Business, Energy and Industrial Strategy Select Committee: Finance and investment in the UK's future energy infrastructure inquiry

Decarbonised Gas Alliance response

April 2019

About the Decarbonised Gas Alliance

1. The Decarbonised Gas Alliance (DGA) is an alliance of gas producers, transporters, suppliers and users, hydrogen and carbon capture experts, alongside R&D, supply chain, trade union and local government specialists whose knowledge and expertise will be vital in decarbonising the UK's gas system and improving poor air quality.

2. Our aim is to work with all levels of government and with other expert organisations to use the gas system as a whole to help deliver our emission reduction and air quality goals. We believe that decarbonising gas – including biogases and hydrogen from a variety of low-carbon methods – would make best use of our existing infrastructure and lower the overall costs of decarbonisation.

3. The DGA is a broad-based alliance, established in late 2016, and has now expanded to 46 signatory organisations, which are listed in full in the diagram below. The DGA secretariat is managed by DNV GL, a global specialist firm which provides advisory, certification and other technical assurance solutions covering a range of energy sources.

4. We welcome the opportunity to respond to the inquiry and are happy to nominate a spokesperson from one of our signatory organisations to provide oral evidence, if this would be useful for the Select Committee.

How do recent investment decisions on nuclear and trends in low carbon investment affect the UK investment outlook for energy infrastructure? Is there a case for changing the Government's current approach to delivering a low cost, low carbon energy system? How could the 'nuclear gap' be filled?

5. We agree that a **gap in low-carbon electricity generation** opens up without a revival in the prospects for new nuclear, given the planned closure of most of the UK's existing nuclear fleet over the next decade. For example, the offshore wind Sector Deal sets a welcome ambition of 30GW of capacity by 2030,[1] but this is not sufficient to fully decarbonise the UK's electricity sector without considerable other low-carbon generating capacity.

6. We believe that it is vitally important not to try to pick winners, but to support and facilitate investment in a portfolio of low-carbon options. This includes renewable generation and electricity storage, but it must also include options for **firm capacity**, including for sustained periods of low wind output. **Gas-fired power generation with CCUS, or power generation from hydrogen**, can provide both continuous and fast-acting back-up low-carbon electricity. This would provide greater flexibility than large-scale new nuclear, and with the opportunity for a lower strike price, there is a case for planned new nuclear investment to be redirected here, in the event that new nuclear is not revived.

7. Electricity storage at scale is also an important consideration. Batteries and pumped hydro storage can provide power for hours, but **storing energy in gaseous form (methane or hydrogen)** can provide power for days, which is particularly important for cold windless spells. It is worth noting that the UK currently has gas storage capacity equivalent to 60 TWh, and the ability to withdraw up to 1.4 TWh per day.[2] By contrast, the electricity system currently has 3.3 GW of storage capacity,[3] of which 2.75 GW is pumped storage.[4] Assuming electricity supply duration of 5 hours for pumped storage and 1 hour for battery storage, the electricity system can currently supply up to 14.3 GWh per day. This is an order of magnitude lower than the gas system. Therefore, further investment in gas (and potentially hydrogen) storage ideally needs to be considered.

8. Our final point in this section is that the availability of sufficient quantities of low-carbon electricity generation is critical to the feasibility of electrification of heat and transport, which will increase electricity demand, particularly at peak times. There is no decarbonisation benefit from electrification if the electricity is not low-carbon. It should be noted that emissions from a gas-fired boiler are around 180g CO_2/kWh, lower than current electricity sector emissions of around 200-300g CO_2/kWh. Any **constraints in low-carbon electricity generation reinforce the central importance of decarbonised gas solutions to heat and transport** – including biogases and hydrogen. The roll-out of decarbonised gases would reduce future peak demand on the electricity grid.

How attractive is the UK energy sector for investment compared to other countries? Are there particular technologies which are more – or less – attractive to investors under current arrangements?

9. **The investment picture is mixed.** On the one hand, offshore wind provides a positive example of consistent policy that has delivered large-scale investment, deployment and cost-reduction, through a well-defined and understood financing mechanism (CfDs). On the other hand, the cancellation in 2015 of the CCS competition was hugely damaging to investor sentiment. It was also a classic example of a false economy, given that the Committee on Climate Change has consistently said that the costs of meeting the UK's carbon reduction targets could be twice as high without CCS.[5]

10. The experience of investment flows reinforces this point. Money will flow to projects and sectors that offer a **stable and predictable return** – this is not rocket science. As we have seen with offshore wind and CCS, policy consistency is critical and policy volatility is highly damaging.

11. With regard to **CCUS**, there has been considerable progress in the last 18 months, which has been broadly welcomed by industry. But there is still some way to go before an investible framework is delivered. The forthcoming BEIS consultation on delivery and investment frameworks for CCUS is critical, and we would urge that it is published and then acted upon as soon as possible.

12. Similarly, programmes such as the industrial decarbonisation challenge for the Industrial Strategy Challenge Fund (ISCF) and the Industrial Energy Transformation Fund (IETF) will provide welcome support to capital investment in initial **industrial decarbonisation projects**. But they require policy development in parallel to provide an ongoing investment mechanism for low-carbon industrial technologies and fuel sources.

How has Government policy improved the UK energy investment environment over the last three years?

13. On the one hand, **strategy development has improved**, including the publication of the Clean Growth Strategy in 2017, the formation of a hydrogen economy team within BEIS in 2018, the publication of the BEIS CCUS Action Plan and Industrial Clusters Mission in late-2018, and the recent Spring

Statement announcement on support for biogases in the gas grid. These are all very welcome developments.

14. On the other hand, the **substance behind the strategy has not yet followed**. We do not yet have investible mechanisms for CCUS, hydrogen, a significant ramp-up of biogases, or attractive solutions such as bio-LPG heating in off-gas grid homes and businesses. All of these options have the potential to save millions of tonnes of CO_2 a year (and to deliver negative emissions in the case of bioenergy with CCUS), but none yet have a mechanism to deploy at the scale required.

15. Also, in some cases, the **investment picture has actually worsened**. For instance, the Levy Control Framework has restricted the amount of financing available through CfDs.

16. This is of critical importance. Although there have been some notable decarbonisation successes in the UK, overall, there has been **far too much decarbonisation through offshoring** of emissions in recent decades. Between 1997 and 2015, when comparable data exists, the UK's *production* of greenhouse gas emissions fell by 33%,[6] but our *consumption* of emissions in goods and services only fell by 4%, as emissions embodied in imports rose by 31%.[7] Over this period, manufacturing fell from 17% to 10% of the UK's economy.[8] To give one example, the closure of Redcar steelworks in late 2015 led to 2,000 job losses and caused nearly half the fall in industrial emissions in 2016.[9] Initiatives such as the Industrial Cluster Mission offer the opportunity to turn this around, but only if they are properly backed-up.

What types of investor can we expect to finance future UK energy infrastructure? What are their criteria for investment, including on risks and returns? Does it matter if investors for specific technologies are largely from overseas?

17. We can expect to see a number of different types of investor, with different risk and return criteria, including:
    - **Oil and gas companies**, who may have a role storing CO_2, and who will operate on similar terms as at present. A number of these companies are investing in low-carbon energy infrastructure, where there is an investible market framework for doing so.
    - **Gas transmission and distribution companies**, who will oversee the decarbonisation of their networks through biogases and hydrogen, and greater integration of gas and electricity networks. There is potential for an extension of the regulated asset base model in this case, including potentially for new CO_2 pipelines.
    - **Electricity generating companies**, including existing generators.
    - **Major multinational companies**, who will judge investment criteria in the UK against their global portfolios when deciding where to allocate capital.
    - **Financial markets**, that will want to see reduced risk. There is a large financial market appetite for low risk renewable projects, which could be extended to other areas with the right policy framework.
    - **Innovative SMEs** with particular technological strengths, but without large balance sheets, who will need supportive investment.

18. A common goal should be to **reduce the cost of capital through reducing investment risk**. For instance, reducing the weighted average cost of capital (WACC) from 10% to 5% for an offshore wind farm would reduce the levelised cost of energy by 30%,[10] or to put another way, a 1% rise in WACC would increase the cost of energy by around €5 per MWh.[11] According to IRENA's latest renewable power generation costs report, one of the factors behind falling renewables costs is "falling or low cost of capital, driven by supportive policy frameworks, project de-risking tools and the technological maturity of renewable power generation technologies".[12] **There is no reason why**

similar financing cost reductions cannot be made for other low-carbon technologies – indeed, it is absolutely essential that they are.

19. We don't believe it matters if investors are from overseas. Given the global nature of low-carbon energy technology, it would be hard to achieve competitive decarbonisation costs without overseas investment, including from major multinationals. But there are two vital qualifications to this:
    - Firstly, there needs to be a significant UK share of the supply chain, which is vital for creating good jobs in communities across the UK and for achieving the Clean Growth goals of the Industrial Strategy. A significant UK share is not a given – it took time to build UK capacity in the offshore wind sector, for example.
    - Secondly, the promotion of UK innovation and IP is also critical, including bridging the gap between invention and commercialisation. The UK has a number of highly innovative companies in the decarbonised gas sector, including many SMEs, and is carrying out world-leading projects across the country to advanced decarbonised gas solutions. But again, it is not a given that UK inventions will be commercialised here – it is a shame, for example, that the Allam Cycle for gas-fired power with CCUS, which was invented in the UK, is being tested on a 50 MW plant in Texas.

What role should the Government play in providing financial support and sharing risks for new energy infrastructure? Are existing financing mechanisms, notably the Contracts for Difference, fit for purpose? Are there any practical issues, or potential unintended consequences, that could affect the feasibility of implementing alternative support models (such as a Regulated Asset Base)?

20. It is clear to us that CfDs have worked well in some sectors, as we have detailed above. But at the same time they have clearly not been successful for new nuclear, so they are not a catch-all.

21. There is a difference between high capex, low opex generation, for example wind, and lower capex, higher opex generation, where fuel costs are a factor, for example gas-fired power with CCUS or hydrogen power. Equally, investments to decarbonise the gas grid, to decarbonise industry, or to decarbonise heavy transport, are very different to those needed to provide low-carbon electricity. Financing mechanisms need to suit all these decarbonisation options.

22. Any mechanisms to support wider roll-out of low-carbon energy infrastructure need to ensure that:
    - Any framework is simple and clear.
    - Industrial competitiveness is maintained.
    - Cost is kept to a minimum with a clear exit path, making sure that any framework is funding a transition rather than becoming a permanent feature.

23. There are several options that are worthy of further consideration, including:
    - Tax credit: A tax credit for emissions reduced, whether through CCUS or other means, would ensure that industrial competitiveness is not negatively affected. It would also avoid additional knock-on costs on smaller consumers. The 45Q tax credit in the US is an interesting example. To provide an example, the US 45Q tax credit is increasing to $50 a tonne for CO_2 storage, which is around £38 per tonne at current exchange rates. A tax credit at the same level would cost £380 million to reduce emissions by 10 million tonnes.
    - Contracts for difference (CfD): The CfD framework in the UK is well-understood, and providing an auction mechanism incentivises cost reduction. The Levy Control Framework allows for new levies to be raised only if the total burden of levies (Renewables Obligation, Feed-in Tariff and CfDs), which now mainly relate to existing contracts, is falling. The Treasury anticipates this to

be in 2025.[13] If this is the case, then new CfDs for decarbonised gas projects could be offered in the mid-2020s.

- **Carbon pricing:** Dependent on the Brexit outcome, the UK may remain part of the EU ETS, which is only now starting to deliver a higher carbon price, albeit one that is still too low to achieve major change on its own. The UK could resume a gradual increase to the carbon price. However, this risks making industry uncompetitive against other countries with a lower carbon price, and hence the transfer of economic activity overseas, which is not a desirable outcome. It is worth noting that the Energy Transitions Commission recommended that carbon prices should be differentiated by sector, depending on the costs of abatement in different industries, and levied on domestically-traded products such as cement, rather than internationally-traded products such as steel.[14]
- **Iron Mains Risk Reduction Programme:** The Iron Mains Risk Reduction Programme is set to be completed in 2032. Between 2032 and 2052, there will be increasing levels of network savings, adding up to 7% of the bill by 2052.[15] This could allow, instead, for a continuation of the Iron Mains Risk Reduction Programme funding for roll-out of decarbonised gas across the gas network, with less noticeable impact on bills.

24. The extent of **risk-sharing between government and industry** also needs to be determined. Similar to nuclear waste or offshore oil and gas decommissioning, long-term CO_2 storage liabilities need to sit with Government. The industry should be strongly regulated, and, if necessary, required to provide financial security to ensure that projects are completed in the event of insolvency – as per the offshore oil and gas industry for decommissioning – but liabilities decades or hundreds of years out need to be borne by Government.

25. Finally, there also needs to be **co-ordination between government and regulator/s**. For example:
    - Co-ordination between Ofgem's gas and electricity units can help to support sector coupling and power-to-gas.
    - Ofgem's RIIO2 framework for gas and electricity networks needs to be consistent with BEIS decarbonisation plans and financing mechanisms.

What further steps should the Government take to increase investor confidence in the UK energy sector?

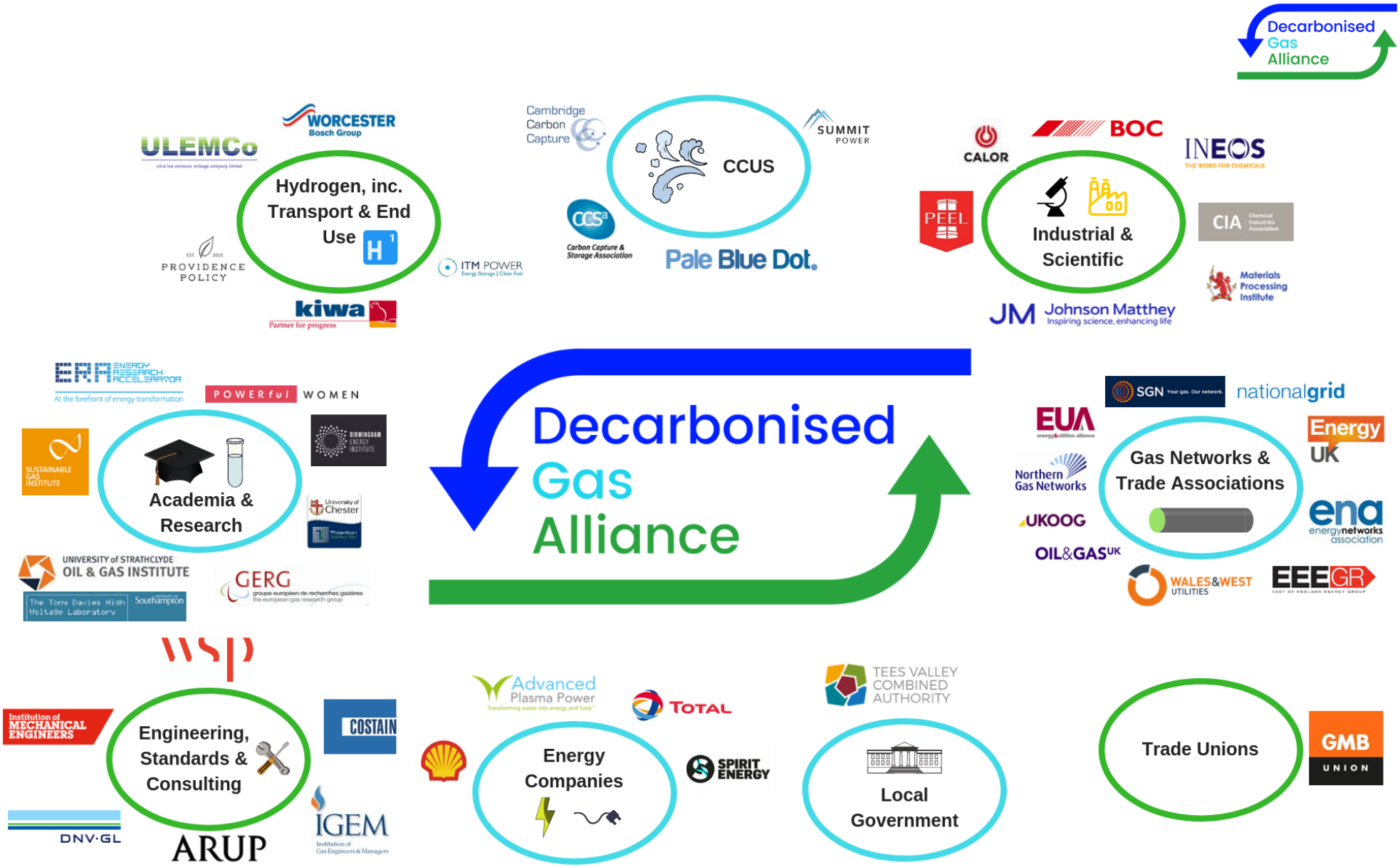
26. Firstly, **don't repeat the experience of CCS in 2015**.

27. Secondly, **do deliver investment mechanisms** for the full range of decarbonisation solutions, as set out above, in a timely manner, including through the upcoming Spending Review.

28. Ultimately, Government needs to decide to what extent it is willing to support **deeper decarbonisation of the UK economy**, including the sectors, such as heat, industry and transport, that have not seen major decarbonisation to date. It also needs to recognise that the **continuing decarbonisation of the electricity sector needs to run to stand still**, given the planned closure of much of the UK's existing nuclear fleet in the next decade.

29. We agree with the Committee on Climate Change that, although compatible with the Climate Change Act, the **carrying forward of overachievement of the earlier carbon budgets** into the fourth and fifth carbon budgets is not desirable and **should be avoided**.

30. Finally, **Government outreach and increasing public awareness** can increase investor confidence. **Local and Regional Governments** have a key role in the energy transition, which includes increasing local support for low-carbon energy investment.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[1] BEIS, Industrial Strategy: Offshore Wind Sector Deal, March 2019 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/786278/BEIS_Offshore_Wind_Single_Pages_web_optimised.pdf
[2] National Grid data, correct as of 30 September 2017
[3] RenewableUK, 5 November 2018 https://www.renewableuk.com/news/425522/Energy-storage-capacity-set-to-soar-300-UK-based-companies-involved-in-new-sector.htm
[4] BEIS, DUKES 2018, Electricity, Table 5.7 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/736152/Ch5.pdf
[5] Committee on Climate Change, 2018 Progress Report to Parliament, June 2018, p.13 https://www.theccc.org.uk/wp-content/uploads/2018/06/CCC-2018-Progress-Report-to-Parliament.pdf
[6] BEIS, Final UK greenhouse gas emissions national statistics: 1990-2016 https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-2016
[7] DEFRA, UK's Carbon Footprint 1997 – 2015, Figure 2 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/704607/Consumption_emissions_May18.pdf
[8] Office for National Statistics, Blue Book, The industrial analysis https://www.ons.gov.uk/economy/grossdomesticproductgdp/compendium/unitedkingdomnationalaccountsthebluebook/2018/supplementarytables
[9] Cooper SJG and Hammond GP, Decarbonising UK industry: towards a cleaner economy, Institution of Civil Engineers paper 1800007, May 2018, p.3; See https://www.gazettelive.co.uk/news/teesside-news/redcar-steelworks-closure-contributes-sharp-12696855
[10] See https://bvgassociates.com/lcoe-weighted-average-cost-capital-wacc/
[11] Credit Suisse, Global Offshore Wind, 9 May 2018, p.12 https://research-doc.credit-suisse.com/docView?language=ENG&format=PDF&sourceid=csplusresearchcp&document_id=1080434601&serialid=mlwV6nQqFrnUz93sJo8YLstnlb3LtsDZnK9uRuY6uuw%3D&cspId=1766766650563231744
[12] IRENA, Renewable Power Generation Costs in 2017, 2018, p.33 https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Jan/IRENA_2017_Power_Costs_2018.pdf
[13] See HM Treasury, Control for Low Carbon Levies https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/660986/Control_for_Low_Carbon_Levies_web.pdf
[14] Energy Transitions Commission, Mission Possible: Reaching net-zero carbon emission from harder-to-abate sectors by mid century, November 2018, Exhibit 13 http://www.energy-transitions.org/mission-possible
[15] H21 North of England, 2018, pp.444-445 https://northerngasnetworks.co.uk/h21-noe/H21-NoE-23Nov18-v1.0.pdf