

Energy Transition on the UKCS – two critical reports published

Introduction

August saw the publication of two documents which will have a significant bearing on developments in the oil and gas industry in the next decade, and which are closely related. The Department for Business, Energy and Industrial Strategy (BEIS) published a response to its consultation on re-use of oil and gas assets for carbon capture, usage and storage (CCUS) projects while the Oil & Gas Authority (OGA) published its final report on UK Continental Shelf (UKCS) energy integration.

The BEIS consultation response can be found [here](#) and the OGA's energy integration report [here](#)

Context

Carbon Capture Usage and Storage (CCUS) is likely to be essential if the UK is to meet its obligations under the Paris Agreement and the net zero target under the Climate Change Act. In order to deploy CCUS at scale in the UK a network of infrastructure will need to be developed to transport and permanently store Carbon Dioxide (CO₂) offshore. The re-use of oil and gas assets has the potential to significantly reduce the cost of development of that network and its carbon footprint. BEIS states *"Whilst the exact value of these cost savings is uncertain, upfront capital costs savings for some projects could be in excess of £100 million compared to the costs to construct new pipeline infrastructure."* The OGA in its energy integration report suggests that re-use of existing infrastructure could save 20-30% of the capital cost for selected CCUS projects. There are also potential benefits for oil and gas owners and operators, including opportunities to maximise the economic life of their assets, and to potentially reduce or transfer decommissioning costs.

The government has been working closely with industry to evaluate potential business models for CO₂ transport and storage. In 2019 BEIS launched a consultation on CCUS business models alongside the consultation on the re-use of oil and gas assets for CCUS projects. (The response to the CCUS Business Models consultation was also published last week and our Law-Now on that document can be found [here](#).) The aim of the BEIS consultation on the re-use of oil and gas assets was to help facilitate the deployment of CCUS at scale by identifying the existing opportunities and barriers to the re-use of infrastructure for CO₂ transport and storage while the OGA's Energy Integration Project, which began in early 2019, has explored how different offshore energy systems (oil and gas, renewables, hydrogen and carbon capture and storage) could be co-ordinated across the (UKCS) for environmental and efficiency gains, including identifying technical, regulatory and economic hurdles.

The OGA report

Working with BEIS, The Crown Estate, Ofgem and others, the OGA published interim findings in December 2019 confirming the technical feasibility of energy integration. The latest report follows the second phase of the project which quantified how energy integration could contribute to emission reductions and the barriers to adoption. The OGA concludes that oil and gas infrastructure, capabilities and supply chain can support energy integration on the UKCS, contributing significantly to offshore renewables expansion and UK net zero. The report describes that integration has the potential to make a significant impact, with a possible 30% contribution towards the country's overall net zero target, primarily through platform electrification, CCUS, blue and green hydrogen, and potentially another 30% of the 2050 target by virtue of these technologies supporting the expansion of offshore renewables (wind, wave and tidal).

Findings

Key findings of the OGA report include:

- **Offshore contribution to emissions:** Offshore O&G installations generate around 6% of UK power generation and emit around 10% of the UK total energy supply emissions (based on 2018 figures). As power accounts for around 70% of all offshore O&G emissions, replacing thermal generation with power from shore or offshore renewables will make meaningful cuts to the sector's GHG emissions. Applying electrification to existing assets with over 15 years of remaining life and to half of future greenfield projects would lead to around a 20-30% reduction in these emissions.
- **Windpower:** Increased offshore electricity demand due to electrification and proximity to (future) offshore windfarms could contribute significantly to windpower growth, expansion of offshore transmission infrastructure, and establishment of floating windpower technologies in the UK, contributing to offshore renewables' 75GW capacity ambition by 2050.
- **CCUS:** CCUS is critical to achieving net zero, removing over 130Mt CO₂ from the UK emissions by 2050. The UKCS has sufficient potential storage capacity to fully support UK needs for hundreds of years, and oil and gas infrastructure which can be reused. Around 26 CO₂ offshore storage sites would be needed with developed storage capacity of around 3.9 Gt CO₂. To reach this, it would be critical to deliver 2 pilots by mid-2020s and 3 commercial projects by 2030.
- **Blue hydrogen:** Blue hydrogen, from methane reforming, can convert the UK natural gas supply to low-carbon fuel. Combining this with CCUS allows elimination of emissions while leveraging operational and logistical efficiencies from co-location, making this currently one of the lowest-cost technologies supporting net zero, potentially replacing nearly 30% of UK natural gas consumption.
- **Green hydrogen:** Green hydrogen, produced through electrolysis from renewable energy, will be essential to support offshore windpower growth in the 2030s and beyond, addressing issues with power intermittency and long-distance transmission losses (e.g. from the Northern North Sea areas). To make that feasible, electrolyser costs need to be reduced.
- **Costs:** Offshore technologies can provide efficient ways to abate UK CO₂ emissions, with a broad range of levelised costs per tonne of CO₂ abated (~£10 to ~£100 / tCO₂). Costs will not only depend on location and logistics, but also on a number of factors which can be influenced, including infrastructure availability and access to market, reuse of existing infrastructure, and technology development. Combining these technologies into energy hubs, linked to existing and future onshore net zero clusters, can accelerate deployment and improve project economics.
- **Regulations:** Effective regulations are in place covering individual energy sectors on the UKCS (including oil and gas, and electricity generation and transmission from windpower and other renewables sources). However, as new technologies emerge, close cross-regulatory co-ordination will be needed to help unlocking energy integration opportunities.

Recommendations

To realise the vision of the UKCS as a critical enabler for net zero, the project recommends:

- **Accelerating progress** on selected pioneering energy integration projects to ensure cross industry opportunities and timely regulatory engagement. Industry has a rich pipeline of energy integration activities in the North Sea – the OGA has identified around 60 of them, not all in the UKCS.
- **Leveraging oil and gas assets and capabilities** essential for CCUS, including preserving appropriate infrastructure.
- **Enhancing regulatory co-ordination**, to anticipate and address regulatory barriers and/or enablers for CCUS, hydrogen and offshore electrification and streamline the approach where there are gaps or areas of overlap. For example: there is currently no guidance on local planning issues as regards H₂ projects; offshore O&G electrification falls under the Petroleum Act 1998 as well as renewable legislation (Energy Act 2008); long windfarm development timelines (driven by leasing, planning and consenting) make joint projects with O&G difficult; critical UKCS data (environmental, subsurface and infrastructure) collected by multiple users, could be shared more widely across regulators and industry.

- **Improving data availability, quality and access** through co-ordinated efforts across government and relevant industries to enhance visibility of cross industry opportunities, accelerating planning and regulatory activities.

The BEIS consultation response

The aim of the BEIS consultation on the re-use of oil and gas assets was to help facilitate the deployment of CCUS at scale by identifying the existing opportunities and barriers to the re-use of infrastructure for CO₂ transport. The consultation and the response cover a broad range of issues that highlight the challenges of seeking to integrate the costs and time requirements for developing and upscaling CCUS technology with the mature nature of many O&G assets. The key themes arising from the response are:

Types of infrastructure to be re-used for CCUS - potential of terminals

BEIS consulted on a list of types of infrastructure it had identified as having re-use potential. The majority of respondents agreed with BEIS' assessment that trunk pipelines and depleted oil and gas reservoirs are likely to have the greatest potential, but considered that BEIS's list should not be considered exhaustive. For example, while there might be limited opportunity to re-use much physical infrastructure at onshore gas terminals, respondents noted that the existing footprint of such sites, including the supporting infrastructure and utilities, and an existing skilled workforce, could significantly reduce the upfront costs to develop a CO₂ transport and storage network. BEIS agrees with this view. The OGA has already conducted an initial assessment of existing UK onshore gas terminals to determine their location and connections to the trunk pipelines identified as having the greatest re-use potential. BEIS will undertake further work with the OGA to determine the capacity, anticipated end of life, and feasibility for re-using infrastructure at these sites.

Importance of data highlighted - OGA and BGS to collaborate

Respondents also highlighted the importance of data, particularly geological data and data on the history, and condition of an asset, in determining whether it is suitable for CCUS re-use. In some cases, an owner and operator may be minded to decommission an asset before a CCUS developer is ready to undertake a detailed assessment of its suitability for re-use. BEIS agrees that it is vital that the relevant information is collated and stored in the intervening period. The OGA already hosts the National Data Repository (NDR), a central repository of petroleum-derived data and information, some of which will likely be of value to CCUS projects (such as data relating to wells, seismic surveys, production history, reservoir characterisation, and upstream petroleum pipelines and infrastructure). Additionally, the British Geological Survey (BGS) hosts and coordinate the CO₂ Stored database. BEIS is working with the OGA and BGS to determine how these resources could be further integrated, and the functionality improved for CCUS- specific purposes. This exercise will be conducted in consultation with industry.

Well re-use feasibility study

In the consultation BEIS commented that the re-use of oil and gas wells is likely to be less common as they would need to be appropriately situated and be capable of safe operation, withstanding pressure during CO₂ injection and corrosion from CO₂ containing fluids. The technical and commercial feasibility of such re- use will be examined by the BGS as part of the Re-using Existing Wells for CO₂ storage operations (REX- CO₂) project, funded by BEIS under the Accelerating CCUS Technologies (ACT) Programme, which will develop a dedicated well-screening tool and best practice recommendations for re-using wells.

Availability of assets – further consultation required on publishing COP dates

In the consultation BEIS said that, depending on their condition, there may be significant time and cost savings for projects able to re-use trunk pipelines, particularly those identified in the annex to the consultation. Several respondents highlighted that many of the trunk pipelines so identified continue to be used for oil and gas extraction activities, and in some cases are not due to be decommissioned within the timescales set out in BEIS' CCUS Deployment Pathway.

BEIS recognises that information on asset availability (including an indication of anticipated cessation of production activities and the potential that they may be required for future hydrocarbon extraction activities in line with the UK Maximising Economic Recovery Strategy) will be a crucial consideration in determining whether it can be re-used for CCUS. BEIS is working closely with the OGA to assess availability and future cessation of production plans for the pipelines and storage sites identified as having the most re-use

potential. This assessment will also highlight where there are more immediate decisions to be made by industry regarding the decommissioning or suspension of assets with re-use potential. BEIS currently considers that publishing an indication of approximate cessation of production date for assets over 5-year intervals would be appropriate and proportionate. However, recognising that there are potential commercial sensitivities around publishing this information, BEIS intends to consult with industry on this proposal over the coming months.

Integrated digital map of potential pipelines and stores to be published by OGA

Alongside the consultation document BEIS published an annex listing the pipelines and CO₂ stores (depleted oil and gas reservoirs and saline aquifers) that BEIS currently considers have the most re-use potential. The 123 stores were selected in consultation with the BGS based on their potential storage capacity (>20 million tonnes of CO₂); the 51 pipelines were selected in consultation with the OGA, based on dimensions (>16 inches in diameter) and whether they make landfall. Respondents were in broad agreement with the pipelines and stores included in the annex. Several additional pipelines and stores were suggested for consideration that did not meet the initial criteria and there was a consensus that a flexible approach should be adopted to future screening exercises.

As part of Phase 2 of the Energy Integration Project, the OGA has mapped infrastructure with re-use potential, which will be integrated with other offshore data in an interactive digital map to be published later this year. This will allow interested stakeholders to visualise the location and interaction of key assets, which may be of strategic value for CCUS projects. BEIS believes this is a more appropriate and dynamic means of holding this information than the lists and tables in the original consultation document. Information on the oil and gas assets (including stores, trunk pipelines, spur lines and onshore gas terminals) BEIS has identified as having re-use potential will be integrated into this map. The OGA will also be publishing an app combining data from the OGA, The Crown Estate, and The Crown Estate Scotland to provide information on UK Continental Shelf leasing and licensing for CCUS projects and offshore wind activities. BEIS is also recommending that a future iteration of the digital map includes cessation of production information for pipelines, stores, and onshore gas terminals identified as having re-use potential.

It is important to note that an asset's inclusion in the BEIS list or in the OGA interactive map does not confer any legal status – the assessment of suitability for re-use is provisional and indicative prior to more detailed assessment in consultation with asset owners, the OGA and BGS. Oil and gas operators are currently required to consult with the OGA and give consideration to whether a submarine pipeline or offshore installation could be re-used for CCUS activities, prior to submitting a decommissioning plan to OPRED.

Removal of decommissioning liability

The summer 2019 consultation proposed to expand on an existing discretionary power for the Secretary of State to remove the decommissioning liability from previous oil and gas owners if assets are transferred to a CCUS project (Change of Use Relief). BEIS emphasised that this proposed power would remain discretionary and prior consideration would be given by both BEIS and HMT to the risk to the government, including the extent to which the transferee can demonstrate that it has adequate resources to carry out decommissioning in due course, and to ensure no disruption to the wider oil and gas decommissioning regime.

Responses were generally supportive of the proposed policy on the basis it would encourage asset transfer and provide clarity on liabilities. However, several oil & gas sector respondents highlighted the need for clarity on the status and eligibility requirements of Change of Use Relief (including that this is entrenched and protected once agreed), as they considered that this would need to be confirmed with all parties before any asset transfer could take place.

BEIS noted in its original consultation some potential challenges to overcome in reusing assets for CCUS projects, including delays between cessation of production and CCUS projects being ready to take over the assets, resulting in essential ongoing monitoring and maintenance costs being incurred by the asset owner and the perceived risk of a CCUS project being unable to meet their decommissioning obligations (resulting in the Secretary of State using the decommissioning regime which applies in respect of offshore oil and gas infrastructure to call upon previous owners and operators to decommission the asset)

Other additional barriers raised by respondents included:

- Complex asset ownership arrangements, where one or more joint venture partners do not currently have an interest in participating in a CCUS project.
- Uncertainty over the implications for decommissioning tax relief of the re-use of oil and gas assets for CCUS, including Transferable Tax History.
- Uncertainty over future decommissioning costs including potential technical and cost differences in decommissioning CO₂ transport and storage infrastructure compared to the oil and gas regime
- Potential conflicts with the OGA UK Maximum Economic Recovery Strategy.

The majority of respondents believed that changes to the current policy and legislative regimes are needed to address these barriers. BEIS notes that since the consultation there have been a number of changes in CCUS project ownership structures and developments in the UK CCUS sector which suggest that the issues identified above may not be as limiting as originally envisaged. However, on the basis of the consultation, BEIS can still envisage scenarios in which it might be appropriate to make use of the Change of Use Relief power outlined in the consultation document. Further analysis and discussions with industry are needed in order to assess how such a policy might interact with the full range of project ownership structures. This includes the potential role of commercial agreements between former and prospective owners to handle contingent liabilities. BEIS plans to set out a more conclusive position on the policy later this year, alongside an update on transport and storage business models which will inform this view. Meanwhile, BEIS will be requesting further detailed information from industry on the circumstances in which they would seek to benefit from this power and how they would demonstrate to the satisfaction of the Secretary of State that the use of the power might be justified, as well as how to protect Government from any associated transfer of risk.

Preservation of assets pending re-use

A number of oil and gas assets that are suitable for re-use are likely to be decommissioned before CCUS projects are willing and able to take ownership of them. They will need to be preserved if they are to remain viable. For pipelines, this will likely involve appropriate monitoring and maintenance activities or decommissioning the pipeline using methods that do not preclude its later re-use. For wells, this would ideally involve suspension but could involve plugging and abandoning the well in a way that increases its resistance to corrosion.

In the consultation document BEIS proposed a recommended that the obligation to carry out decommissioning be suspended for up to 10 years to allow a CCUS project to develop and the transfer of assets to take place. Many respondents said that this should be broadly asset-specific and that the appropriate suspension period would be largely dependent on the readiness of a CCUS project to take on ownership of the asset. It was also noted that the assessment would need to consider the condition and design life of the asset to prevent deterioration and associated risks to the environment or other sea users. However, BEIS has concluded that the 10-year suspension period is appropriate and proportionate.

In some cases, for example where a CCUS project is not ready to take on the asset, a longer suspension period may be required. BEIS is recommending that a decision to extend a suspension period is contingent on the progress of the associated CCUS project and that an appropriate milestone to assess this against could be the associated project being awarded a CO₂ storage license. BEIS considers that the additional costs and liabilities for the existing asset owner and operator resulting from the extension should be dealt with in commercial agreements between the asset owner and the CCUS project developer as part of the transaction.

BEIS also asked about the costs of maintaining pipelines or wells for re-use. Most respondents who replied highlighted that costs would largely be asset-specific, dependent on the condition and integrity of the facilities; however, the majority agreed with the statement that the costs of maintaining pipelines or wells for re-use are relatively low. It was noted that there are also ongoing liabilities for offshore structures arising from interaction and damage from other users of the sea, for examples snagging and anchor damage.

Most respondents from the oil and gas and industry sectors noted that the additional costs to plug and abandon a well to a higher standard to minimise the risk of CO₂ leakage would result in significantly increased decommissioning costs, compared to industry standard practice (estimates given ranged from a 20-30% increase in cost). This is mostly attributed to increased costs for the additional monitoring requirements. Historic wells which have already been plugged and abandoned in reservoirs of interest without consideration of potential future CO₂ injection into the reservoir would likely require modification and recompletion to replace certain materials and components that might negatively interact with CO₂. In some

cases, the data available on the location, design, materials used, and processes to plug and abandon these wells may be limited or poor quality.

The additional cost for activities required to maintain assets for re-use may be partially offset by the ability to delay the costs of decommissioning for a period of time and the potential for decommissioning liabilities to be transferred to a new owner. However, BEIS recognises that this will be partly dependent on external market conditions and the potential to achieve cost savings by bundling individual assets as part of a wider decommissioning campaign. With increasing time there is likely to be some increase in the liability faced by owners and operators, through age-related degradation of some of the components. However, this is likely to be highly dependent on the condition and integrity of specific assets.

An asset owner's decision to preserve an asset and to take on additional monitoring and maintenance costs will likely be considered against the likelihood of a CCUS project progressing. Several respondents suggested that financial support, for example through a relief or incentive, could be made available for oil and gas operators preserving assets. BEIS notes that it does not impose legal obligations on existing asset owners requiring them to suspend and maintain assets with re-use potential. The decision to do so rests with asset owner, and where appropriate any joint venture partners. (However, it should be noted that, if amended as currently proposed, the MER UK Strategy might impose such obligations. See our summary of the proposed changes to the Strategy [here](#)).

However, BEIS will continue to work with OPRED, HSE and OGA, including through the CCS Regulation Forum, to review the existing oil and gas regulatory framework, including whether guidance regarding the suspension of assets may require amendment to encourage oil and gas asset owners to propose maintaining those assets for a period to support CCUS projects. This would only be applicable to the small number of assets which have been identified by BEIS, the OGA and industry as having significant re-use potential, based on guidance developed using the criteria set out in the consultation, and that have a demonstrable chance of being re-used within the suggested ten-year timeframe proposed in the consultation. BEIS will work with OPRED, HSE and OGA to determine the appropriate arrangements to safely preserve the assets during the 10-year timeframe.

BEIS notes that further work is needed to build its evidence base on the cost of suspending assets for re-use, including consideration of how the costs are managed. BEIS will also consider the monitoring requirements and associated costs as part of its wider work on developing a UK CO₂ transport and storage network. This includes ongoing research and development activities on integrity monitoring for infrastructure, such as CO₂ injection and investigation wells and pipelines. BEIS will also consider findings from research activities focused on monitoring the integrity of CO₂ storage sites, including projects currently funded by BEIS through the ACT Programme, such as British Geological Survey's SENSE Project, the preACT project, and the DETECT project.

A commonly expressed view in the evidence received was the need for appropriate and detailed guidance on plugging and abandoning wells to retain the integrity of CO₂ stores and minimise the risk of CO₂ leakage. BEIS has commissioned Oil and Gas UK to coordinate the development of appropriate guidance on this, in consultation with industry, government, and the OGA.

Decommissioning CCUS infrastructure

BEIS has identified that further work is needed to understand the technical differences between the current oil and gas decommissioning regime and the CCUS regime. A more in-depth study of decommissioning assets in CCUS projects would help bodies like OPRED and HSE assess future CCUS decommissioning plans and to consider securities and would also help government develop CCUS guidance. This will build on the expertise of leaders in this area, such as the Oil and Gas Technology Centre. This work will be done in consultation with the regulators and industry stakeholders.

BEIS notes that in recent years the offshore oil and gas decommissioning industry has achieved rapid cost reduction through innovation and that there is an opportunity to replicate this success in the CCUS sector to reduce the costs of preservation, re-use and end of life decommissioning, by utilising the existing expertise of the oil and gas sector and service companies, for example, in the development of alternative barrier materials and placement techniques.