Cluster Sequencing for Carbon Capture Usage and Storage Deployment: Phase-2

Power CCUS Project Plan



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Any enquiries regarding this publication should be sent to us at: Powerccusphase2@beis.gov.uk

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# Power CCUS Project Plan Introduction

In November 2020, the Government published the Ten Point Plan for a Green Industrial Revolution[[1]](#footnote-2), with commitments focused on driving innovation, boosting export opportunities, and generating green jobs and growth across the country to level up regions of the UK. In doing so, government has set its agenda for a clean, resilient, and sustainable economic recovery, as the UK builds back from the impacts of Covid-19.

Included in the Ten Point Plan was a commitment to deploy Carbon Capture, Usage and Storage (CCUS) in two industrial clusters by the mid-2020s, and a further two clusters by 2030 and the Net Zero Strategy goes further by setting out an ambition to capture 20-30MtCO₂ per year across the economy by 2030. Government also committed to support at least one Power CCUS Project, to be operational by the mid 2020’s.

In May this year, BEIS launched Phase-1 of the Cluster Sequencing Process to select Track-1 CCUS clusters and in October announced the Clusters that have been selected to participate as Track-1 Clusters: Hynet and the East Coast Cluster. In addition, BEIS also announced the Scottish Cluster as a reserve cluster if a back-up is needed. In November BEIS launched Phase-2 of the Cluster Sequencing Process to select which Track-1 projects will progress through to negotiations and due diligence.

This document sets out the questions that Power CCUS Projects should answer as part of their Phase-2 submission. The information and relevant supporting evidence provided by capture projects within the completed Project Plan will, alongside the Economic Benefits Template (Annex B), Cost Template (Annex C1) and Financial Statement Template (Annex D), form the basis of the assessment to determine which capture projects are shortlisted. This document is an Annex to the Phase-2 Guidance Document and should be read alongside it. Please see the Phase-2 Guidance Document for further guidance on the assessment process, including how the information will be assessed and note that the caveats and reservations to that document set out in Section 1.5 of that document apply equally here.

The Phase-2 CCUS Cluster Sequencing Process will be run by the Department for Business, Energy and Industrial Strategy (BEIS). If applicants have any general questions about the submission process or about filling in any part of the submission documentation, please email queries to Powerccusphase2@beis.gov.uk.

## Important information regarding this process

* **The deadline** for finalised Phase-2 submissions is 23:59 on 21st January 2021.
* The assessment process will be run fairly, transparently, and objectively in accordance with the published Phase-2 guidance.
* The information provided within this form will be used throughout the Phase-2 process and the negotiations/due diligence phase. Entering a negotiation does not mean that a DPA 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 Phase-2 Guidance Document.
* BEIS will not be responsible for any costs incurred in the preparation of any submission, irrespective of whether the capture project is successful in the Phase-2 process.
* Projects will need to pass the eligibility criteria to be considered within the evaluation, as described in the Phase-2 Guidance Document.
* The evaluation will be based on five evaluation criteria with relative weightings of: Deliverability (30%), Emissions Reduction (25%), Economic Benefits (20%), Costs (15%) and Learning and Innovation (10%).
* This document, the Power CCUS Project Plan, is divided into nine sections:
	+ Section 1, Applicant Information.
	+ Section 2, Power CCUS Project Summary; this information will provide background and context to assessors when reviewing the rest of the submission.
	+ Section 3, Eligibility, information submitted in this section will be used to determine the eligibility of the Power CCUS Project.
	+ Section 4, Power CCUS Project Overview, information submitted in this section will be used to improve BEIS’ understanding of the Project.
	+ Sections 5-9 each focus on the information required to support one of each of the five evaluation criteria (listed in the bullet above).
* Section 2 and Section 4 do not apply to specific criteria, but BEIS may draw on information submitted in these sections to support the assessment of any of the relevant assessment criteria.
* Alongside the Power CCUS Project Plan the assessment of the Project will be supported by the submission of several templates:
	+ Annex B - Economic Benefits Template will be used to assess in more detail quantitative information associated with the assessment of Economic Benefits.
	+ Annex C1 - Cost Template will be used to assess the cost of the Power CCUS Project.
	+ Annex D - Financial Statements Template will be used to assess of the financial and commercial health of participating companies within the Deliverability criterion. This template should be considered supplementary to the questions to assess the Project’s deliverability. The figures included in the template should be supported by relevant accounting notes and documentation.
* Across the assessment BEIS will place significant emphasis on the credibility and consistency of information provided.
* BEIS reserves the right to use information provided within the submission for any part of the Phase-2 assessment; such that information provided in one section, for example for a particular criterion, could be used to inform assessments against another criterion. 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 Power CCUS Project submissions have been individually assessed, BEIS 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 DPA and Department as a whole. The process used for this step is described in section 3.4 of the Phase-2 Guidance Document.
* BEIS 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.
* BEIS 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 Power CCUS 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. To aid with document referencing please also fill in the References Matrix provided in Annex E1.
* 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 in excess of 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 Section 2.2 (Entry Process) of the Phase-2 Guidance Document for additional detail on entry into non-disclosure agreements and Section 1.6 (General Considerations) for additional detail on parties involved in the Phase-2 process.

All information provided by applicants may be disclosed in accordance with BEIS’s legal obligations (including under the Freedom of Information Act 2000 (FOIA), the Data Protection Act 2018 (DPA),[[2]](#footnote-3) 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, DPA, GDPR and EIR (including information on exemptions) can be found at: <https://ico.org.uk/for-organisations/>

To help BEIS 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 your reasons for non-disclosure 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, BEIS 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.

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| 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. |
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## Glossary of terms

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| Acronym | Meaning |
| BAFO | Best and Final Offer |
| BECCS | Bioenergy Carbon Capture & Storage |
| CAPEX | Capital Expenditure |
| CO₂ | Carbon dioxide |
| CO₂e | Carbon dioxide equivalent |
| COD | Commercial Operation Date |
| DCO | Development Consent Order |
| DPA | Dispatchable Power Agreement |
| FID | Final Investment Decision |
| FEED | Front-End Engineering Design |
| GHG | Greenhouse Gas |
| HoT | Heads of Terms |
| JV | Joint Venture |
| MJ/kg | Mega-joule per kilogram |
| MMV | Measurement, Monitoring and Verification |
| MoU | Memorandum of Understanding |
| MWh or MW | Mega-Watt Hour or Mega-Watt |
| OPEX | Operating Expenditure |
| T&S | Transport and Storage |
| T&SCo | Transport and Storage Company |
| WACC | Weighted average cost of capital |

## Definitions

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| Term | Definition |  |
|  Availability Payment Rate (APRi) | Figure for the overall costs of the Power CCUS Project. Note: Please see Section 3.3 of the *Phase-2 Guidance Document* for further information. |
| Battery Limit | The geographic boundaries identifying scope of works for process units or the Project. |
| Carbon Intensity | Grams of CO₂ equivalent per kWh of power generated g CO₂e/kWh |
| CO₂e | Carbon Dioxide equivalent. The amount of carbon dioxide emission that would cause the same radiative forcing, over a given time horizon, as an emitted amount of greenhouse gases (GHG). As calculated using global warming potential (GWP) values for a 100 year time horizon, relevant to reporting under UNFCCC, published by the IPCC in its Fourth Assessment Report (AR4). |
| Cluster | Transportation and storage network (incorporating the onshore and offshore network and offshore storage facility) and an associated first phase of carbon capture projects. |
| Cluster Lead | Party responsible for submitting the Cluster Plan to BEIS. It should be the entity primarily responsible for the T&S network. |
| Commercial Operation Date | 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. |
| Cost of connection  | The costs incurred by the Project to deliver CO2 compliant with the T&S specification (pressure, phase and composition) to the Project battery limit. This would include any compression, pumping and CO2 treatment required but does not include the costs of extending the T&S network to the Project battery limit.  |
| Cross Chain | All elements of the Project including development, delivery and operation of all capture projects as well as Onshore, Offshore and storage infrastructure. |
| Mitigation | Mitigation refers to actions taken to reduce the overall risk either pre- or post-event. |
| Net Dependable Capacity | As defined in the DPA business model update published in October 2021.  |
| Offshore | The offshore element of the CO₂ transportation network up to the point where CO₂ enters the geological Storage. Note: This excludes shipping transportation. |
| Onshore | The onshore element of the CO₂ transportation network which may include intermediate CO₂ storage for T&S operational purposes. Note: This excludes road and rail transportation. |
| Power CCUS Project | Power generation facility with CO₂ abatement.  |
| Storage | Geological store for the captured CO₂ from the end of the injection well. |

## 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.

## Applicant information

Please provide the contact information for the Power CCUS Project through the online portal[[3]](#footnote-4). Completed versions of this document, the Economic Benefits Template (Annex B), Power Cost Template (Annex C1) and Financial Statements Template (Annex D) are to be uploaded to the online portal alongside any supporting evidence and completed References Matrix (Annex E1).

## Power CCUS Project Summary

### High-level Project description (300 words)

Please provide a concise summary description of the Power CCUS Project. Respondents should include, but are not necessarily limited to:

* Details of the type of generating plant, the source of the CO₂ stream for capture, proposed capture plant, CO₂ treatment, any storage, compression facilities, any electricity transmission/distribution connection point, and connection point to the Transport and Storage (T&S).
* The location of the Power CCUS Project. Is the Power CCUS Project dependent on, integrated with, or does it provide support or products to other local industrial plant(s)?
* A clear diagram / schematic of the Power CCUS Project.

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| References to supporting documentation for Section 2.1 |
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### Power CCUS Project and Partners (300 words)

Please summarise the organisational structure of the Power CCUS Project and relationship with the CO₂ transport and storage provider(s). Please include the status and details of agreements that exist between these organisations.

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| References to supporting documentation for Section 2.2 |
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### Power CCUS Project status and key metrics (250 words)

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| Metric | Value |
| Final Investment Decision date |  |
| Commercial Operation Date |  |
| Power CCUS Project carbon intensity (gCO₂e/kWh) |  |
| Overall capital costs to end of 2050 (£m) |  |
| Overall operational costs to end of 2050 (£m) |  |
| Proposed DPA term length (years) |  |
| APRi (£/MW/Settlement Unit) |  |
| Net Dependable Capacity (MW) |  |
| Capture Rate |  |
| Plant efficiency at full load |  |

Please provide a concise description of the Power CCUS Project’s stage of development. Please also fill in the metrics within the table below. Any additional graphs to summarise the captured CO₂ profile would be beneficial.

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| References to supporting documentation for Section 2.3 |
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### Regional context of Power CCUS Project (300 words)

Please summarise the importance of existing and future industry to the region in terms of jobs and infrastructure. How does the Power CCUS Project link into the local regional development plans? The response may include descriptions of historic, current, and future planned activities related to regional initiatives and local developments.

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| References to supporting documentation for Section 2.4 |
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### Documentation sign-off (250 words)

Please confirm the information and accompanying documentation provided within your submission has received appropriate level of internal sign off, such as Board level sign off. For those areas that do not have appropriate approvals, please highlight, and explain the reasoning within your responses, making sure to include any associated uncertainties.

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| References to supporting documentation for Section 2.5 |
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## Eligibility

Eligibility Criteria are fully described in the Phase-2 Guidance Document. In summary to be eligible a Power CCUS Project must:

* Be located onshore in GB.
* Have one of the eligible configurations. The Project must be natural gas fuelled thermal generation and must be one of the following technology types: post-combustion; pre-combustion (on-site); or oxy-fuelled combustion.
* Have a minimum abated capacity of 100MWe.
* Have access to a CO₂ transport solution and Track-1 or Reserve Cluster CO₂ storage site.
* Have a minimum projected capture rate of 90% at full load.
* Demonstrate access to finance.
* Be operational no later than the end of December 2027.
* Have commenced pre-FEED studies or be ready to commence pre-FEED no later than the end of December 2022.
* Show that the Project will be able to have relevant consents in place no later than December 2024.

Please confirm and evidence how the Power CCUS Project meets the Eligibility Criteria and provide appropriate supporting evidence.

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| References to supporting documentation for Section 3 |
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## Power CCUS Project Overview

### Project Overview

### 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.

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| References to supporting documentation for Section 4.1.1 |
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### Organisational structure – 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 describe the commercial arrangements with the T&S provider(s) in relation to the organisational structure, referencing supporting documentation.

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.

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| References to supporting documentation for Section 4.1.2 |
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### Power CCUS Project

### Power CCUS Project Description (2000 words)

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

1. Details of the type of generating plant, the source of the CO₂ stream for capture, proposed capture plant, CO₂ treatment, any storage, compression facilities.
2. Clear diagram(s) / schematic(s) of the Power CCUS Project.
3. The location of the Power CCUS Project. Is the Power CCUS Project dependent on, integrated with, or does it provide support or products to other local industrial plant(s)?
4. Details of the transmission/distribution connection point, connection point to the T&S, connection point to the gas network, water intake/cooling.
5. Maps showing the location of the Power CCUS Project, including but not necessarily limited to its location in relation to the T&S, grid connection point, gas network connection point, and other relevant local industrial plant(s).
6. If the power plant is separate from the capture plant, is it in operation, construction or development.
7. When is FID programmed / anticipated for the total facility including power and capture elements of the plant?
8. The design life of the Power CCUS Project, including the capture facility and overall plant life for any pre-existing plants
9. The CO₂ capture efficiency and carbon intensity of power at full load, steady state operation
10. The captured and uncaptured CO₂ sources across the whole operational site, including anticipated annual CO₂ volumes and the hourly CO₂ volumes during an hour of operation at full load. Please include the assumptions for load factor which inform the profile of captured volumes.
11. A process description of the proposed CO₂ capture technology, including details of power and thermal energy requirements during start-up and normal operation of the plant (including the extent to which this is a firm position).
12. To what extent the Power CCUS Project is dependent on third party agreements (e.g. fuel supply, grid connection) to be able to confirm programme delivery dates and volume certainties
13. Engineering work completed and the status of ongoing work
14. The proposed DPA term length, alongside a justification for the rationale behind this term length.

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| References to supporting documentation for Section 4.2.1 |
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### Expansion Phases

This section is to describe whether there is planned staged development of the Power CCUS Project.

### Expansion of Power CCUS Project (500 words)

Please provide a concise description of additional stages of development of the Power CCUS Project whether this be multiple staged units or applying capture to additional CO₂ sources within the Power CCUS Project site. Please include a description of the uncertainty around these future phases in terms of execution, offtake market, volumes, costs and capture efficiency.

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| References to supporting documentation for Section 4.3.1 |
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## Deliverability

The deliverability criterion will consider the applicant’s capability and capacity to deliver the Project successfully and the timeline on which the Power CCUS Project will come online. The deliverability criterion contributes 30% to the final Power CCUS Project score.

### Schedule: Level 1 integrated project schedule (1000 words)

Please provide an integrated Level 1 schedule for the Power CCUS Project. This should show when the T&S will be available, when the Power CCUS Project comes online, activities related to any expansion projects and any key milestones such as: planning, consents, decisions gates, long lead equipment items, gas 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 Power CCUS Project is progressing to plan.

Please provide a concise description of the schedule’s critical path with reference to important parts of the Level 2 plan that the critical path is dependent on. Please reference to a separate fully logic linked Schedule in native file format - Primavera P6 (XER) or MS Project (XML/MSP) which is required. This should be at least Level 2 detail, fully logic linked, integrated across the chain including critical path and float. Ideally this will be costed and resourced.

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. Reference to a commissioning plan and coordination of commissioning activities with the T&SCo would also be beneficial.

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| References to supporting documentation for Section 5.1 |
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### Planning and Consents (750 words)

Please provide a description of the status of the planning and consents, including securing an environmental permit, for the Project.

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.

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.

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| References to supporting documentation for Section 5.2 |
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### Plant dispatch (1000 words)

Please describe the key plant operating parameters to demonstrate the plant will supply low carbon, mid-merit, dispatchable power to the electricity grid.

These should include:

1. Net Dependable Capacity
2. Turndown ratio
3. Ramp rate
4. Minimum running time whilst maintaining the minimum average capture rate.
5. Start times - hot (<8 hrs offline), warm (>8 hrs, <48 offline) and cold (>48 hrs offline)

To support the stated Net Dependable Capacity, please provide a breakdown of auxiliary load consumers including compression. Supporting evidence may include the submission of the master equipment list or process flow diagrams showing associated equipment duties.

Please describe the capture rate during each transient and measures taken to improve transient performance of the power plant and capture plant together to the extent that this is known.

To confirm that the plant has been designed to provide dispatchable power, start and shutdown studies or similar to be provided as supporting evidence if available.

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| References to supporting documentation for Section 5.3 |
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### Project execution plan (1000 words)

In this section, please describe how the Power CCUS Project intends to execute the Project including the development and engineering stages. This should concisely describe the envisaged contracting strategy and the governance structure. Please provide a concise explanation of any aspects of the Project execution that apply novel construction / installation techniques.

Please provide a Preliminary Commissioning Plan, including any risks and uncertainties identified for the commissioning phase of the Project.

Please also highlight key risks and uncertainties for the execution phase and their potential to impact on Project CAPEX and schedule.

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| References to supporting documentation for Section 5.4 |
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### Risk Management (1000 words)

In this section, please provide a concise description of the approach to Risk Management including the interactions with the T&S.

Please provide a concise description of all the major risks to the Power CCUS Project and how are they going to be mitigated. It would be beneficial to evidence the risk management approach with a risk management plan.

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

Please also summarise separate cluster-wide cross-chain risk and reference any collaboration with T&S risk register development.

Please set out how cyber security risks and digital resilience are addressed, including any business continuity management plans.

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 ID’s included in the risk register
* Any significant residual safety risks
* Highlight Project innovation risks and mitigations – overlap with Learning and Innovation criterion

Below are examples of key risks that may need to be considered in relation to the Power CCUS Project (noting that this is not an exhaustive list of possible risks and that certain market and cross chain risks are addressed in the proposed DPA business model):[[4]](#footnote-5)

Development risks including

1. If existing assets (e.g. in a retrofit project) cannot be re-used after further assessment
2. Delays in obtaining DCOs, other 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 delay 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. Low availability/high downtime of capture plant, increasing vented volumes of CO₂ and resulting in greater intermittency
4. Low load factor for power plant
5. Delays or cancellations of downstream projects – stranded asset risk
6. Closure/bankruptcy of T&S – leaving capture plant as stranded asset

Overarching or general risks including

1. Covid-19/Pandemic/Epidemic external risks
2. Force majeure events
3. 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.

Please provide a Quantitative Risk Assessment for cost and schedule where available to evidence confidence in the estimates.

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| References to supporting documentation for Section 5.5 |
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### Operating philosophy (750 words)

In this section, please explain who will be responsible for operating and maintaining the Power CCUS Project – individually and as an integrated whole (where relevant).

This should include a description of who will be responsible for the operation and maintenance of the Power CCUS Project; the control philosophy of the Power CCUS Project in coordination with the T&S; and how many roles are required to operate the Power CCUS Project.

Please describe the levels of redundancy in the Power CCUS Project design including the overall design availability.

Please provide a concise description of the assumptions that have been incorporated into the operating expenditure estimate. This should confirm the level of uncertainty related to these assumptions and the extent to which any specific risks identified could require additional CAPEX or OPEX during operations to manage.

Reference to specific activities in the Project programme to support the descriptions provided would be helpful.

Supporting evidence for this section may include preliminary Process and Instrumentation diagrams, Process description, and process control philosophy.

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| References to supporting documentation for Section 5.6 |
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### Stakeholder engagement (750 words)

Please provide a description of how the Project is identifying and engaging with key stakeholders (such as adjacent property owners, local communities, local industries) during project execution, operation and post-cessation. This should include a description of the approach to developing and maintaining co-operation with key stakeholders to assure successful delivery. Reference to specific related activities in the Project schedule would be helpful.

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| References to supporting documentation for Section 5.7 |
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### Health, Safety and Environment

### Health and Safety (1500 words)

Please provide a concise description of the work that has been performed to identify and mitigate Health and Safety risks. Describe the work that has been performed or is planned to demonstrate that all residual Project Health and Safety risks to staff, contractors and the local population during project development, execution, operational and post-cessation phases are as low as reasonably practicable. Supporting evidence of risk analyses or process hazard reviews would be beneficial.

Please also describe the systems, processes, and governance in place for Health & Safety Management. Please describe how the Project complies with CDM 2015 and other relevant safety regulations. If the Construction Phase Plan has not yet been developed, please provide any information you do have, e.g. from the design risk registers. Please detail the health and safety indicators monitored at Board level and their current status against targets.

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| References to supporting documentation for Section 5.8.1 |
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### Environmental (1000 words)

Please provide a concise description of the environmental impact of the Power CCUS Project during the project execution, operational and post-cessation phases. Please also provide a concise description of the further work required to prepare the necessary Environmental Statement(s).

Please describe how the Power CCUS Project will comply with environmental permit requirements and abstraction licensing and describe any uncertainties in the consenting process.

Please also describe the systems, processes, and governance in place for Environmental Management. Please detail the environmental indicators monitored at Board level and their current status against targets.

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| References to supporting documentation for Section 5.8.2 |
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### Supply chain

### Supply chain planning (1000 words)

Please provide a concise explanation of the assessment of the supply chain, labour and skills needed to support the proposed delivery timescales for the project and any identified gaps. This should include:

1. A description of the key uncertainties linked to the supply chain, the consequential uncertainty in project costs and timelines, and when the uncertainty is expected to be resolved
2. A description of the key risks linked to the supply chain and how these will be managed
3. A description of the challenges anticipated and the associated potential mitigations / solutions to these
4. A description of the supply chain capacity and capability to support the project.

Reference to specific related activities in the project programme would be helpful.

Please also confirm the project developers will follow best practice in sourcing of labour and materials.

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| References to supporting documentation for Section 5.9.1 |
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### Supply chain engagement (1000 words)

Please provide a concise explanation of the extent of the Supply Chain Engagement, including which parts of the supply chain have been engaged with and where there are key contracts in place. Please also provide a description of the current view of capability and capacity and how any associated challenges are going to be addressed.

Please detail the extent to which technology licensors have been engaged with for items such as CO₂ compressors, carbon capture technologies and other long-lead items. Please describe what agreements been entered into with third parties and their scope; please also confirm what preliminary studies have been performed.

Reference to specific related activities in the Project schedule would be helpful.

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| References to supporting documentation for Section 5.9.2 |
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### Financial and Commercial

This section aims to understand the financial and commercial health of all the companies involved in the development of the Power CCUS Project and the proposed financing plan for the Power CCUS Project. To support this assessment, please submit copies of the Financial Statement Template (Annex D) and associated financial documents as requested in Annex D 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 Power CCUS Project must provide a response. Multiple responses may be necessary if the Power CCUS 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 five 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 (if applicable)

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.

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| References to supporting documentation for Section 5.10.1 A |
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### B - Business plan and financial health – company level (750 words)

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

Please see Section 5.10.1 A for further details.

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| References to supporting documentation for Section 5.10.2 B |
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### C - Business plan and financial health – company level (750 words)

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

Please see Section 5.10.1 A for further details.

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| References to supporting documentation for Section 5.10.3 C |
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### D - Business plan and financial health – company level (750 words)

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

Please see Section 5.10.1 A for further details.

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| References to supporting documentation for Section 5.10.4 D |
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### E - Business plan and financial health – company level (750 words)

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

Please see Section 5.10.1 A for further details. If additional rows are needed, please insert them into the table below.

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| References to supporting documentation for Section 5.10.5 E |
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### 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.

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| References to supporting documentation for Section 5.10.6 |
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### System Integration

### Specification of capture gas (1000 words)

Please describe quality controls and required processing for the CO₂ entering the T&S system and how this meets the T&S specification. This should include technical details of the phase envelope for this gas composition and a concise description of the impact of variation of this specification on the CO2 treatment and processing. 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. Describe the safety systems that allow communication between the T&S and the Power CCUS Project in the event of emergency and off-spec CO2 scenarios.

To what extent is there uncertainty in the achievable specification for the costs presented to date? What would the cost / schedule impact of a tightening or loosening of the CO₂ entry specification be for the Power CCUS Project and which components will have the greatest influence on these?

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| References to supporting documentation for Section 5.11.1 |
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### System operating parameters (1000 words)

Please provide a concise description of the key system operating parameters for the operational monitoring and quality control of the produced CO2. This should demonstrate the feasibility of the proposed system configuration with reference to control of composition, temperature, pressure, flow rate and describe the CO2 metering system adopted for quality measurement of the CO2 entering the T&S network.

This should include a description of the key risks and uncertainties associated with the operation including any limits on transient operation and emergency shutdown scenarios.

Reference to risks within the risk register would be helpful.

Supporting information should include preliminary process description and process basis of design.

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| References to supporting documentation for Section 5.11.2 |
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### T&S connection (1000 words)

With reference to agreements or discussions with the T&SCo, please describe the connection between the Project and the T&S. This should include:

* The work completed to date by the Project and the T&SCo, to understand the work required and anticipated costs to connect the T&S network and the Project, including the Cost of connection, and the cost of extending the T&S network to the Project. Please include non-pipeline transport considerations such as shipping as required.
* The method of CO₂ transport, the intermediate pipework in private land or pipelines in public land to connect to the T&S, the battery limits of the Project, the intended interface point where responsibility for the connection is assumed, and the eventual ownership and operational boundaries.

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| References to supporting documentation for Section 5.11.3 |
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## Emissions Reduction

The emissions reduction criterion will assess the carbon intensity of the power generated. This will be measured using a Carbon Intensity figure in gCO2e/kWh and the percentage saving compared to a baseline power plant. The emissions reduction criterion contributes 25% to the final Power CCUS Project Score.

Carbon Intensity is calculated as:

$$Carbon Intensity of Power= \frac{CO\_{2}e per hour - CO\_{2}e captured per hour}{Projected Power Output per hour}$$

### Carbon Intensity (1500 words)

Please describe the carbon intensity of the Power CCUS Project. Please include details of the calculation using the Joint Environmental Programme methodology (a standardised measure of CO2 generated by fuel burn) for calculating the carbon emissions generated from burning a measure of the plants fuel.

Please detail the following:

1. the CO2 captured during an hour of operation,
2. the fuel-gas consumption per hour of operation
3. the net dependable capacity at the point of connection to the electricity grid
4. guaranteed net capture rate of the capture plant
5. operational capture rate that is expected on a day-to-day basis

Supporting documentation should include: process flow diagrams with associated heat and material balance; master equipment list with duty data; and process basis of design. Where possible, provide the basis for process simulations with equipment basis of design or a description of how equipment efficiencies and duties, used to derive carbon intensity, have been determined.

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| References to supporting documentation for Section 6.1 |
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## Economic Benefits

This criterion aims to assess the potential contribution that the Project can make to the Government’s objective of supporting clean, resilient and sustainable economic growth as we build back from the impacts of Covid-19. Projects should look to demonstrate the contribution the Power CCUS Project can make to the UK economy and government’s levelling up agenda.

Assessment against this criterion will be undertaken on the basis of information provided through the Economic Benefits Template (Annex B) and answers provided within the Project Plan alongside any associated supporting documentation.

Projects will be assessed against the economic benefits criterion with reference to four key factors:

* Number and quality of jobs
* Transparency of supply chain procurement process
* Investment in CCUS skills
* Wider economic benefits

The emissions reduction criterion contributes 20% to the final Power CCUS Project Score.

### Number and quality of jobs (Annex B and 500 words)

The assessment of number and quality of jobs will be mostly considered through the information outlined in the Economic Benefits Template (Annex B); please complete the form to provide the jobs and skills information.

Applicants should provide supplementary information and any clarifications or assumptions within the box below, referencing any supporting evidence.

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| References to supporting documentation for Section 7.1 |
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### Transparency of supply chain procurement processes (750 words)

Please provide information on how you will make the Project procurement strategies as transparent as possible. For example, identifying supply chain opportunities, advertising them as early as possible, and beginning meaningful engagement with CCUS supply chain companies.

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| References to supporting documentation for Section 7.2 |
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### Investment in CCUS skills (750 words)

The assessment of investment in skills will be mostly considered through the information outlined in the Economic Benefits Template (Annex B); please complete the form to provide the skills information.

Please also provide evidence that demonstrates where consortium partners are individually or collectively investing in training programmes to develop skills in CCUS, for example in apprenticeships and retraining programmes. We ask that projects provide detail on time and duration of these programmes and specifically how they will support retraining workforces transitioning from other sectors – locally, regionally and nationally.

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| References to supporting documentation for Section 7.3 |
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### Wider economic benefits (750 words)

Noting the commitments made in the Ten Point Plan and the CCUS supply chains roadmap, which set out the Government’s objective to drive local and regional growth to level up across the UK, please set out how the Project contributes to economic growth within the local area in line with the strategic priorities (for detail on strategic priorities, please refer to the economic benefits sub-section of section 3.3: Evaluation Criteria in the Phase-2 Guidance Document).

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| References to supporting documentation for Section 7.4 |
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## Cost Considerations

For Power CCUS Projects the cost considerations criterion focusses on the APRi (Availability Payment Rate) and the credibility of assumptions included.

Assessment against this criterion will be undertaken on the basis of information provided through the Power Cost Template (Annex C1) and answers provided below, alongside any associated supporting documentation.

Please provide detailed comments in Annex C1, or in supporting documentation, to explain the Project costs, cost certainty and contingencies, or any other cost information submitted. This should be done at a granular level. Projects may also provide their own cost model as supporting documentation.

The cost considerations criterion contributes 15% to the final Power CCUS Project score.

### APRi (1000 words; please also use the Power Cost Template – Annex C1)

This section is focused on understanding the proposed APRi figure (£/MW/Settlement Unit) for the Project to be used when calculating the Availability Payment within the DPA.

In order to evidence the APRi, the Power CCUS Project should provide the assumptions made to calculate the proposed APRi.

This supporting evidence should be provided here and in Annex C1, and include:

1. The (average) capture rate the Project will operate at on an everyday basis (including assumptions for reductions in capture rate while starting up and shutting down operations due to lack of demand for electricity, and assumptions for unabated operations during capture plant outages)
2. The anticipated availability of generation (percentage of each year that the Project would anticipate being available to dispatch power (assuming no T&S unavailability, and including any assumption for periods of unabated generation due to capture plant outages))
3. Projections of market revenues
4. Projections of future market revenues beyond the proposed term of the DPA and/or any assumptions as to the terminal value ascribed to the plant
5. A confidence interval for the APRi bid
6. Anticipated cost of capital (WACC) and/or rate of return
7. Costs associated with the Project as detailed in Annex C1

Annex C1 should be populated and referenced in this section to enable evaluation and support the descriptions provided. Annex C1 should include a detailed breakdown of the costs of the Project including the capture plant, CO₂ treatment, compression, liquefaction, remaining cost uncertainty and financing costs.

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| References to supporting documentation for Section 8.1 |
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### Project costs (1000 words; please also use the Power Cost Template – Annex C1)

Please provide a summary of the Power CCUS Project costs including expenditure to date, DEVEX, CAPEX, OPEX and decommissioning costs. This should include the level of estimates, benchmarking, accuracy, contingency applied and any grants that have been awarded to date. Supporting information may include an itemised breakdown of equipment and bulk material costs.

Given the maturity of the Project please provide the best cost estimate with an explanation of the cost uncertainties (as entered in Annex C1 across the respective plant areas) and state the steps intended to refine the cost certainty ahead of any FID. Please also provide justification for any contingencies which have been applied.

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| References to supporting documentation for Section 8.2 |
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### Project uncertainty and risk (1000 words)

Please describe the level of uncertainties and risks that have been identified that could affect the CAPEX and OPEX estimates (either as a cost increase or reduction). This should clarify which uncertainties and risks will be reduced or eliminated before FID. Providing specific references to the Project risk register(s) would be helpful.

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| References to supporting documentation for Section 8.3 |
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## Learning and Innovation

This criterion assesses the production and sharing of learnings from Power CCUS Project development which will be a crucial step in reducing future costs and de-risking projects for future rounds of CCUS deployment. The sharing of information will also promote innovations and collaboration both within and between projects. The learning and innovation criterion contributes 10% to the final Power CCUS Project score.

### Cost reduction, replicability, and innovation (1000 words)

This section is seeking information on the potential benefits to subsequent CCUS projects.

Describe the innovative aspects of the Power CCUS Project design (including any non-pipeline CO₂ transportation), what technology maturation is required for these innovations and what future cost reductions are expected from them. How replicable are these innovations for future CCUS projects in the UK and globally?

Please outline any additional benefits from the project which will support wider decarbonisation innovation e.g. use of low carbon materials in project supply chain.

Please explain if there are any subjects which could not be shared due to sensitivity around intellectual property.

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| References to supporting documentation for Section 9.1 |
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### Knowledge sharing plan (1000 words)

Please explain how the Power CCUS Project will generate, disseminate, and promote new knowledge and best practice, including how the Project will drive delivery partners to share information. These plans should describe how the Power CCUS Project will share knowledge with different stakeholders including local and national institutions to ensure maximum benefit of the learnings gained.

Please also provide a list, or separate document, of the Key Knowledge Deliverables (KKD) that will be shared either in full or redacted as appropriate.

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| References to supporting documentation for Section 9.2 |
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This publication is available from: [www.gov.uk/government/publications/cluster-sequencing-for-carbon-capture-usage-and-storage-ccus-deployment-phase-2](https://www.gov.uk/government/publications/cluster-sequencing-for-carbon-capture-usage-and-storage-ccus-deployment-phase-2)

If you need a version of this document in a more accessible format, please email Powerccusphase2@beis.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/the-ten-point-plan-for-a-green-industrial-revolution/title> [↑](#footnote-ref-2)
2. For the rest of this document, DPA refers to the Dispatchable Power Agreement, as defined below. [↑](#footnote-ref-3)
3. The online portal is the system set up to collect all of the relevant information, documents and supporting evidence from the Power CCUS Project. [↑](#footnote-ref-4)
4. Applicants should refer to the DPA Business model updates published in December 2020, May 2021, October 2021 for more information on risks. [↑](#footnote-ref-5)