporting documentation for Section 4.1.2 |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

### Technical Maturity (750 words)

Please describe the level of project engineering definition providing the studies completed as evidence. With reference to the schedule, describe the studies to be completed and, where identified, who will complete them.

Please describe the project and provide supporting information detailing the following:

1. The location and layout of the project, clearly identifying related facilities and required third party connections;
2. Process description with schematics or process flow diagrams;
3. Engagement with the supply chain to date including technology providers, contractors (tier 1 contractors or beyond), equipment suppliers, consultants and external advisors, and planned future engagement;
4. Maturity of the supply chain for this type of project;
5. Access to intellectual property and demonstration of the technology at scale for both components and system with evidence of the operating record of the technology (e.g., duration in service). The CO2 capture quantities anticipated, capture rate, energy efficiency and any associated emissions;
6. For retrofit projects, the status and operation of any related facilities including remaining operational life and any planned life extension programmes;
7. The status of required land, access and third-party connections required to deliver the project such as electricity, fuel, or water. Note: there is a separate section covering the CO2 T&S connection.

Please describe the technology readiness level[[9]](#footnote-10) (TRL) and commercial readiness indicator (CRI)[[10]](#footnote-11) of the selected capture technology with supporting evidence such as TRL or CRI justifications, reference projects and pilot/demonstration scale testing.

Please describe how the technology will be scaled up to 0.05 Mtpa if not already demonstrated at this scale.

|  |
| --- |
|  |

|  |
| --- |
| References to supporting documentation for Section 4.1.3 |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

### Project Programme (1000 words)

Please provide an integrated schedule for the GGR Project. This should be at least Level 2 detail, fully logic linked, including critical path and float. This should show when the GGR Project comes online, and any key milestones such as: planning, consents, decisions gates, long lead equipment items, fuel and electricity grid connections, FID, COD, etc. This should also show progress to date against the stated Project schedule, with documentation and engineering information provided to demonstrate that the GGR Project is progressing to plan.

The schedule must be provided in both pdf and native file format - Primavera P6 (XER) or MS Project (XML/MSP).

Please provide a concise description of the schedule’s critical path with reference to important parts of the schedule that the critical path is dependent on.

Please describe the development of the project business plan and how this relates to other key activities in the programme including securing intellectual property rights, finance and supply chain.

We recognise different projects are at varying degrees of development, so please provide the greatest level of detail currently available that is supportable with evidence.

Please describe areas of uncertainty in the schedule: if possible, please present the Base schedule with uncertainty ranges around individual activities and identify the key risks that could expand these ranges further.

Reference to separate ‘What if’ scenarios or quantitative schedule risk analysis of the schedules would be beneficial to increase confidence of deliverability within a given time.

|  |
| --- |
|  |

|  |
| --- |
| References to supporting documentation for Section 4.2 |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

### Planning and Consents (750 words)

With reference to the schedule, please provide a description of the planning and consents required for the Project and the route to securing those consents. This is expected to include planning consents and environmental permit. It would be beneficial to demonstrate evidence of engagement with the relevant planning and permitting authorities and their feedback, or expert advice on the most appropriate approach to planning and permitting.

Please ensure that you highlight areas of risk and uncertainty surrounding planning and consents that could increase the durations or require design modifications to achieve approvals. For instance, disposal or emission of chemicals.

For BECCS projects producing power please include a concise description of the arrangements for grid connection including the status of connection application, whether this is a new application or modification to existing, the generation licence, and any associated planning consent for the grid connection if separate to the Project planning consent.

Reference to a separate Planning and Consents Register would be helpful, as would any evidence of engagement with statutory bodies or preparation work for applications. We would anticipate planning and consent risk being an intrinsic element of the Project risk register.

|  |
| --- |
|  |

|  |
| --- |
| References to supporting documentation for Section 4.3 |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

### Risk Management (1000 words)

Please provide a concise description of all the major risks to the GGR Project and how they are going to be mitigated. It would be beneficial to evidence the risk management approach with a risk management plan or reference to company procedures in compliance with industry standards such as [ISO 31000](https://www.iso.org/iso-31000-risk-management.html).

The separation of construction and operation phase risks would be preferable.

The risk registers should include:

* Risks for all elements of the Project and downstream chain risks, including interface risks and details on risk owners.
* Mitigations and how they will be managed (e.g., eliminate, reduce, transfer, insurance, etc.) alongside estimated mitigation costs.
* Identification of risks that cannot be transferred to contractors or insurers or others.
* Probability estimates both pre and post mitigation.
* Three-point (high, low and most likely) impact estimates for cost and schedule impacts for both pre and post mitigation.
* Identification of any schedule activities that are impacted by the occurrence of each risk.
* Activity IDs included in the risk register.
* Any significant residual safety risks.
* Highlight Project innovation risks and mitigations.

Below are examples of key risks that may need to be considered in relation to the GGR Project (noting that this is not an exhaustive list of possible risks and that certain market and cross chain risks are in the considered in the indicative Heads of Terms and update on the GGR business model):[[11]](#footnote-12)

Development risks including:

1. If existing assets (e.g., in a retrofit project) cannot be re-used after further assessment.
2. Delays in obtaining planning consents and permits or any required licence or connection agreements.

Construction and commissioning risks including:

1. Contractor interfaces.
2. Insolvency of key suppliers.
3. Supply chain delays and delivery delays of critical equipment items.
4. Workforce/ Key skills availability.
5. Commissioning dependencies including unavailability of downstream T&S.

Operational risks including:

1. Limited design and operational experience of type of plant.
2. Underperformance of capture plant, increasing vented volumes of CO₂.
3. Higher than expected energy consumption, increasing OPEX.
4. For pre- or post-combustion capture, higher than expected solvent consumption, increasing OPEX.
5. High emissions of pollutants (e.g., nitrogen compounds).
6. Low availability/high downtime of capture plant, increasing vented volumes of CO₂ and resulting in greater intermittency.
7. Delays or cancellations of downstream projects – stranded asset risk.
8. Closure/bankruptcy of T&S – leaving capture plant as stranded asset.

Overarching or general risks including:

1. Force majeure events.
2. Regulatory risks for new technology or processes, for example, hydrogen – natural gas blending or other novel processes.

To increase our understanding of the Project and its credibility, the inclusion of an opportunity register alongside the risk register would be beneficial for the assessment.

A quantitative risk assessment for cost and schedule where available would be beneficial to evidence confidence in the estimates.

|  |
| --- |
|  |

|  |
| --- |
| References to supporting documentation for Section 4.4 |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

### Financial and Commercial

This section aims to understand the financial and commercial health of all the companies involved in the development of the GGR Project and the proposed financing plan for the GGR Project. To support this assessment, please submit copies of the Financial Statement Form (Annex C) and associated financial documents as requested in Annex C for each *Business plan and financial health – company level* response.

### A - Business plan and financial health – company level (750 words)

Note: Each company participating in the development of the GGR Project must provide a response. Multiple responses may be necessary if the GGR Project is being developed in partnership.

Please describe the following:

* Describe how your company business plans and industrial output have been impacted by events since the start of 2020.
* What is the outlook for the company out to 2030? (Your answer should include, but not be limited to, a description of, and rationale for, expected trends in revenue, overheads and profitability, plus a comparison of these to the historical period.)
* Describe how the Project aligns with the company’s overall strategic ambitions in the UK to 2030 and beyond.

Please provide copies of the latest two sets of audited accounts, any accompanying reports, management accounts covering the remainder of the current financial year, and forecast financial accounts covering the remainder of the current financial year and a further ten years for the following companies where applicable:

1. The company or companies operating the Project.
2. The company or companies financing the Project.
3. The company or companies responsible for key investment decisions in relation to this Project.
4. The group parent company or companies (e.g., consolidated accounts) and ultimate parent. For the avoidance of doubt, the group parent should be regarded as the largest group in which the accounts of the companies operating and/or financing the Project are consolidated.

In support of these accounts and reports for the above entities, please include key assumptions underlying financial forecasts.

Please confirm that accounts for the above entities have not received a qualified audit report in any of the previous five years. Highlight any areas of material uncertainty raised by auditors in this period.

Please confirm if the corporate group currently has any financial obligation to HMG and provide details where applicable.

|  |
| --- |
|  |

|  |
| --- |
| References to supporting documentation for Section 4.5.1 A |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

### B - Business plan and financial health – company level (750 words)

Note: Each company participating in the development of an individual project must provide a response. Multiple responses may be necessary where projects are being developed in partnership.

Please see Section 4.5.1 A for further details.

|  |
| --- |
|  |

|  |
| --- |
| References to supporting documentation for Section 4.5.2 B |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

### C - Business plan and financial health – company level (750 words)

Note: Each company participating in the development of an individual project must provide a response. Multiple responses may be necessary where projects are being developed in partnership.

Please see Section 4.5.1 A for further details.

|  |
| --- |
|  |

|  |
| --- |
| References to supporting documentation for Section 4.5.3 C |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

### D - Business plan and financial health – company level (750 words)

Note: Each company participating in the development of an individual project must provide a response. Multiple responses may be necessary where projects are being developed in partnership.

Please see Section 4.5.1 A for further details.

|  |
| --- |
|  |

|  |
| --- |
| References to supporting documentation for Section 4.5.4 D |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

### E - Business plan and financial health – company level (750 words)

Note: Each company participating in the development of an individual project must provide a response. Multiple responses may be necessary where projects are being developed in partnership.

Please see Section 4.5.1 A for further details. If additional entries are needed to cover all companies participating in the development, please insert new sections 4.5.6 F Company etc.

|  |
| --- |
|  |

|  |
| --- |
| References to supporting documentation for Section 4.5.5 E |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

### Financing plan – Project level (1000 words)

Note: In the event of multiple participants in a project, we would expect to see a single overarching financing plan and for it to be clear how each participant fits into that.

Please describe the proposed financing arrangements for progressing the Project. Your response should distinguish between different stages of the Project and explain what is needed to achieve a final investment decision. Within your answer, please provide the timeline, dependencies, key risks and mitigations for the financing process. Please also detail the assumptions underpinning the financing plan including key ratios.

If the Project will be financed by intragroup financing or external debt arrangements that already exist, then please provide a summary of those arrangements. Your summary of the debt arrangements should reference any factors that are material to the financing e.g., headroom, duration, security, and covenants.

If new capital needs to be raised then set out the type and amount of finance anticipated, the level of market engagement that has taken place, feedback received, as well as the activities and timescale needed to secure the financing.

Please summarise the status of key agreements needed to realise the Project and the plans to finalise them e.g., shareholder/sponsor documents, loan and security documents, and Project documents.

|  |
| --- |
|  |

|  |
| --- |
| References to supporting documentation for Section 4.5.6 |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

### T&S Connection (1000 words)

Please describe the connection between the Project and the T&S. This should include:

* The battery limits of the Project, the intended interface point where responsibility for the connection is assumed, custody transfer of the captured CO2 will take place, and the eventual ownership and operational boundaries.
* The intermediate pipework in private land or pipelines in public land to connect to the T&S, major crossings.
* Evidence of engagement with the T&SCo, including agreements in place.

The information to answer this section could come from collaboration with the T&SCo or a high-level route options study by the applicant.

Please describe quality controls and required processing for the CO₂ entering the T&S system and how this meets the T&S specification. Please describe how the engineering solution is aligned to meet the T&S CO2 specification and what measures are in place to prevent off-spec CO2 from entering the T&S network.

Please describe the intended operating regime for the capture plant export to the T&S and any measures planned to manage intermittency or operability of the T&S network. In evidence, please provide a table showing annual mass flow rate of CO2 to the T&S and the expected CO2 percentage (on a mass basis) in the CO2 rich export stream.

|  |
| --- |
|  |

|  |
| --- |
| References to supporting documentation for Section 4.6 |
| Document reference | Document name | Relevant page/section |
|  |  |  |
|  |  |  |

This publication is available from: [www.gov.uk/government/publications/carbon-capture-usage-and-storage-ccus-deployment-track-1-expansion-hynet-cluster](https://www.gov.uk/government/publications/carbon-capture-usage-and-storage-ccus-deployment-track-1-expansion-hynet-cluster)

If you need a version of this document in a more accessible format, please email ccust1x@energysecurity.gov.uk. Please tell us what format you need. It will help us if you say what assistive technology you use.

1. <https://www.gov.uk/government/publications/net-zero-growth-plan-and-carbon-budget-delivery-plan-analysis-methodology> [↑](#footnote-ref-2)
2. <https://www.gov.uk/government/publications/biomass-strategy> [↑](#footnote-ref-3)
3. https://www.gov.uk/government/publications/uk-low-carbon-hydrogen-standard-emissions-reporting-and-sustainability-criteria [↑](#footnote-ref-4)
4. Life cycle assessment (LCA) aims to understand the environmental impact of a product or service (termed a functional unit) over its entire life cycle - using ‘standard methodologies’ (reference: <https://www.gov.uk/research-for-development-outputs/a-newcomer-s-guide-to-life-cycle-assessment-baselines-and-boundaries>). [↑](#footnote-ref-5)
5. <https://www.erm.com/public-information-sites/a-review-of-engineered-greenhouse-gas-removal-ggr-standards-and-methodologies> [↑](#footnote-ref-6)
6. The Integrity Council for the Voluntary Carbon Market (Integrity Council) is an independent governance body for the voluntary carbon market. The Integrity Council encompasses varied expertise from across the voluntary carbon market ecosystem including world-leading scientific, financial, practitioner, NGO, policy, indigenous, local and other forms of knowledge. [↑](#footnote-ref-7)
7. <https://ghgprotocol.org/> [↑](#footnote-ref-8)
8. [Review of engineered greenhouse gas removal (GGR) standards and methodologies (ERM)](https://www.erm.com/public-information-sites/a-review-of-engineered-greenhouse-gas-removal-ggr-standards-and-methodologies) [↑](#footnote-ref-9)
9. For the definition of TRL please refer to the Definitions in Table 2 of this document. [↑](#footnote-ref-10)
10. For CRI definitions please refer to <https://arena.gov.au/assets/2014/02/Commercial-Readiness-Index.pdf> [↑](#footnote-ref-11)
11. Applicants should refer to the GGR Business Model update published in December 2023 for more information on risks. [↑](#footnote-ref-12)