



Department for
Energy Security
& Net Zero

Call for evidence on the future policy framework for the delivery of power with Carbon Capture, Usage and Storage

Government response

August 2023



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Executive Summary

The call for evidence on the future policy framework for the delivery of Power with Carbon Capture, Usage and Storage (CCUS) opened on 25 July 2022 and closed on 17 October 2022. The call for evidence sought views and evidence on how government can best support the continued deployment of power CCUS projects into the 2030s beyond Track-1 of the Cluster Sequencing process. Topics covered included:

- competitive allocation design for power CCUS
- the evolution of the business model used to support power CCUS
- the development of the power CCUS sector and supply chain
- how power CCUS could operate under future market arrangements

There were four key themes identified throughout the responses provided.

Firstly, the need for clarity on ambition, funding and policy to stimulate a future pipeline of projects. Since the publication of the call for evidence, the government has made significant progress with up to £20 billion for the early deployment of CCUS being announced in the Spring budget alongside critical policy announcements as part of the Powering Up Britain publications. This included the launch of Track-2 and confirmation that a process to expand the Track-1 clusters will be launched this year. Following on from these announcements, on the 31 July 2023 the review of the Expression of Interest (EoI) applications for Track-2 concluded with Acorn and Viking Transport & Storage (T&S) systems due to be taken forwards subject to final decisions, due diligence, consenting, subsidy control, affordability and value for money assessments¹.

Secondly, there was strong support for the DPA and its continued use. On the strength of this feedback the government intends, subject to compliance with all applicable subsidy controls, to continue using the DPA as the model to support power CCUS projects that are successful in the Track-2 or Track-1 expansion processes in the 2020s. Ahead of any decisions on the use of the DPA to support future power CCUS deployment beyond 2030 we will continue to consult stakeholders for further feedback through both the Review of Electricity Market Arrangements (REMA) and specific engagement on power CCUS.

Thirdly, there was feedback from stakeholders on the need to further develop government thinking on what competitive allocation should look like and how this should work with the wider CCUS programme and wider energy policy. The range of views and challenges raised by stakeholders on competitive allocation will assist us in the development of cross cutting policy, including the longer-term CCUS vision that was announced as part of the Powering Up Britain publications and the REMA, on which we intend to publish the next consultation by the end of the year.

¹ <https://www.gov.uk/government/publications/cluster-sequencing-for-carbon-capture-usage-and-storage-ccus-track-2/update-to-industry-on-conclusion-of-the-ccus-cluster-sequencing-track-2-expression-of-interest>

Finally, there was strong support for a supply chain strategy focused on a transition that would promote moves between sectors for a workforce likely to hold transferable skills. This will be addressed as part of the upcoming Supply Chain Strategy in 2023 which will act as a supply chain guidance/charter document for Track-1 CCUS clusters and successive clusters and capture projects thereafter.

The government would like to thank all respondents to this call for evidence. The views and evidence provided will continue to help us develop the future policy framework for power CCUS and build an enduring UK power CCUS sector.

Introduction

As set out in the Powering Up Britain publications², the government is committed to the use of power CCUS as part of our plan to reach a decarbonised electricity system by 2035, subject to security of supply.

In the Spring Budget³ up to £20 billion of funding was announced for CCUS and in the Powering Up Britain publications government made significant announcements for the Cluster Sequencing Process, setting out a clear plan to ensure CCUS plays a key role in decarbonising the UK economy. These included the list of projects for negotiation as part of Track-1, the launch of Track-2 and confirmation that a process for expanding the Track-1 clusters will be launched later this year. It was also announced that government will set out a longer-term vision on how CCUS will support our net zero ambitions to raise confidence and improve visibility for investors. This is in response to a recommendation from the Skidmore Review to provide a roadmap for the longer-term direction for CCUS.

Building on these announcements, on the 31 July 2023, the review of the Eol applications for Track 2 concluded with Acorn and Viking T&S systems now due to be taken forwards subject to final decisions, due diligence, consenting, subsidy control, affordability and value for money assessments⁴.

Power CCUS is key to both the CCUS programme and the government's ambition to achieve a decarbonised electricity system by 2035, subject to security of supply. Through the inclusion of a power CCUS project on the Track-1 project negotiations list we have progressed towards the government's ambition to deliver at least one power CCUS plant by the mid-2020s, and we are anticipating continued power CCUS deployment beyond Track-1 in order to meet our decarbonisation ambitions.

This document is the government response to the call for evidence on the future policy framework for power CCUS that was published in July 2022 which sought views on how we can best develop our future policy framework to support the continued deployment of power CCUS beyond Track-1.

Views and evidence on six key areas, listed below, were requested. The responses to these topics have been summarised by question and will be used to inform Government's next steps.

Chapter 1 – How the power CCUS business model, the Dispatchable Power Agreement, (DPA), should be evolved over time

Chapter 2 – How we can introduce competitive allocation in the 2020s

Chapter 3 – The removal of barriers to deployment

² <https://www.gov.uk/government/publications/powering-up-britain>

³ <https://www.gov.uk/government/topical-events/spring-budget-2023>

⁴ <https://www.gov.uk/government/publications/cluster-sequencing-for-carbon-capture-usage-and-storage-ccus-track-2/update-to-industry-on-conclusion-of-the-ccus-cluster-sequencing-track-2-expression-of-interest>

Chapter 4 – How we can maximise economic benefits through our future policies

Chapter 5 – How the power CCUS sector is expected to develop

Chapter 6 – How power CCUS could work with wider electricity markets, taking particular note of the recently launched Review of the Electricity Market Arrangements (REMA) consultation

Government will use the information supplied as part of this Call for Evidence, alongside wider research and evidence, to develop a policy framework for power CCUS that will fit with wider energy market developments and the CCUS programme to drive the deployment of power CCUS in the 2020s, supporting the levels of power CCUS needed to meet UK decarbonisation ambitions.

Territorial extent:

This call for evidence sought views on the Dispatchable Power Agreement and other electricity market structures that apply to the UK but do not currently operate in Northern Ireland. We are not currently seeking views on how power CCUS could be deployed in Northern Ireland. The call for evidence therefore applied to Great Britain only.

Responses received

We would like to thank all stakeholders that responded to this Call for Evidence, with detailed and insightful views that are informing policy development across the Department for Energy Security and Net Zero. In total we received 22 responses. The Call for Evidence was available on GOV.UK from the 24 July to 17 October 2022 and responses were received via email and Citizen Space. The Call for Evidence was also advertised through our power CCUS mailing lists, and DESNZ held 5 stakeholder engagement across August, September and October 2022 for the Call for Evidence.

We received responses from a variety of stakeholders, broken down as follows:

- *Industry*: including developers, suppliers, generators, service providers, manufacturing and consultancy – 11 responses
- *Public sector organisations*: including devolved administrations, local authorities, and government agencies – 5 responses
- *Delivery*: including network operators and government delivery partners – 1 response
- *Research*: including academia, thinktanks and research institutions – 1 response
- *Trade associations and industry bodies* – 3 responses
- *Charities, advocacy groups and advice services* – 1 response

Summary of responses

In this section we summarise the responses provided for each question and at the end of each chapter provide a government response setting out next steps given the views and evidence provided.

Whilst most responses directly noted which questions they were responding to, some did not. For these responses we have addressed them within our response summaries where we believed they most appropriately fit.

Chapter 1 – Evolution of the power CCUS business model

- 1. What is your view on the continued need for a business model to bring forward power CCUS in the 2020s? If you see the need for continued use of a business model what is your view on the continued use of the DPA as that business model?**

Respondents were agreed on the need for a continued use of a bespoke business model to bring forwards power CCUS in the 2020s. There was also agreement that the DPA should continue to be used and no alternative models were proposed. Only one respondent opposed the use of a business model on the basis that they believed power CCUS should not be being deployed as a technology at all. The importance of policy stability was highlighted in a significant number of responses, and it was noted that consideration of alternative models could introduce uncertainty for investment in the sector. Several respondents highlighted the fact that the DPA was still under development and yet to be tested so detailed and concrete feedback was challenging at this stage. This was a limitation that we acknowledged as part of our call for evidence document.

A number of respondents reflected on the point at which a bespoke business model for power CCUS could cease to be required. All of these responses though were clear on the need for continued use in the 2020s. Suggested points at which a bespoke business model could cease to be used included: when power CCUS projects were in a position to participate competitively within the Capacity Market (CM), once our electricity system decarbonisation ambition had been met in 2035, and when gas CCUS projects had reached level 6 on the Commercial Readiness Index and were considered as bankable assets.

- 2. If the DPA were to continue to be used as a business model to support power CCUS in the 2020s, how could it be evolved to be used as part of a competitive allocation process in the 2020s? What key changes, if any, would need to be made? Please include your views on the elements on which projects should compete and your views on which elements would need to be consistent across competing projects and the implication of those decisions**

Consistent with responses to questions 1 and 4 a number of respondents noted that it was too early to consider changes to the DPA and did not offer a response to the question posed. A number of respondents also provided general feedback on the current DPA design, which was not the subject of this call for evidence and has already been addressed in our previous consultations on the DPA.⁵

Some respondents considered how the DPA may need to be evolved in the future to work as part of a competitive allocation process and a range of feedback was provided. The clear numerics of the Availability Payment (AP) and Variable Payment (VP) in the DPA were identified to be a good starting basis for competitive allocation. A range of opinions were offered on the relative roles of the AP and VP in a competitive process. One respondent expected the VP to become less important over time but that it would need to be retained over the 2020s. One respondent went further and suggested that competition could be based on the single price point of the AP if we assume that stronger carbon pricing means that gas CCUS will run ahead of unabated gas generation, which could mean the VP would no longer be required.

Some respondents reflected on the surrounding complexities of wider CCUS aspects such as the CO₂ transport and storage (T&S) network and how competitive allocation should only focus on those aspects under the power CCUS developers' control. One respondent raised that in moving to a competitively allocated DPA there was a risk of removing some of the more subjective assessment criteria that are needed to credibly deliver power CCUS. An example provided was of early Capacity Market (CM) rounds where it was deemed that the viability of projects was not fully taken into account, resulting in a number of projects reneging on their agreements.

Two respondents raised how competition based on the current DPA arrangement could favour certain project types over others. One respondent expressed the need for the DPA to better accommodate combined heat and power (CHP) projects, whilst another respondent wanted the DPA to be adapted to better encourage more novel CCS technologies by making accommodations within any scoring mechanisms or conditions applied. The government response to accommodating different project types is covered in Chapter 5s.

Limited responses were provided on what elements of the DPA would need to be consistent across applications. One respondent suggested that outside of the AP all other aspects of the DPA should be consistent. One respondent provided further detailed thought on the need for government to provide datasets to allow projects to be assessed against a commonly agreed scenario, or commonly agreed scenarios. They suggested the use of a single scenario for the load factors of dispatchable power CCUS plants, a single carbon pricing scenario and single wholesale market revenue scenario to create a level comparison across projects.

⁵ <https://www.gov.uk/government/consultations/carbon-capture-usage-and-storage-ccus-dispatchable-power-agreement-business-model>

3. Are there alternatives to the DPA that the Government should consider for use in the 2020s? How could these alternatives work better with a competitive allocation process than the DPA?

In line with responses to question 1 respondents echoed support for the DPA and that creating a new model could create confusion and introduce uncertainty for investors. It was noted that priority should be given to ensuring the DPA operates as intended instead of the development of alternative business models. Outside of using business models one respondent reflected on how existing competitive mechanisms which address both carbon emissions and security of supply could be utilised if developed appropriately. Reflections on participation in the wider energy market are considered further in Chapter 6 – Creating suitable market arrangements for power CCUS.

4. What key principles should be considered for business model evolution into the 2030s?

Around half of respondents replied to this question and the principles suggested broadly fit into six categories.

1. Clarity and stability. Raised by 6 respondents, the principles suggested here echoed a recurring message of the need for policy stability and clear setting of ambitions.
2. Interactions with wider technology and markets. 6 respondents reflected on interactions with wider policies such as the Review of the Electricity Market Arrangements (REMA) and placement in the merit order in comparison to other technologies.
3. Deliverability. The importance of projects evidencing deliverability was raised by 5 respondents.
4. Flexible and negotiable. Raised by 5 respondents and includes the ability to adapt the DPA and accommodate new CCUS technology through the different application of conditions.
5. Value for money. Raised by 3 respondents, who emphasised the need for value for money for the electricity consumer and cost competitiveness to be a key principle in power CCUS business model design.
6. Ability to evolve. 3 respondents raised this and reflected how the DPA should continue to be evaluated once it has begun to be used so it continues to provide the right incentives and reflect the latest technology and market developments.

Government agrees that all of the above are important considerations in future evolution of the DPA.

Government response to Chapter 1

For the near term at least, there was a clear weight of opinion that the government should continue using the DPA to support power CCUS. In response the government intends, subject to compliance with all applicable subsidy controls, to continue using the DPA as the model to support power CCUS projects that are successful in the Track-2 or Track-1 expansion processes in the 2020s. Ahead of any decisions on the use of the DPA to support future power CCUS deployment beyond 2030 we will continue to consult stakeholders for further feedback through both the Review of Electricity Market Arrangements and specific engagement on power CCUS.

A range of feedback was provided on how the DPA may need to be evolved to work as part of a future competitive allocation process, all of which will be considered as part of any future development. With regards to the feedback on general improvements to the DPA these will be considered as part of running the Track-2 and Track-1 expansion processes, but government is negotiating with the power CCUS project on the Track-1 Project Negotiations List on the basis of the DPA terms and conditions published in November 2022⁶.

Government will continue to consider whether the DPA needs to evolve to reflect developments in the CCUS sector and relevant markets, including the electricity, gas, and carbon markets, but any future changes will be subject to advance consultation and developed in conjunction with stakeholders. Some key topics for future consideration that were raised during this call for evidence and its response were the future of the VP and how effectively the current DPA works for retrofit and CHP projects.

The responses received also largely confirmed that the DPA is a business model that could be adapted to be directly awarded through a competitive allocation process. As part of any competition process we would consider competition based on elements of the AP formula, as well as other approaches, and note other key considerations such as viability of the projects entering competition.

Respondents reflected on the surrounding complexities of wider CCUS elements such as the T&S network and how competitive allocation should only focus on those elements of the project that are under the developers' control. We will continue to ensure interactions with the T&S network are managed as we consider future options for bringing forward power CCUS.

⁶ <https://www.gov.uk/government/publications/carbon-capture-usage-and-storage-ccus-business-models>

Chapter 2 – Introducing competitive allocation in the 2020s

The questions in chapter 2 explored what a competitive allocation process could look like and when it could first be introduced. Our definition of ‘competitive allocation’ as set out in the call for evidence was a process through which we could determine the project(s) that will receive support based solely upon bids against one or more pre-set numerical criteria. Through the responses provided in this chapter significant feedback has been provided on competition more broadly that falls outside of this competitive allocation definition. In particular a range of views were provided on how the policy framework could be evolved from the negotiated process that we are currently undertaking as part of Track-1 and it is helpful to reflect on this first before going into the details of questions 5 to 7.

Firstly, a number of stakeholders expressed a potential preference for moving to a competitive allocation process for power CCUS projects for future rounds following the current negotiated process, before then moving to greater integration within the wider energy market. However, a similar number of stakeholders expressed a potential preference for moving straight to closer integration within the wider energy market and not implementing a competitive allocation process solely for power CCUS projects as an interim step. Finally, several stakeholders recognised that the current process for awarding contracts under Track-1 is already competitive with several projects being unsuccessful after a competitive assessment was carried out.

It is clear from the responses provided that there are a wide range of thoughts on what constitutes ‘competitive allocation’ and how competitive allocation processes can be introduced to the sector to stimulate growth that delivers value for money. To clarify, in this response document when using the term ‘competitive allocation’ we mean that as defined in our call for evidence – ‘determining the project(s) that will receive support based solely upon bids against one or more pre-set numerical criteria’, with contracts allocated directly without the need for negotiations. We agree that there can be competition within processes that don’t fit this definition, but we believe that processes that do not meet the full definition cannot easily deliver price-discovery alongside efficient and swift contract allocation.

5. What should an ideal competitive allocation process look like when introduced? As part of your answer, you should provide views on what the strategic aims of any competitive allocation should be, competitive allocation design and the institutional framework design. We would also welcome information and views on any existing schemes which you believe we could utilise or adapt.

A variety of response were provided by stakeholders on what the strategic aims of any competitive allocation process should be. Several stakeholders raised securing low-carbon energy resilience and meeting our net zero commitments as a strategic aim. Linked to this several respondents noted the need for clearer ambitions to be set by government that set out the volume of power CCUS required by 2030 and beyond. Stakeholders’ thoughts on ambition setting and the government's current approach to this are further explored in chapter 5 of this Call for Evidence. Another strategic aim noted by several stakeholders was growing the UK

supply chain and levelling up industrial regions. A few stakeholders stated that there had been a lack of growth of the offshore wind sector in the UK despite the increased deployment as part of the Contracts for Difference scheme and noted that the government should look to avoid this in the case of carbon capture.

On the design elements of any future competitive allocation process there was a great variety of points raised with most elements being mentioned by only 1 or 2 stakeholders each. There were some design elements such as the use of pots versus the need for a competition to be neutral in terms of gas CCUS technologies supported that received equal levels of feedback both for and against. Other points that were raised included the need for flexibility on commissioning dates, that competition should not just consider costs within the electricity system but also wider social and economic values, use of a transparent points-based system, a focus on deliverability, regular allocation windows and the need to provide advanced sight for industry.

There was one design element that was noted by multiple stakeholders, and this was how CO₂ Transport and Storage (T&S) availability should be managed as part of any competitive allocation process. Stakeholders suggested that T&S availability would need to be assured and that any T&S costs should not form any part of the competition due to being out of the developer's control.

With regards to an institutional framework for competitive allocation there was a limited response. However, a few stakeholders noted that the existing framework used for the Contracts for Difference scheme was a good and appropriate place to start.

- 6. With regards to a first competitive allocation process in the 2020s what projects do you think should compete and when in the 2020s could this first competitive allocation process take place from? Do you have any views of how a competitive allocation process for power CCUS can best be incorporated into, or aligned with, the Cluster Sequencing Process? In your answer you should consider the points raised in the 'managing interactions across the CCUS chain' section above.**

With regards to when a competitive allocation process could begin from the vast majority of respondents did not specify a time period but instead noted certain conditions that would need to be fulfilled before competitive allocation could begin. These conditions included the establishment of a mature T&S network, maturity of gas CCUS technology reaching a higher level of commercial readiness and there being an adequate depth of participants wanting to participate. Of the limited respondents who did suggest a time frame, 1 respondent felt that competitive allocation could begin by the mid-2020s and another suggested it could begin immediately following the Track-1 process for projects that had access to available T&S capacity.

Fewer views were provided on what projects could compete and how this could be aligned with the Cluster Sequencing Process however, a key theme that did emerge was that competition

would need to take place where there was an established T&S network and as such an initial focus for competitive allocation could potentially be Track-1 clusters.

7. Through our competitive allocation design how can we ensure that value for money is achieved? What mechanisms could be used and how should they be implemented? Your answer should pay particular attention to the points raised in the last paragraph of the ‘aspects of competitive allocation design’ section.

Many respondents to this question re-iterated previous points made that value for money should not just focus on ‘least cost’ but also social and economic benefits such as the build-out of a UK supply chain. The relative importance of deliverability to value for money was also noted by a number of respondents again with some respondents stating that it should be a higher priority than value for money given that if a project were not to deliver then this would have negative impacts on value for money and the government’s ability to meet CB6 requirements.

In terms of competitive allocation design a split of views were provided on the overall competitive allocation method that could best ensure value for money is achieved. Several respondents considered that an auction similar to that of the Contracts for Difference scheme would be most appropriate whereas a similar amount considered that a modified Capacity Market or an auction designed similar to the Capacity Market would be most appropriate. One respondent suggested that a power CCUS Regulatory Asset Based model could be considered to enhance value for money partly due to the greater revenue stability reducing costs of capital for investors. On more granular aspects of competitive allocation design the importance of transparency and clear communication of criteria to ensure all projects were on a level playing field was noted as important for ensuring value for money was achieved.

Government response to Chapter 2

The government remains committed to bringing forward competitive allocation in the 2020s for power CCUS but recognises the need to co-ordinate future power CCUS allocation processes with the evolution of the CCUS Cluster Sequencing Process and wider energy policy developments such as the Review of the Electricity Market Arrangements (REMA). As noted by respondents, bringing in competitive allocation can be achieved through both the development of a bespoke allocation process for power CCUS or by bringing power CCUS into open competition with other similar technologies. Both of these options will continue to be evaluated. We will consider further policy development work on competitive allocation for power CCUS alongside the different carbon capture sectors of the CCUS programme and alongside wider development in the electricity markets through REMA. The government also remains committed to continue co-ordinating policy on bespoke business models, such as the DPA, with REMA and through this work we will consider the conditions and timescales under which power CCUS plants could compete in the wider electricity markets without bespoke support,

alongside other similar technologies. There will be a further consultation on REMA before the end of the year, through which government will provide updates on reforms previously consulted on, including those for low-carbon dispatchable generation. The feedback received in response to this call for evidence will help inform power CCUS input to these critical items along with any future work on designing and operating a competitive allocation process for power CCUS.

Chapter 3 – Managing barriers to deployment

8. What are the barriers to future power CCUS deployment in the 2020s?

9. Who is best positioned to manage each barrier, and how can parties support the best placed stakeholder to do so?

Questions 8 and 9 received 19 responses. Responses ranged in detail between the definition of one barrier, to a table provided with many barriers and suggested responsibilities. We identified approximately 45 individual barriers in total.

The barriers referenced most frequently are listed below, followed by an explanatory line which summarises the justifications provided in the responses. These responses were provided before the Powering Up Britain publications in March and the up to £20 billion of funding for CCUS announced in the Spring budget.

- Delays to cluster sequencing and T&S infrastructure progress (11):
A lack of progress on cluster sequencing, especially Track-2, and the need to accelerate the deployment of CO₂ T&S infrastructure;
- Ambiguity of government ambitions (8):
A lack of clarity of government's ambition on both power CCUS, and across the CCUS programme, as well as the lack of clarity on funding;
- Skills gap (6):
A lack of skills to support the deployment of power CCUS, and lack of a plan to remedy this skills gap and transition workers from other sectors;
- T&S network interactions – including clarity on flexibility (6):
A lack of clarity on interactions between power CCUS and the T&S system due to the lack of a final version of the T&S network codes, in connection with the need to ensure the T&S network enables the flexible operation that power CCUS plants require;
- Public acceptance (5):
Engaging and educating the public, both locally and nationally, to allow better understanding of the technology;
- Unfair advantages between regions (5):
Barriers to ensuring the benefits are shared nationally and the absence of a level playing field, recognising first mover advantages;
- Lack of non-pipeline transport (NPT), such as CO₂ shipping (5):
A lack of any deployment of NPT for CO₂, and a lack of clarity around policies to support future rollout of NPT, is preventing investment and progression of projects not in close proximity to a CO₂ store;
- Environmental impacts and permitting (5):
Potential environmental impacts need managing effectively and upfront, as well as the potential for project delay caused by environmental permitting delays.

Beyond the above, responses also highlighted barriers including: electricity grid access and reinforcement; delays to planning and permitting; solvent disclosure; T&S right sizing; development constraints; competition from international deployment; licensing of solvents;

health and safety; as well as other technical, policy, financial and regulatory barriers to deployment.

A small number of responses included suggestions for who would be responsible for best managing these barriers. The majority of these suggested cooperation was needed across multiple parties, often including both government and the private sector.

Government response to Chapter 3

We welcome the information shared by stakeholders on the current and future barriers to the deployment of power CCUS. We see this as a cooperative process; by seeking to manage these barriers in a collaborative and transparent way, we can build public and investor confidence in power CCUS. This will help to deliver decarbonisation and economic opportunity while protecting people and the environment. The responses raised several challenges that transcend both the CCUS and power sectors.

We have considered the barriers raised which are specifically related to government activity. Many of these barriers were already visible to the department, but we continue to engage internally in the Department for Energy Security and Net Zero, and across government in light of the views and evidence shared by stakeholders. We have since concluded the EoI process for Track-2 of the CCUS programme, announced that we will launch a process this year to expand the Track-1 clusters, and confirmed up to £20 billion of funding for the early deployment of CCUS in the Spring Budget. These announcements and milestones should alleviate some of the stakeholder concerns raised, especially with respect to the provision of certainty and future visibility. Further information on future deployment, government ambition, and skills and supply chains are set out in our response to chapters 4 and 5.

To complement the announcements in the Powering Up Britain publications, government is contributing to positive progress on many of the key barriers identified:

- The CCS Network Code will form a key component of the business model and regulatory regime being developed for carbon dioxide transport and storage. The first draft versions of the Heads of Terms for the CCS Network Code were published in June and December 2022. Our ambition is to consult on the finalised version of the Heads of Terms during the summer of 2023, and then to finalise and publish the full CCS Network Code at the earliest opportunity thereafter. In addition, we will continue to consider how T&S networks can manage the dispatchable behaviour of power CCUS in the most efficient and cost-effective way.
- We note the views on first mover advantage, and we will consider the effect of this when designing any future allocation processes to maintain a fair process for all applicants. The Cluster Sequencing process to date has been designed to create economies of scale and maximise regional economic benefits. Government has focused on supporting the most viable CCUS clusters first based on a robust assessment of criteria deliverability and value for money.

- Government recognises the importance of remote emitters being able to access CO₂ transport and storage networks. We consider that the capacity for T&S networks to be able to accept CO₂ from dispersed or distant sites and international sources by non-pipeline transport (NPT) will be important for achieving our long-term decarbonisation objectives. We are continuing to engage with industry to understand the arrangements necessary to enable non-pipeline transport of CO₂.
- We are working with the environmental regulators and planning authorities to ensure they are prepared to manage first of a kind environmental permit applications. This includes working with the Environment Agency (EA) on their updates to the Post Combustion Capture 'best available techniques' (BAT) and their work on the degradation of common capture solvents to form an Environmental Assessment Level (EAL). In addition, government is consulting on the National Policy Statements for energy⁷. This work will contribute to setting clear requirements for applicants to form more efficient and timely permitting process.

Going forward, we will continue to engage and cooperate with the whole CCUS sector and the relevant parts of the power sector to support the management of barriers. This includes engagement with key industry stakeholders through the CCUS Council and other forums. By doing so, we can ensure the deployment of power CCUS remains on track to meet our Carbon Budgets and a decarbonised electricity system by 2035, subject to security of supply.

⁷ <https://www.gov.uk/government/consultations/planning-for-new-energy-infrastructure-revisions-to-national-policy-statements>

Chapter 4 – Realising the economic benefits

10. Which areas of the power CCUS supply chain are well provided for in the UK and internationally, and where is there room for further development of supply chains to support power CCUS?

Respondents agreed that the pipeline, subsea, and offshore supply chains are currently well established in the UK but considered there to be more areas than not that needed development.

Throughout, respondents referenced the CCSA's 2021 Supply Chain Excellence for CCUS report⁸ and Siemens Energy – Supply Chain for Net Zero GB electricity system by 2035⁹ when outlining their views on capacity, expertise, and areas for development, both in the UK and internationally.

Most respondents highlighted that skills and workforce in the UK need to be developed to support the supply chain, with respondents agreeing that the main economic impact of power CCUS will be on engineering and construction. Respondents considered that although the UK construction supply chain is developed, it cannot currently withstand the volume of projects planned at the same time in the context of the energy transition. Respondents showed support for bringing labour in from abroad in the near term and putting in place a long-term plan for increasing the UK skillset.

Some respondents noted that capture technology is one of the key areas where there is room for further development of UK supply chains, stating that most of the technologies have yet to be proven at scale. Respondents also flagged particular areas for development could also include specialised metering equipment and CO2 pipelines.

Finally, respondents flagged the need for individual specifications for each cluster, rather than a 'one size fits all' approach, as different clusters have different construction methods, with different supply chain requirements.

11. How can the future policy we develop maximise social and economic benefits such as supporting businesses, including optimising opportunities for supply chains at home and globally?

Respondents agreed that clarity on funding and policy commitments will provide investor confidence in the supply chain and boost supply chain development across the whole value chain. One respondent was in support of designing a competitive allocation process to optimise opportunities for supply chains.

Additionally, it was highlighted that the future policy framework can maximise the social and economic benefits by providing the market with confidence on the opportunities for power

⁸ <https://www.ccsassociation.org/all-news/ccsa-news/ccus-supply-chain-report-showcases-major-uk-opportunity/>

⁹ <https://www.siemens-energy.com/uk/en/offerings-uk/net-zero-2035.html>

CCUS, and clear guidance from government on the social and economic benefits it would like power CCUS to support.

Several respondents flagged that it is vital to address skills gaps, to ensure we have skills necessary for jobs to be created in the sector. Respondents said that the department should work with local authorities and other government departments, to develop targeted policy and funding to upskilling and retraining, this would enable workers to move between sectors easily. Respondents flagged that there needs to be a clear action plan created for skills, current and future, to do this. This could also help to mitigate a shortage of skilled workers when projects deploy. Additionally, one respondent flagged that the action plan created should be focused on transition promoting moves between sectors where a workforce is likely to hold transferable skills, and through working in collaboration with industry, communities, and the public sector, to support a new workforce.

Two respondents highlighted that government and industry should work to continue positioning the UK as a world leader for power CCUS, and in future export these learnings abroad.

12. What are the anticipated bottlenecks in the supply chain and what can be done about them?

Many respondents answered questions 10, 11 and 12 in parallel and bottlenecks in the supply chain are therefore noted in the response summaries to questions 10 and 11 above.

An additional point on bottlenecks, that was raised specifically in response to this question, was on transmission networks. It was highlighted that for the UK to deliver on its decarbonisation targets, transmission cable manufacture to expand access to the grid needs to be accelerated as high priority. These respondents highlighted that encouraging and building new or expanded sustainable manufacturing in the UK would facilitate an accelerated rollout of power CCUS and other low-carbon technologies.

13. How do we best ensure that economic benefits are realised at a regional level where power CCUS plants and businesses are located?

Most respondents outlined engagement with local authorities for stakeholders across the supply chain as key to ensuring economic benefits are realised at a regional level. These respondents suggested organising regional supply chain engagement events to understand capacities and gaps of local supply chains. Respondents also highlighted the importance of clear guidance from government and industry on local and regional content requirement for supporting projects.

Respondents also referred to the need for expansion of the Cluster Sequencing Process, including developing clusters beyond Track-2 in new regions to unlock economic benefits and job opportunities there, awarding dispatchable power agreements to a portfolio of projects, and development of non-pipeline transport solutions (NPT). These respondents also flagged that

project developers should be encouraged to develop partnerships with local industry and maximise the benefit to the UK from their project.

One respondent suggested adjusting the policy framework from a cluster-based approach to an asset-based approach. This respondent flagged that this shift in approach would allow appropriate utilisation of all UK assets and open more regions and projects for consideration.

14. Across the whole CCUS sector we anticipate that 50,000 jobs¹⁰ could be supported. How can future policy best support businesses to develop a diverse sector that provides opportunities for all?

Respondents reflected on how government could help encourage the development of a diverse and inclusive sector.

The importance of training, education and communication of opportunities to all was emphasised by almost all respondents to this question including the suggestion that government work with the wider energy sector to design and implement training programmes from school level upwards.

In order for industry to put in place the training programmes to develop a diverse and inclusive sector, the importance of policy certainty to provide confidence in the longer-term market for CCUS was noted by many respondents.

Government response to Chapter 4

Government welcomes the information shared by stakeholders on how the future policy we develop can maximise social and economic benefits, including optimising opportunities for supply chains and how any policy we deliver can best support the creation of a diverse and sustainable sector. The UK is ideally positioned to lead the global development and deployment of CCUS, given its industrial experience and world-leading capital investment landscape, and responses to this call for evidence have reflected this, while giving government a clearer understanding of how to strengthen the supply chain.

We understand that the future policy framework we develop should provide the market with confidence on the opportunities for power CCUS. We also understand the UK government itself cannot create a UK CCUS supply chain, and are already working closely with devolved administrations, project developers, cluster leads, original equipment manufacturers (OEMs) and engineering contractors to identify and address any delivery risks across the entire value chain.

In continuing to work closely across the value chain, government is confident that areas in need of development, such as capture technology, can continue to advance. For example, we are working with industry through the CCUS Council's Supply Chain

¹⁰ EINA 2019 <https://www.gov.uk/government/publications/energy-innovation-needs-assessments>

Working Group to address the key strategic issues to enable UK supply chains to realise the economic benefits of our CCUS infrastructure programme.

We have considered anticipated bottlenecks as outlined by stakeholders, and how government and industry can work to ensure economic benefits are realised at a regional level. We are satisfied with the response that the UK construction supply chain is well developed and will continue working with industry and engaging with local authorities to understand capacities and gaps of local supply chains.

Through the CCUS Council, industry and government have been collaborating to develop a CCUS Supply Chain Strategy. The CCUS industry has now published the CCUS Supply Chain Good Practise Document¹¹, setting out its strategy to build a domestic supply chain and to ensure it is ready in time for the deployment of the first Track-1 CCUS Clusters as well as for the subsequent ramping up of the UK's CCUS industry to serve a major and growing international demand. We will consider responses to this call for evidence when shaping supply chain guidance for future projects.

To help the UK supply chain develop and encourage investment in the maturation of carbon capture technologies, the government is driving deployment through the CCUS Cluster Sequencing Programme and importantly has a longstanding programme to support UK innovation in CCUS.

Between 2004 and 2021 the UK Government has invested over £346 million into CCUS Research, Development and Deployment (RD&D). This funding has ensured the UK remains at the forefront of CCUS Research and Innovation. Developing the skills, knowledge, and technology to allow the UK to deploy CCUS domestically and export it expertise around the world. Innovation programmes are a critical enabler in developing technology, a skilled workforce and supporting the 'gearing up' of UK supply chains.

In addition, in 2020 the UK Government confirmed Advanced CCUS and Greenhouse Gas Removal (GGR) innovation would be two of the ten priority areas of the £1 billion BEIS Net Zero Innovation Portfolio (NZIP, 2021-2025).

With regards to an inclusive workforce, the government welcomes the feedback provided. Such issues are, and will continue to be, a regular topic at our CCUS council and CCUS Kickstarter forum which we run in conjunction with industry.

One key aspect of establishing a new sector is attracting people to the sector and facilitating investment in the necessary jobs and skills. Government is working with the UK's offshore oil and gas sector through the North Sea Transition Deal to set out a plan to deliver the skills, innovation, and new infrastructure required to meet stretching greenhouse gas emissions reduction targets. The North Sea Transition Deal has a commitment to deliver an integrated People and Skills Plan to ensure the highly transferable workforce is being tapped into throughout the energy transition.

¹¹ <https://www.ccsassociation.org/all-news/ccsa-news/ccsa-launches-new-ccus-supply-chain-strategy/>

Government will continue to take a holistic approach to developing the UK power CCUS sector and strengthening UK supply chains – focusing on technologies, people, and skills – in order to enable social and economic benefits to be fully realised.

Chapter 5 – Future plans in the GB power CCUS sector

- 15. Our CB6 targets could require as much as 10GW of power CCUS by 2035. In general, what do you think the trajectory for power CCUS deployment should look like to meet our CB6 targets in the most cost-effective manner? Do you think the current pipeline is developing at the scale and pace necessary to meet our CB6 targets? Please provide evidence to substantiate your views.**

A number of respondents thought that a more explicit government target beyond at least 1 power CCUS plant by the mid-2020s was needed to keep us on course for meeting our CB6 targets. With regards to the scale of deployment needed it was suggested by a number of respondents that 10GW for power CCUS deployment by 2035 would be a minimum, and that more than this was likely needed to deliver a secure and decarbonised electricity system. Analytical evidence was provided by some respondents, one of which suggested that 7GW by 2030 could be needed and another that 20-30GW could be needed by 2050. Reasons given for this scale of deployment were to ensure security of supply and include plants running at a wide range of load factors to cover the full range of the wholesale electricity market. No respondents provided feedback that aiming for a trajectory that can deliver as much as 10GW by 2035 would create a risk of overbuilding.

With regards to the current trajectory several responses expressed a view that the potential project pipeline is sufficient but is not being supported to develop at the scale necessary to meet CB6 targets. These respondents suggested that more government support and clarity of ambition is needed to bring forward power CCUS projects. Respondents considered there to be a sufficient pipeline of projects, but that a key limiting factor was be the amount of government support available. These respondents considered that a clear forward process from government is needed to deliver projects at pace with minimal supply chain constraints. In addition, some respondents noted that the government should be working on deployment pathways beyond 2035 and out to 2050 as well.

In reference to the scale of deployment needed respondents also mentioned the dependencies around demand, the development of other technologies, and storage options as important to consider. One respondent noted that the 2035 deployment levels in the government's analytical pathways are dependent on the growth of other flexibility options, including multiple forms of electricity storage, demand side response, and imports of electricity from abroad. Respondents also flagged that as electricity demand increases, the need for firm capacity to maintain system security will increase.

- 16. What are your views on the composition of the current and future pipeline? For example, what is the anticipated locational make-up of future power CCUS deployment across the UK and what mix of power CCUS projects do you expect to come forward?**

When answering this question, respondents did not answer specifically on where future projects could be or about the mix of projects that could come forward, but instead flagged

barriers and constraints to new projects. There was very little information given about views on the anticipated locational make up of deployment across the UK.

Recurring themes included access to T&S networks and how this would dictate deployment locations, the development of new clusters, NPT, and retrofitting versus building new projects. Respondents considered there to be ambiguity around policy and funding commitments and that this acted as a barrier to understanding what the composition of the future pipeline could look like.

One respondent outlined that new build projects would be optimal, to maximise the economic life of a plant. Another respondent stated retrofitting existing CCGTs would be more economic, even at lower load factors, due to the amount of existing gas generation capacity available in and outside of the current clusters.

17. Are there any specific power CCUS projects that you are planning for the late 2020s and into the 2030s that you would like to make us aware of at this stage?

Respondents to this question were generators and developers and individual responses are confidential. From the information provided, we anticipate there is the potential for a healthy pipeline of power CCUS projects.

18. Are there any particular technology innovations that government should be made aware of? What support might these innovations require and what potential do they have to contribute further to the cost-effective delivery of our decarbonisation ambitions?

One respondent encouraged the provision of specific support for combined heat and power (CHP) with CCUS, and another for offshore modular OCGTs that they believed would ensure a level playing field with more typical plants, such as gas CCGTs with CCUS.

Other responses included: a request for further research into alternatives to liquid amine solvents; highlighting research on maximisation of capture rates during start up and shut down; support being needed for verification of technologies; the need to research CO₂ shipping, and include it in future allocation rounds; a suggestion to focus on proven technologies in the near-term to support cost reduction; the deployment of international interconnectors to help the UK to export low carbon balancing services to Europe; clear short term deployment targets and incentives that would encourage investment in technological innovation.

A few responses looked more broadly than power CCUS and mentioned alternative technologies, including hydrogen to power and battery technologies, suggesting they could supplement or replace gas CCUS. These responses encouraged government to look at the role of these technologies and the potential for support.

Government response Chapter 5

Government welcomes the responses shared by stakeholders on the trajectory for power CCUS deployment to meet our CB6 requirements and we are satisfied that there is a sufficient pipeline of potential projects to meet the anticipated deployment trajectories.

However, a key theme mentioned by respondents across the chapter was a request for more visibility around the future support available and clarity on ambition. As noted in the introduction to this response document government has made significant announcements on funding and the next steps for the CCUS programme as part of the Spring Budget and Powering Up Britain publications since this call for evidence was launched – notably launching the Track-2 process and confirming the intention to launch a process to expand the Track-1 clusters by the end of this year. We do however still recognise the ongoing importance of providing further certainty for industry beyond these recent announcements and our ambitions for CCUS by 2030. We will therefore set out a vision for the UK CCUS sector this year, which will provide clarification on the future of CCUS, how it will support our net zero ambitions, and crucially provide the confidence and certainty developers and investors are looking for in the longer term.

With regards to the call for a specific ambition or target for power CCUS that goes beyond at least one power CCUS plant by the mid-2020s the government can re-confirm its commitment to supporting a level of power CCUS deployment that enables us to meet our 2035 decarbonisation ambitions. We will however not be introducing a new power CCUS specific target or ambition at this stage.

Based on our analysis, and external analysis, including that provided by stakeholders in response to this call for evidence, it is clear that a significant capacity of low-carbon dispatchable generation from sources such as power CCUS or hydrogen to power will be required, alongside other forms of flexibility such as batteries, long duration electricity storage and demand side response. Power CCUS is likely to be a key technology in this mix and as we stated in our call for evidence as much as 10GW of power CCUS capacity could be needed by 2035. We believe this approach provides the necessary assurance to the power CCUS industry whilst allowing the exact mix of technologies providing low-carbon flexibility to be determined by market developments, such as cost reductions, technology development, and the buildout of enabling infrastructure. As we set out in the recent Powering Up Britain publications, government acknowledges the need for a long-term strategy for all types of flexibility and plans to set this out through the Review of Electricity Market Arrangements (REMA).

With regards to the different plant types noted in response to question 18, as set out in the government's response to Chapter 1 we will continue to consider whether the DPA needs to evolve to reflect developments in the CCUS sector. This could include further consideration of how effectively the current DPA works for retrofit projects, which are intended to be eligible for DPA contracts, and CCUS technologies beyond standard CCGT power stations with CCUS, such as CHP and offshore modular OCGTs with CCUS.

Chapter 6 – Creating suitable market arrangements for power CCUS

19. Do you agree with the continuation of the mid-merit role we envisage for power CCUS relative to other technologies? Please provide evidence to support your view.

The majority of respondents broadly agreed with the continuation of the mid-merit role we envisage for power CCUS. A few responses did not state their agreement or disagreement. However, some responses stated that it should run ahead of unabated generation. Responses suggested the mid-merit role was conditional on: the market being designed to achieve this; the market recognising all the benefits power CCUS can provide to the electricity system, including those beyond generation such as inertia; the fact that it is not yet zero carbon and hence should not dispatch ahead of zero carbon alternatives; there not being locational or systems needs to run at higher load factors.

Two responses disagreed with the mid-merit role. One of these responses stated that power CCUS should in the future not be considered as 'mid-merit' as they believed that in the future there should be no unabated generation on the system meaning it would be the next (and last) to dispatch after renewable generation. The other response stated that there is no case for Power CCUS, due to deployment and performance risks, and deployment will divert investment away from renewables. One other response requested further consideration of the relative order of power CCUS and hydrogen to power, suggesting that hydrogen to power may offer a lower total cost of generation.

Other responses noted that: power CCUS can run as required (either baseload or more flexibly, but with lower capture rates when flexible); both new build and retrofit (at lower load factors) can play a mid-merit role; the merit order should be based on lifecycle carbon emissions of the generation; gas CCS should run after BECCS; that we should not conflate technologies that cause no net increase in generation (i.e. batteries and deferred demand) with power CCUS that increases overall generation.

20. Noting the need to secure best value and to avoid overcompensation, what should the relationship between the CM and the DPA (or indeed an alternative power CCUS business model) be in the future? What changes would be required to facilitate such a relationship?

Responses focused on three themes: the comparable suitability of the CM and the DPA for power CCUS over different time periods; the arrangements for transition between a DPA and a CM agreement; and the need for clarity on these policies.

Many responses discussed the comparable suitability of the CM vs the DPA for securing the deployment of power CCUS plants. In general, responses agreed that the DPA was needed now, and that the CM could be suitable, if reformed, in the long term. However, responses differed over what timeframe the CM could be suitable. Two responses stated that the CM would become suitable when: the transition to a decarbonised power system is sufficiently well

established; or when power CCUS reaches maturity. One of these two responses further detailed that the DPA and CM should be kept separate because the CM ensures security of supply, while the DPA brings forward low carbon flexible power that would be uncompetitive in the CM and the wholesale electricity market. In contrast, two other responses stated that the CM should be reformed on an ambitious timeline to bring forward new low carbon capacity and allow for competition between technologies, thereby securing value for money for consumers.

Many responses requested clarity on interactions between the CM and the DPA. A key theme in these responses was the need for FOAK power CCUS projects to understand the forward relationships between the CM and DPA in order to make investment decisions. Multiple responses also stated that these interactions should be fully considered as part of the reformation of the CM under the REMA. These responses were received before our consultation in January 2023 on the CM, Capacity Market Consultation: Strengthening security of supply and alignment with net zero.

Some responses discussed the transfer of a powerplant between a CM and a DPA. These responses included views that any transfer during the contracted period could be based on the transfer representing value for money for consumers, that it supports decarbonisation goals, and that the transition downtime does not risk security of supply. Respondents largely focused on the transition from a CM contract to a DPA contract. Several responses also highlighted the importance of the interaction at the end of a DPA contract and interaction with CM auction timings.

A few responses said that there was too little information to answer this question or that it was too early to be able to comment on the future relationship, or the changes required. Finally, two responses stated that the market (either through a reformed CM or otherwise) needed to fully value the system benefits of power CCUS.

21. Over what time period do you believe power CCUS could move from requiring direct support under a competitive allocation system to that of a market-based solution in direct competition with other technologies providing similar services to the electricity system?

There was significant overlap between responses for Question 20 and Question 21, and all but one of the responses to Question 21 also responded to Question 20. There were no overwhelming themes identified, but many conditions were stated for power CCUS to move away from requiring direct support.

Only one response suggested a date, the mid-2030s, but this was regarded as dependent on significant rollout in the 2020s and associated cost reduction, a high carbon price, and unrestricted T&S access. Across the responses many conditions were instead stated in order for power CCUS to move to or reach a market-based solution: maturity; market conditions that fully value all the benefits of power CCUS; significant rollout in the short term; a high carbon price; cost reduction achieved through significant rollout; diminishing of cross-chain risks; the maturity of other low carbon flexible technologies to compete with; the level of decarbonisation

of the electricity generation; existing and future system support schemes; the funding pipeline; and appropriate electricity market design.

Three responses said that other technologies that provide low carbon flexible power may not be sufficiently mature in the medium term to allow for technology neutral competition. Two responses said that it's not clear that power CCUS could move away from direct support. One of these two said that even with a high carbon price power CCUS may not be price competitive against renewable generation and electricity storage. The other said that demand for power CCUS, as low carbon but fossil fuel-based generation, may have diminished by the time the technology is mature and de-risked.

A few responses said that it is important government delivers first on Track-1 and Track-2 of the Cluster Sequencing Process, and cost reductions are socialised, before government focuses on market-based solutions. A few other responses more generally stated that an accelerated rollout of power CCUS is required in the short term to create an environment where power CCUS can move away from requiring direct support.

One response said that power CCUS should move from First of a Kind (FOAK) projects with a DPA to an optimised Capacity Market in the medium-term, thereby resulting in wider competition. One other response noted that sufficient advance notice should be given of future plans to provide the certainty required to make investments. A few responses cited interactions with REMA, with some directly stating this question should be considered as part of REMA.

Government response to Chapter 6

Following analysis of the call for evidence responses, we continue to believe that power CCUS should play a mid-merit role in our generation mix. Mid-merit represents the dispatch of electricity to the grid after lower cost lower carbon renewable generators have dispatched but ahead of unbated fossil fuelled generation plant, something the Dispatchable Power Agreement is designed to incentivise. We will continue to assess how this role may evolve in the longer term as we move towards a decarbonised electricity system and unabated fossil fuelled generation is converted to low carbon technologies or retired. We will consider this with full awareness of the system benefits of power CCUS and its role in supporting stable operation of an electricity system that is likely to become dominated by weather dependent non-synchronous generation.

Government is also considering the role of power CCUS alongside other low carbon flexible technologies and working together through REMA to ensure that future markets recognise the benefits of flexible technologies and send the appropriate dispatch signals to minimise system costs. Given the pace of the transition required to meet our 2035 power sector decarbonisation ambitions it is important we deploy all viable forms of low-carbon flexibility at pace, and government sees a role for various forms of low-carbon dispatchable power, such as power CCUS and hydrogen-fired power generation (hydrogen to power), to co-exist together to deliver low-cost decarbonisation and ensure low-carbon security of supply. That is why, alongside committing to continuing using the

DPA to support power CCUS deployment in the 2020s, government also announced in the Energy Security Plan our intention to publish in autumn 2023 a consultation on the need, and potential design options for, market intervention to support the deployment of hydrogen to power.

We are considering interactions between the Capacity Market contracts and Dispatchable Power Agreement contracts. In January, government published a consultation on reform to GB's Capacity Market. These reform proposals include introducing tighter emission limits for new build and refurbishing capacity from 2035, thereby incentivising oil and gas generators to decarbonise through methods such as carbon capture and hydrogen. Government will consider options for how a power plant with an existing Capacity Market agreement would decarbonise, including how it might transfer to a DPA contract. This transfer would be subject to any transfer representing value for money for consumers, and subject to security of supply, including during the refurbishment and commissioning period.

When appropriate, government envisages power CCUS may be able to compete with all technologies, or other low carbon flexible generation technologies such as hydrogen-fired power generation, as well as demand side response and long duration storage. This will require competing technologies, including power CCUS, to be at the right level of maturity to enable their competition in the electricity market. We will continue to consider the potential characteristics or conditions, such that power CCUS could transfer from bespoke support towards a market-based solution, and we welcome the views and evidence shared by stakeholders on this. As set out in the Net Zero Strategy¹² the government remains committed to moving towards competitive allocation of power CCUS contracts within the 2020s and this may be achieved through a bespoke power CCUS competitive allocation process or via enabling power CCUS to compete with other similar technologies through the changes being considered under the REMA.

Government will continue to enable knowledge sharing from early CCUS deployment, and research projects, as a crucial element of de-risking and enabling cost reduction for future CCUS projects. In Track-1 of the Cluster Sequencing Process, power projects were required to submit plans for knowledge creation and sharing as part of the assessment process. We expect that sharing learning will continue to be an important requirement in the Cluster Sequencing process. In the long term, the government will set out any information obtained on how cost reduction can be achieved, and how we can move away from government subsidy, while providing value for money for electricity consumers and ensuring security of supply.

¹² <https://www.gov.uk/government/publications/net-zero-strategy>

Conclusion & next steps

This call for evidence set out to gather views and feedback to assist with the development of the future policy framework for power CCUS. There were four key themes that were identified throughout the responses provided.

Firstly, the need for clarity on ambition, funding and policy to stimulate a future pipeline of projects. As noted in the introduction, the government has made significant recent progress with up to £20 billion for the early deployment of CCUS being announced in the Spring budget alongside critical policy announcements as part of the Powering Up Britain announcement, including the launch of Track-2 and confirmation that a process to expand the Track-1 clusters will be launched this year. Furthermore, on the 31 July 2023 the review of the Expression of Interest (EoI) applications for Track 2 concluded with Acorn and Viking T&S systems due to be taken forwards subject to final decisions, due diligence, consenting, subsidy control, affordability and value for money assessments¹³.

Whilst government does not have a power CCUS deployment target, power CCUS has consistently been a key pillar of our plans to decarbonise the power sector since the 2020 Energy White Paper¹⁴, and this commitment was most recently re-emphasised in the Powering Up Britain publications¹⁵. DESNZ analysis¹⁶ shows that a significant capacity of low carbon dispatchable generation is required to meet our decarbonisation ambitions, and that power CCUS is likely to be a key technology in meeting those ambitions, with as much as 10GW of power CCUS required to decarbonise the electricity system by 2035. We will also set out a strategy for all low carbon flexibility technologies as part of the REMA process, as confirmed in the Powering Up Britain publications.

The second theme was the strong support for the DPA and its continued use as part of our future policy development. As stated in the government response to chapter one based on the strength of this feedback the government intends, subject to compliance with all applicable subsidy controls, to continue using the DPA as the model to support power CCUS projects that are successful in the Track-2 or Track-1 expansion processes in the 2020s. Ahead of any decisions on the use of the DPA to support future power CCUS deployment beyond 2030 we will continue to consult stakeholders for further feedback through both the Review of Electricity Market Arrangements and specific engagement on power CCUS.

The third key theme was on the need to further develop government thinking on what competitive allocation should look like and how this should work with the wider CCUS programme and wider energy policy. The range of views and challenges raised by stakeholders on this subject of competitive allocation will assist us in the development of cross cutting policy including the longer-term CCUS vision that was announced as part of the

¹³ <https://www.gov.uk/government/publications/cluster-sequencing-for-carbon-capture-usage-and-storage-ccus-track-2/update-to-industry-on-conclusion-of-the-ccus-cluster-sequencing-track-2-expression-of-interest>

¹⁴ <https://www.gov.uk/government/publications/energy-white-paper-powering-our-net-zero-future>

¹⁵ <https://www.gov.uk/government/publications/powering-up-britain>

¹⁶ <https://www.gov.uk/government/publications/energy-and-emissions-projections-net-zero-strategy-baseline-partial-interim-update-december-2021>

Powering Up Britain publications and the REMA, on which we intend to publish the next consultation by the end of the year.

Finally, there was strong support for a supply chain strategy focused on a transition that would promote moves between sectors for a workforce likely to hold transferable skills. This has now been addressed, through the publication of the CCUS Supply Chain Good Practise Document¹⁷, setting out the CCUS industry's strategy to build a domestic supply chain. Government and industry will continue to work collaboratively to build on this for successive clusters and future capture projects.

The government would once again like to thank all respondents to this call for evidence. The views and evidence provided will continue to help us develop the future policy framework for power CCUS and build an enduring UK power CCUS sector.

¹⁷ <https://www.ccsassociation.org/all-news/ccsa-news/ccsa-launches-new-ccus-supply-chain-strategy/>

This call for evidence response is available from:

www.gov.uk/government/consultations/future-policy-framework-for-power-with-carbon-capture-usage-and-storage-ccus-call-for-evidence

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