Scottish Affairs Committee: The Future of Oil and Gas.

Thank you for the opportunity to give evidence to your enquiry The Future of Oil and Gas which was held on December 18th, 2018. I am writing to you to add additional evidence to your Committee's enquiry.

During the session, specific questions were raised, to which I offered to give more information in writing. I have set out a response to each of these below.

1. **Hugh Gaffney MP asked about what action the Government was taking in relation to helicopter safety.**

Offshore helicopter services provide a vital link to ensure the viability of the UK’s oil and gas industry. They transfer the majority of the workforce to and from offshore installations in an open sea environment that is both challenging and hazardous. The safety of those who rely on these offshore helicopter flights is paramount.

The UK's aviation safety regulator, the Civil Aviation Authority (CM), monitors all aspects of the operations of offshore helicopter companies and any risks to safe operation through its ongoing programme of safety oversight.

In 2014 the CM conducted a thorough review of offshore helicopter safety which resulted in a number of safety interventions and recommendations leading to changes and new safety standards in equipment standards, flight operations procedures and airworthiness practices. These changes were welcomed by offshore worker and pilot unions.

In addition, in May 2018, I wrote to the CM to seek further reassurance that the measures introduced on helicopter safety are working, and for any further assurances the CM can provide. Richard Moriarty, Chief Executive of the CM, responded, confirming that the CM regularly updated and consulted with the Offshore Helicopter Safety Action Group (OHSAG, now OHSLG), a consultative body including representatives from unions and the industry, and will continue to work closely with the members of this group to collectively enhance offshore safety standards still further.
I recognise the strategic significance of offshore helicopter safety and officials at both my department and the Department for Transport work closely with the CAA and industry to consider any issues that Government should be aware of.

2. David Duguid MP asked about the different streams of funding for CCUS and how they related to each other, including the purpose of current funding for the Acorn project.

Through our CCUS Action Plan we have underlined the potentially important role CCUS has in supporting the UK in meeting our 2050 emissions reduction target. CCUS could help tackle hard to decarbonise sectors of the economy, support long-term industrial competitiveness and help achieve the 2050 target at least cost. CCUS is an important element of our Clean Growth Grand Challenge, part of our Industrial Strategy. As a result, we are committed to progressing CCUS both in the UK and globally.

Our ambition is for the UK to have the option to deploy CCUS at scale during the 2030s, subject to costs coming down sufficiently. To support this to have, and continue to, provide funding to support the development of the technology. For example, we have continued to provide funding to specific CCUS initiatives. This includes providing grant funding for CCUS projects in the UK, such as £1.3 million to support the work of the Teesside Collective; £1.7 million, with the Scottish Government, to support Summit Power’s Caledonia Clean Energy Project; and more recently £1.3 million to support Project Acorn in St Fergus through a joint European initiative, the Accelerating Carbon Technologies (ACT) Research Programme, which is covered in more detail below. In November 2018 we also announced a further £175,000 in support for Project Acorn alongside funding by the Scottish government, Total and the European Commission.

In parallel, through our Industrial Energy and CCUS Innovation Programme, we are investing in cost reduction and technological development by putting £45 million into CCUS innovation programmes between 2017 and 2021, including:

- a £20 million Carbon Capture and Use (CCU) Demonstration Programme to fund design and construction of CCU demonstration plants in the UK;
- a £15 million CCUS Call for Innovation to fund innovative projects that lead to cost reduction or accelerated deployment; and
- £6.5 million of UK funding to the second international call of the ACT research programme, a €30 million fund supporting CCUS research across 11 countries that can lead to safe and cost-effective development of CCUS technology. This is in addition to the £4.4m for UK participants across 5 of the 8 projects from the first call of the ACT programme.

In addition, we are supporting CCUS through the overarching Industrial Strategy by emphasising the importance of industrial decarbonisation and providing funding through:

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4 https://www.gov.uk/guidance/funding-for-low-carbon-industry#era-net-cofund--accelerating-ccs-technologies-act
5 https://www.gov.uk/guidance/funding-for-low-carbon-industry
• investing up to £170 million from the Industrial Strategy Challenge Fund to support the Industrial Clusters mission; and
• creating the £315 million Industrial Energy Transformation Fund to help companies invest in decarbonising industry, including the potential to use CCUS.

The UK is also at the forefront of international collaboration on CCUS as demonstrated by the recent International CCUS Summit and Conference in Edinburgh on 28/29 November 2018. Alongside our domestic funding, we are financially supporting global efforts to accelerate the deployment of CCUS technology, for example:

• the UK co-leads the Mission Innovation Carbon Capture Challenge (with Saudi Arabia and Mexico) to reduce the cost of innovative new carbon capture technologies, so that CCUS can become commercially viable at scale; and
• the UK is also the largest donor of Official Development Assistance for CCUS globally, providing £70 million since 2012 to support developing countries to enhance both the technical and institutional knowledge necessary to enable the deployment of CCUS technologies.

These separate funding streams are complementary. Our international collaborations and domestic innovation funding are intended to accelerate technological developments, which can in turn drive cost reduction to ensure CCUS projects are cost effective in the UK and able to play a prominent part in industrial decarbonisation and the creation of low-carbon industrial clusters.

Regarding the Acorn Project specifically, the current funding includes £1.3 million in autumn 2017 to support the Acorn Phase 2 project through a joint European initiative, the Accelerating Carbon Technologies (ACT) Research Programme. The Phase 2 project was designed to move the opportunity from proof-of-concept (TRL3) to the pre-FEED stage (TRL5/6) through cutting-edge research on increasing storage efficiency, integrity, policy development and life cycle analysis.

In addition, as mentioned above, we provided a £175,000 grant for the Acorn CCUS project in November 2018. This was a one-off grant from the UK Government, alongside funding from the Scottish Government, Total, and the European Commission. The co-funding was provided to support the Acorn CO2 Sapling Transport Infrastructure Project which forms the CO2 transport component of the proposed St. Fergus Project Acorn. The money will support the pre-FEED work, funding a detailed engineering feasibility. Looking specifically at how to transport CO2 from where it is captured to where it will need to be used or stored.

3. Additionally, your committee staff have asked if I can provide additional evidence to your enquiry, in several areas that the Committee sought to ask about but could not complete in the allotted time; I have set out information on these below.

A. What assessment has the Government made of the potential market for the re-use of captured CO2?
B. Which sectors does the Government see as having the greatest potential?
C. What action is the Government taking to support these sectors?

As set out in our CCUS Action Plan, Carbon Capture and Use (CCU) could offer new economic opportunities, support cost reduction and create new industrial markets.
In May 2017 two studies were published on CCU by Ecofys\textsuperscript{6} and the Royal Society\textsuperscript{7}

The Royal Society report reviews a range of previous analysis demonstrating that estimates as to how much carbon dioxide is already used globally range from approximately 116 Mt\textsuperscript{8} to 222 Mt\textsuperscript{9} of carbon dioxide per year.

The Ecofys work, commissioned by BEIS, identifies the most promising UK applications which are:

- Synthetic methanol: methanol produced through the electrolysis of water using renewable electricity.
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- Polymers: transforming CO2 into polycarbonates using catalysts, which are then processed further into different types of polymers such as polyurethane.
- Horticulture: use of industrial CO2 to enrich the growing environment and increase the production yield of crops.
- Concrete curing: CO2 forms part of the concrete components and embedded into the concrete, offering permanent sequestration.
- Novel cements: new types of cement that react with CO2 and water.
- Carbonation: carbonation technology is based on the weathering of silicate minerals, in which CO2 reacts with silicate minerals to form a solid structure.

However, the study concludes that the future CO2 demand from the selected CCU technologies is limited to 113-624 kt CO2 per year by 2030, less than 1% of the current CO2 emissions in the UK and not all these applications (e.g. horticulture) will result in permanent CO2 abatement.

Both reports highlight that it is currently hard to quantify the potential of CCU, both in the UK and globally, as the majority of CCU technologies are at an early R&D stage and not yet ready for commercial deployment. Despite the relative infancy of CCU, we are already seeing new innovative UK companies in this field such as:

- Econic Technologies in North West England using CO2 to make plastics;
- Carbon 8 in East Anglia, using CO2 to make cement and aggregates;
- Carbon Capture Machine in Aberdeen, turning CO2 into valuable products.

We want to support innovation in these sectors, keep encouraging new ideas and further test the potential of CCU in the UK. To do so we will deliver our £20 million CCU Demonstration programme by March 2021 supporting the construction of CCU technologies at industrial sites across the UK.

\textsuperscript{7}https://royalsociety.org/topics-policy/projects/low-carbon-energy-programme/potential-limitations-carbon-dioxide/
4. Also, on CCUS you wished to ask questions about creating a market for the storage of CO2; I have set out information on these below:

D. What assessment has the Government made of the level at which the carbon price would have to be set to make storing CO2 economically preferable to emitting it?

E. What would be the broader economic impact of setting the carbon price at this level?

The costs of CCUS are influenced greatly by a number of factors including technology, sector and geographic location. This makes it difficult to extrapolate the costs of existing CCUS projects to forecast the exact carbon price required to incentivise deployment of CCUS in the UK. Costs are reducing as CCUS technology is being deployed globally and recent analysis by the IEA estimated that there are potential low-cost carbon capture opportunities at around $28 per tonne for ammonia production, and $30 per tonne for ethanol production, although the costs are higher for other potential applications, such as steel. We are also studying the 45Q tax credit introduced in the United States in 2018 which provides a performance-based tax credit to power plants and industrial facilities that capture and store CO2 – this is $35 per tonne of carbon captured and utilised (e.g. for enhanced oil recovery) and $50 per tonne of carbon captured and stored geologically.

We are continuing work with industry on cost reduction, building on the CCUS Cost Challenge Taskforce report that was published in July 2018. As outlined in the November 2018 Action Plan, a review of CCUS Delivery and Investment Frameworks will be completed in 2019, which, working with industry, will seek to identify investable commercial models and establish market-based frameworks for bringing forward CCUS. This review will include detailed work on the commercial models for carbon dioxide transport and storage, and for industrial carbon capture, and assess how revenue from carbon credits can be most effectively distributed.

As the Clean Growth Strategy clearly sets out, we remain firmly committed to carbon pricing as an emissions reduction tool whilst ensuring energy intensive businesses are appropriately protected from any detrimental impacts on competitiveness. The Government is supporting industry in the transition to a low-carbon economy through the Industrial Decarbonisation Mission of the Industrial Strategy.

To help industry decarbonise, we have launched an Industrial Energy Transformation Fund, worth up to £315 million. This will provide funding for transformative decarbonisation investments, potentially including fuel switching and carbon capture. We will consult on the Fund’s design during 2019. We have also announced the UK’s intention to establish the world’s first net-zero carbon industrial cluster by 2040, and at least one low-carbon cluster by 2030, supported by up to £170m of industrial strategy challenge fund money.

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CCUS can play a key role in cost-effectively reducing emissions from industry and therefore our ambition is that the UK should have the option to deploy CCUS at scale during the 2030s, subject to the costs coming down sufficiently.

I hope you find this information helpful and look forward to the results of your enquiry.

Yours ever,

THE RT HON CLAIRE PERRY MP
Minister of State

January 2019