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Between Scientific Knowledge and Planned Investment

- 1.1. The alignment of energy supply and the UK's net zero commitments are well understood, and indeed, no sector exemplifies the gap between scientific necessity and planned fossil fuel investment more starkly than oil and gas.
- 1.2. The IPCC released (August 2021) their [starkest warning yet](#) on the dangers posed to all by climate change: it is unequivocal that human influence, principally the burning of fossil fuels, has caused widespread and rapid changes to the planet. This was further amplified [this year](#) by the co-chair of the IPCC's Working Group III: "It's now or never, if we want to limit global warming to 1.5C without immediate and deep emissions reductions **across all sectors**, it will be impossible." The UN Secretary-General Antonio Guterres has described these findings as 'Code red for humanity', and has called on countries to 'end all new fossil fuel exploration and production, and shift fossil fuel subsidies into renewable energy.'
- 1.3. Yet more striking was the International Energy Agency's [net zero 2050 roadmap](#) (May 2021). The IEA has long operated as a sort of energy thinktank for the Global North, and has traditionally been perceived as closer to the fossil fuel industries than the environmental movement. In May, the International Energy Agency's [net zero 2050 roadmap](#) highlighted that Paris-aligned decarbonisation does not allow for investment in new oil and gas fields. The IEA's Executive Director put it thusly: "If governments are serious about the climate crisis, **there can be no new investments in oil, gas and coal, from now on – this year.**" The most [recent science](#) aligns with these analyses. 60% of existing oil and gas reserves must remain unburnt in order to align supply with 1.5°C, and UNEP's [production gap report](#) demonstrated that between now and 2030 global production of oil and gas must decline by 4% and 3% respectively, with developed economies such as the UK reducing supply even more rapidly.
- 1.4. It is within these parameters that this submission addresses the Inquiry's ToR. Our approach is multi-disciplinary (geology, law, human geography) and draws upon current [research](#) on oil and gas transitions in the North Sea. We focus on three aspects of the ToR:
 - Maturity, opportunities, and risks of CCS
 - North Sea Transition Deal and a 'Just Transition'
 - Climate Compatibility Checkpoint, rigour thereof

CCS Maturity

Is carbon capture and storage technology sufficiently mature to be deployed at scale in the necessary timescale? What economic opportunities are there in carbon capture in the North Sea? What risks are there to relying on carbon capture technologies?

- 1.6. There is no technology blockage to construction of a CO₂ capture, pipeline transport, and geological deep underground storage system (CCS) at small scale, or very large scale of tens million tonnes per year CO₂. Commercial CO₂ capture and geological storage has been operating offshore at Sleipner in the North Sea since 1996, and Snohvit in the Barents Sea since 2008. There are many tens of examples worldwide at Demonstrator smaller scale. And currently more than 20 full scale CCS projects operating from capture to storage in global locations. An independently curated display and links to CCS projects is available at www.sccs.org.uk/expertise/global-ccs-map.

1.7. Prior Parliamentary evidence on CCS can be found at:

https://archive2021.parliament.scot/S5_EconomyJobsFairWork/Inquiries/20210203-Prof_Stuart_Haszeldine-Supplementary_evidence.pdf

<https://www.parliament.scot/-/media/files/committees/net-zero-energy-and-transport-committee/correspondence/2021/20211210-submission-stuarthaszeldine.pdf>

1.8. Globally there are about 10 CCS projects operating to dispose CO₂ into deep geological aquifers filled with unuseable saline water. These are few in number because there is no price paid to dispose of CO₂. There are about 40 projects capturing and transporting CO₂ to inject for the commercial purpose of Enhanced Oil Recovery. The fate of the CO₂ is certainly not inevitable for oil recovery – that is a misunderstanding and it is clear that the CO₂ simply ends up where a suitable price is paid. These operate at up to 7 Mt CO₂/yr – comparable in size to the CCS projects currently solicited by UK Government to develop for operation in 2026 as part of the Industry Decarbonisation Strategy. The two leading examples include the East Coast Cluster around Tees and Humber; and HyNet around Merseyside. In each of these, a consortium of established hydrocarbon, chemical and engineering companies are committing their own money and time, to be co-funded by UK Government. If CCS is judged to work, that is logical, but if CCS is unworkable or high risk, why would these companies invest their money?

1.9. In addition, several CCS projects are in development around the North Sea. These include Northern Lights in Norway to offer the world's first commercial CO₂ storage service. Greensand in Denmark operating in 2023, led by petrochemical giant Ineos, and PORTHOS in Netherlands offshore of Rotterdam, to store CO₂ in a depleted gasfield and operate in 2024. In 2005 the UK was in lead position globally, to co-develop CCS with BP in the DF1 (Peterhead-Miller) project. But serial delays and lack of financial confidence by UK government means that the UK is now 4th in Europe to develop CCS. That pace is important in a race to 2050 Net Zero capture and storage of CO₂ emissions, combined also with the construction and operation of Direct Air Capture (DACCS) where CO₂ is recaptured from air and geologically stored deep underground in the same site as CO₂ captured from industrial decarbonisation emissions.

1.10. Commercial opportunities are extremely large. The Northern Lights project (above) was oversubscribed by about 20x with requests for commercial CO₂ storage. That is a demand, which the UK could and should be meeting with business scale-up. This vision appears to be very low priority for the present Government – meanwhile pipe networks will be built to enable rival EU countries to settle long duration CO₂ storage contracts. Multiple studies have established that this CO₂ storage is a viable business around the North Sea geological basin, which can assist EU Member states who have less access to storage. This could create profits of multiple £ Billion per year into the UK for the next 200 years, and importantly create a Just Transition – retaining skills, communities, and supply chains – for the offshore hydrocarbon industries to pivot into CO₂ storage evaluation and injection. Our work estimates 30 boreholes should operate for the UK by 2030 and more than 100 boreholes by 2050. That is closely comparable to the scale of the present (2021) North Sea hydrocarbon industry.

North Sea Transition Deal

1.11. The North Sea Transition Deal, a collaborative proposition by the UK Government and the oil and gas industry outlined a pathway in which the sector could reach net zero by 2050, with targets set to reduce emissions by 50% by 2030 and 90% by 2040 compared with a 2018 baseline.¹ However, analysis by the Climate Change Committee stipulates the need for emissions to decrease by 68% by 2030 if net zero

¹ Department for Business, Energy and Industrial Strategy. 2021. North Sea Transition Deal. GOV.UK.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/972520/north-sea-transition-deal_A_FINAL.pdf

targets are to be reached by 2050.² Even at first glance, the Deal is characterized by a lack of ambition. Further, there is ambiguity regarding the definitions of the emissions and whether they are to incorporate scope 3 emissions. Our broadly based stakeholder engagement work indicates that the Deal is regarded as inadequate in its aims and lacks detail with respect to near term policy implementations.

- 1.12. Another limitation of the Deal is the limited participation it afforded across the sector's actors. Dominated as it was by the UK Government and OGUK, it presents a very partial approach. Many obvious stakeholders were excluded, including the Scottish Government. Considering the major ties to the North Sea – not merely the UKCS (which of course is UK-owned), but also the communities which rely on the oil and gas sector – this was a major omission. Further, the plurality of NGOs and CSOs were not consulted, meaning that the Deal lacks any meaningful representative character.
- 1.13. Perhaps the fundamental limitation of the Deal is its treatment of a 'Just Transition'. When compared to an international standard of Just Transition principles³, the NSTD only meets three of the seven criteria. One of those principles 'support to affected regions', yet as identified in our [OGT report](#), the majority of the UK's oil and gas workforce resides in England. Although Aberdeenshire is the largest single place of domicile for O&G workers, c.60% are living in England. The Deal offers no insight in the management of these communities, which is problematic given the absence of JT support, policy, or mechanisms in English law. By contrast [Scotland](#) has various, albeit nascent, policies and support mechanisms in place. Whilst they are far from free of their limits, such policies stand in contrast to the policy gap in England.
- 1.14. The lack of coordination with and between the governments of the UK is well acknowledged and requires urgent attention. See the [recent report](#) of the Select Committee of the Constitution. Well-coordinated policy for oil and gas workers is necessary to ensure a 'just' transition for oil and gas workers, whether they live in England or Scotland, or indeed elsewhere in the United Kingdom. Whilst the Scottish Just Transition Commission does detail support to communities that will be affected it extends to Scotland only.⁴ This is despite the widespread acknowledgement of the need for continued investment to ensure that the low carbon skills transfer can take place. A micro-level example of this is to be found in the fact the role and performance of OPITO. The Deal steps back from supporting workers and reskilling, leaving skills policy to an independent oil and gas skills provider, OPITO, an industry owned entity with representatives from industry, government, and unions. It has supported 'offshore/skills passports', a mechanism introduced in August 2021. The skills passport aim to increase the ability for workers to transfer between O&G and renewable sectors without the need for significant additional certification, a cost that is often borne personally by the worker at an estimated average total of £1,800 per year and comes with no guarantee of work upon completion. Although 94% of workers support the introduction of an 'offshore passport' to facilitate job transitions, it is reported that workers are often required to repeat existing training when starting a contract with a new employer or when starting a new contract with the same employer or when moving to jobs in other offshore sectors. 62% of workers report that when taking a contract with a different employer they were asked to duplicate their existing qualifications that were still in date.

² Climate Change Committee. 2020. The Sixth's Carbon Budget. The UK's Path to Net Zero. <https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf>

³ Atteridge, A. and Strambo, C. 2020. Seven principles to realize a just transition to a low-carbon economy. SEI Policy Report, Stockholm Environment Institute.

⁴ Scottish Government. 2021. Just Transition – Greener, Fairer Scotland. <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2021/09/transition-fairer-greener-scotland/documents/transition-fairer-greener-scotland/transition-fairer-greener-scotland/govscot%3Adocument/transition-fairer-greener-scotland.pdf>

- 1.15. Failing to incorporate the skills aspect of the Deal with the Levelling Up Agenda or considering the Skills White Paper published in January 2021 (leading to a Skills and Post-16 Education Bill) is a missed opportunity to upskill oil and gas workers in line with existing government policy. The Deal does not set out commitments for oil and gas companies to support their workers in terms of retraining, reskilling, nor other compensation or support schemes and does not give sufficient attention to the quality of new roles, including in terms of parity of pay and safety. Whilst Scotland operates the National Transition Training Fund, such schemes are not present in other UK nations, showcasing opportunities for collaboration or knowledge exchange, particularly given the diffuse nature of the oil and gas workforce.

The Carbon Takeback Obligation

- 1.16. An enduring regime for development of CCS will need direct Government intervention, as the market alone requires a firm visibility of multi-decade need for CCS and pricing of CO₂ storage. Our research demonstrates that these commercial conditions can be met by a Carbon Take Back Obligation (CTBO) see below and Joule 2021 <https://doi.org/10.1016/j.joule.2021.10.012>) which places a mandate on hydrocarbon companies to clean up the environmental emissions from their products, and to include the cost of that cleanup in the wholesale price charged for the raw material feedstock. The percentage of cleanup starts small at 1-3% per year, and progressively ramps up to reach at least 100% by 2050 – guaranteeing that the policy delivers its target. This conceptually simple, popular and rapid to enact mandate follows established principles of producer responsibility, and enactment in electronic recycling WEET legislation. An additional advantage is that the CTBO requires a very simple civil service and small public sector operation – and so is a system of CO₂ management which can readily be adopted and copied by nations worldwide. In fact the UK could define and lead a CTBO coalition at CoP27 in a similar way to “Powering Past Coal”.
- 1.17. A similar mandated intervention was successfully made by the UK from 2002-2017, to accelerate deployment of renewable electricity – specifically wind. This Renewables Obligation placed an obligation on electricity suppliers to use the wholesale market to source an increasing quantity of their electricity from renewable energies. Government additionally sets a Certificate price for the Contract to subsidise the wind electricity – this has been successful in rapid buildout of wind power and a spectacular decrease of costs and price charged.

Climate Compatibility Checkpoints

- 1.18. The concept of a Climate Compatibility checkpoint can be advantageous to gradual transition to lower carbon operation, led and regulated by the North Sea transition Authority (NSTA). Unfortunately the present dialogue appears to have little ambition and even less horizon-scanning vision. The aim of a CCC should presumably be to enforce principles of sustainability. We see no signs that any of present proposals provide tight limits to ensure that the first stages of Transition occur and are well designed and operated during the lifetime of these offshore assets. This will place the UK and its operating companies at a competitive advantage if they develop oil and gas elsewhere in the North Sea, or globally, from 2035 onwards, when electricity supply emissions in the UK should be zero.
- 1.19. Consequently we propose that the oil and gas industry is made by the CCC to be more adventurous and to move at a faster pace in transition, to effect the following:
- a) decrease CO₂ emissions embedded in the construction materials for a new hydrocarbon development
 - b) decrease emissions during operation of the new development (scope 2)
 - c) enable easy re-use and conversion of topside equipment, boreholes and pipelines for CO₂ injection

- d) use high quality long duration storage, to permanently offset CO₂ emissions from the oil and gas produced (scope 3)
- e) either recycled steel and other recycled material are used, or newly made certified low carbon materials. The designs should be minimising materials – for example seabed completions instead of an offshore Normally Unmanned Installation. Or a FPSO may be used as a CO₂ transfer plus hotel base – which can be relocated and re-used after 10 or 20 years of field life
- f) rigorous BAT standards applied to all equipment. Electrification of the offshore should be expected, with no excuses – this is being well pioneered by Norway
- g) All facilities should be designed specifically to be re-used easily and rapidly for CO₂ transport and injection
- h) Mandated storage of CO₂ can be applied from the first production. The CO₂ injected will cover the annual emissions from the offshore oil, ensuring 100% is offset afterwards. We calculate that for the first phase of Cambo field for example, the offset is only 2 tonnes CO₂/yr. It is down to the developer to source and reliably inject the required balance of CO₂ each year. This creates a storage market to discover efficient operation, which will advantage the developer in global ventures after 2030. The price of providing “100% offset petrol” is we estimate equivalent to price increase of £0.2 on each litre of petrol, i.e. from £1.70 to £1.90. Quite cheap, for zero carbon.

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