Right Hon Ed Miliband MP
Secretary of State for Energy Security and Net Zero
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Cc:

Rt Hon Lord Hunt of Kings Heath, Minister of State (Minister for Energy Security and Net Zero)
Sarah Jones MP, Minister of State (Minister for Industry)
Michael Shanks MP, Parliamentary Under-Secretary of State, Department for Energy Security and Net Zero)

18 October 2024

Dear Secretary of State

We write in response to a letter of 27th September, referred to in The Times,[1] from a group led by Professor Stuart Haszeldine. Since that letter, the government has announced its intention to press ahead with almost £22 billion of investment in carbon capture and storage. The first projects lined up to benefit from this funding are primarily new fossil fuel infrastructure, not retrofit of existing facilities. As set out in our original letter of 11 September, we do not believe that this investment would be the best use of public finance, and we call for a thorough review of all the evidence before a final investment decision.

There are also specific points we feel need addressing in Professor Stuart Haszeldine's letter, as below.

Liquefied Natural Gas (LNG) imports

We are glad to see that Professor Haszeldine and his co-signatories share our grave concerns about the very high life-cycle emissions associated with imported LNG. These are explained in more detail in our original letter, and are further highlighted by a study just published.[2] This estimates that when US-UK LNG imports are burned, that upstream emissions (from extraction, processing and transport rather than combustion) account for almost half (48%) of the total LNG greenhouse gas footprint when CO2 and methane are compared over 100 years. This figure rises to 63% if a 20yr comparison period is used to assess the impact of methane.[3] The exact figures will clearly vary for different scenarios, but it's crucial to note that these emissions cannot be mitigated by capturing carbon at end use.

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[1] Vaughan, A (2024) 'Bitter row over the future of carbon capture in the UK', The Times 27/09/24
[2] Howarth RW. The greenhouse gas footprint of liquefied natural gas (LNG) exported from the United States. Energy Sci Eng. 2024; 1-17. doi:10.1002/ese3.1934
[3] Calculated using figures taken from Supplemental Table B

In their letter Haszeldine et al suggest that emissions from LNG imports will not be a significant concern, since "as gas demand declines, an ever-larger fraction of UK supply will come from increased pipeline imports from Norway". However, the 2023 DESNZ report, *The role of gas storage and other forms of flexibility in security of supply*,[4] reports that "LNG and interconnector gas supply is projected to rise from a predicted 13% in 2023 to around 32% by 2030" and peak at 58% in 2045, and that "it is likely that LNG will make up a significant proportion of these future gas imports." Based on DESNZ statistics from March 2024, Carbon Tracker estimate that in 2023 LNG accounted already for 24% of the UK's total gas supply.[5]

It should be noted that the supply of gas from Norway is predicted to fall in the coming years. The Norwegian Offshore Directorate projects in its "base case" that its oil and gas output will drop by about two-thirds from 2025 to 2050.[6]

Therefore, although we strongly agree with Haszeldine et al. that reducing UK demand for gas heating through energy efficiency measures must be a key goal for government - and we would indeed argue for more funding to be directed towards this proven means of reducing emissions - this does not mean LNG imports will not rise as a consequence of gas-based CCUS projects.

In the report *Kind of Blue*, Carbon Tracker estimates that "if all the gas-based CCUS projects proposed by the UK's Net Zero strategy are built, by 2035 new gas demand could be two times greater than the projected domestic production requiring an inevitable reliance on LNG imports".[7] Given the projected decline in North Sea supply, any extra demand for gas created by new CCS-enabled facilities will most likely be met by LNG imports. It would therefore make sense to assess these projects using carbon intensity data for imported LNG, rather than the current average carbon intensity for the UK gas grid.

As well as the climate impacts of LNG imports, it is clear that relying on LNG for hydrogen production also carries energy security and cost risks from continued reliance on the global gas market.

Carbon capture and storage prospects

The letter contains the accusation that we advocate for "continuing to release millions of tonnes of fossil CO_2 each year into the atmosphere." We do not, of course, but simply challenge the assumption that blue hydrogen or gas power projects with CCUS are a reliable means of preventing these emissions. This is firstly because of the significant upstream emissions, as noted above. And secondly because the past history of CCUS does not inspire confidence. A 2021 study estimated that almost 80% of the large-scale CCUS projects had either been cancelled or put on hold. Where CCUS is operational this tends to be extraction of CO_2 as part of the processing of natural gas to produce a marketable

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[4] DESNZ (2023) The role of gas storage and other forms of flexibility in security of supply: Energy security plan update
[5] Sani (2024) Kind of Blue Carbon Tracker
[6] Norwegian Offshore Directorate Resource Report 2024 'Three potential scenarios'
[7] Sani (2024) Kind of Blue Carbon Tracker

product. A review of 12 major projects, while not comprehensive, gives a clear picture of cost overruns and missed targets.[8]

It is also clear that multiple billions in public funding spent on carbon capture are billions which are therefore not available for spending on other means of cutting emissions, including those with important social, economic and ecological benefits, such as insulating homes, improving public transport and active travel, or ecosystem restoration. An economic review of CCS points out that the cost of CCS implementation has not declined at all in 40 years, in contrast to renewable technologies like solar, wind, and batteries, which have fallen in cost dramatically. The authors conclude that using carbon capture and storage for any more than the most essential uses in hard to abate sectors would be prohibitively expensive.[9]

Haszledine et al. may see our approach as being unduly pessimistic or sceptical about CCUS. We believe that they are too pessimistic about the potential of the alternatives. We would call attention to the review of independent studies on 100% renewable energy by the IEEE for an alternative perspective.[10] This comprehensive paper states that “the main conclusion of the vast majority of 100% renewable energy systems studies is that such systems can power all energy in all regions of the world at low cost” and that, “as such, we do not need to rely on fossil fuels in the future”.

The role of hydrogen and gas power with CCUS

We recognise the debates around the use of hydrogen in ‘hard-to-abate’ sectors, with cost currently an issue for green hydrogen. But with encouraging progress on electrification reducing projected demand in some areas, it is likely estimates for requirements are overstated. We would also welcome further clarity about plans to substitute for current ‘grey’ hydrogen, which is often omitted from these discussions.

The plans announced for the UK’s new CCUS clusters, currently under consideration for Government funding, involve building new (additional) fossil fuel infrastructure (mostly gas power stations and blue hydrogen facilities), with a service life of decades. Oil and gas companies argue that they can be part of the solution to climate change, and if they were willing to themselves invest in retrofitting existing power stations with carbon capture, there would be a stronger argument for this being a bridging technology. However, it’s vital to note that the power sector is not in itself a 'hard-to-abate' sector and that there are clear alternatives for decarbonisation which do not risk locking the UK into fossil gas.

Carbon storage

A clarification may be needed here. The letter from Haszeldine and colleagues states that we have claimed that CO_2 has leaked from the Sleipner storage site. What we in fact wrote

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[8] B Fossil Fuel Companies Made Bold Promises to Capture Carbon. Here’s What Actually Happened. DeSmog website 25/09/23

[9] Bacilieri et al. (2023) Assessing the relative costs of high-CCS and low-CCS pathways to 1.5 degrees Oxford Smith School of Enterprise and the Environment | Working Paper No. 23-08

[10] Breyer et al. (2022) On the History and Future of 100% Renewable Energy Systems Research IEEE Access 10, 78176–78218

was that it had leaked from the stratum in which it was expected to be sealed, although ultimately contained by a caprock structure above. Our point was that both the Sleipner and the Snohvit experience demonstrate that injected CO_2 may behave in unexpected ways, and that predictions based on geological surveys and modelling may well prove inaccurate even when the best of expertise is applied to them. On this point we would have to agree with the author of the IEEFA report that there are considerable risks and uncertainties, especially with regard to the very much larger and more complex cluster projects planned for the UK which have no precedent anywhere.

The need for a review

While decarbonisation is clearly of the utmost urgency, we call on DESNZ to - at minimum - carry out the following before making any funding decisions:

- Publish up to date predictions for LNG imports if all currently planned CCUS projects are funded, and the basis on which these are calculated.
- Publish an up to date sector wide cumulative greenhouse gas assessment, including realistic projections for upstream methane leakage, for the projects identified in the CCUS programme up to 2035 against the Carbon Budget Delivery Plan.
- Review the adequacy of the Low Carbon Hydrogen Standard in the light of independent assessments of upstream emissions, both for imported LNG and for North Sea extraction, and including consideration of whether the GWP_{100} for methane is adequate as we approach climate tipping points.
- Consider alternative, more effective ways in which this investment could be used to cut emissions.
- Rule out the use of hydrogen for home heating.

As a more general point, it is essential that government energy policy decisions are taken taking into account all available evidence. This must include serious consideration of evidence from independent sources, and not just the well-funded lobbying operations of industry bodies.

Many thanks for your consideration.

Yours sincerely

Professor Kevin Anderson, Tyndall Centre, University of Manchester
Dr Keith Baker, Research Fellow, Department of Civil Engineering and Environmental Management, Glasgow Caledonian University
Professor Tom Baxter, Visiting Professor, University of Strathclyde and Chemical Engineering Consultant
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Professor Joanna Haigh, Imperial College London, former co-director, Grantham Institute
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Professor Robert Howarth, Professor of Ecology and Environmental Biology, Cornell University
Tahir Latif, Secretary, Greener Jobs Alliance
Professor Mark Maslin, Professor of Earth System Science, University College London
Dr Amy McDonnell, Zero Hour
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Emeritus Professor Rupert Read, University of East Anglia
Ellen Robottom, Secretary, Campaign against Climate Change
Pascoe Sabido, Researcher and Campaigner, Corporate Europe Observatory
Professor Peter Strachan, independent researcher, Energy Transition & Public Policy

Additionally, in support:
Professor Paul Behrens, Oxford Martin School
Dr Alison Green, Executive Director, Scientists Warning Foundation
Professor Bill McGuire, Emeritus Professor of Geophysical and Climate Hazards at UCL
Emeritus Professor Barry McMullin, School of Electronic Engineering, Dublin City University
Dr Philip Webber, Visiting Professor, School of Earth & Environment, Leeds