The voice of the energy industry

Energy UK Response to the BEIS Committee's Carbon Capture, Usage and Storage Inquiry

24th August, 2018

About Energy UK

Energy UK is the trade association for the GB energy industry with a membership of over 100 suppliers, generators, and stakeholders with a business interest in the production and supply of electricity and gas for domestic and business consumers. Our membership encompasses the truly diverse nature of the UK's energy industry – from established FTSE 100 companies right through to new, growing suppliers and generators, which now make up over half of our membership.

Our members turn renewable energy sources as well as nuclear, gas and coal into electricity for over 27 million homes and every business in Britain. Over 730,000 people in every corner of the country rely on the sector for their jobs, with many of our members providing lifelong employment as well as quality apprenticeships and training for those starting their careers. Annually, the energy industry invests over £11bn, delivers £88bn in economic activity through its supply chain and interaction with other sectors, and pays £6bn in tax to HMT.

Executive Summary

1. Energy UK and our members welcome the opportunity to provide this submission into the Business, Energy and Industrial Strategy (BEIS) Select Committee's inquiry into carbon capture, usage and storage (CCUS). We welcome the ambition of the Government in facilitating the delivery of cost-effective CCUS in the wider context of meeting the UK's climate change obligations.

2. Energy UK's CEO, Lawrence Slade, is a member of the CCUS Council and Energy UK's Director of Generation, Barbara Vest participated in the CCUS Cost Reduction Taskforce, providing a number of key background documents and supporting the publication of their report (available here).

3. As the Government intends to ask the Committee on Climate Change (CCC) to look at targets beyond 80% by 2050 to meet the increased ambition required under the Paris Agreement, further thinking about the role CCUS (and other "yet to be developed" technologies) could play across all sectors to meet a net zero target is required. In this context it is anticipated that the UK will be required to meet net zero emissions, or close to net zero, by 2050. CCUS and bioenergy with carbon capture usage and storage (BECCUS) could be vital in helping the UK to achieve either the current or any more ambitious target.

4. If CCUS becomes cost effective in the near future, it could provide a source of firm and flexible generation alongside nuclear and renewables as the reliance on unabated gas-fired generation is reduced. A cost-effective mix of low carbon generation technologies will be required in parallel with improvements in energy efficiency. The extent of CCUS's role will depend on how competitive it is against other low carbon generation technologies in terms of impact on whole system costs.

5. There are also promising opportunities for the deployment of CCUS in sectors where there are few alternatives for decarbonisation, such as certain industrial processes. The CCC has concluded that deploying CCUS is the most cost-effective pathway to decarbonisation in these difficult-to-reach sectors. Negative emissions from BECCUS in electricity generation could be

particularly advantageous to offset emissions in other sectors that are more difficult or expensive to decarbonise.

6. Broader industrial strategy benefits should also be considered. The development of CCUS in the UK could also stimulate the growth in the UK supply chain in terms of manufactured goods and services. A strengthened industrial base could in turn create significant export potential in a growing market. In 2012 the worldwide utilisation of CO2 was 114 MtCO2 per year, primarily for chemical and polymer manufacture. This has the potential to be rapidly increased to a range of 2000 – 2200 MtCO2 per year particularly when the manufacture of synthetic fuels using CO2 is considered. For context the UK emitted roughly 404 MtCO2 in 2015.

7. However, UK energy policy should not become an 'either/or' with CCUS on the one hand and alternative technologies on the other – both should be pursued in parallel. The significant cost reductions we have seen in a number of other low carbon technologies should be capitalised upon by ensuring that in there is a route-to-market for them through a revenue stabilisation CfD. Affordable decarbonisation cannot take place without such an approach.

8. For more detail about the questions posed within the consultation document please refer to the responses submitted by our members. Should you have any questions regarding this consultation response then please do not hesitate to get in touch via the details below.

9. I can confirm that this response may be published on the Parliamentary website.

Joshua Atkins
Policy Manager, Generation
Energy UK
26 Finsbury Square
London, EC2A 1DS

joshua.atkins@energy-uk.org.uk

Responses to Questions

How essential is CCUS for the UK to meet its carbon emission reduction targets to 2050?

10. Energy UK notes that this is an area that successive governments have considered for a number of years and that the independent CCC continues to see as essential in meeting our climate change targets at an acceptable cost to the consumer. The history of CCUS in the UK is one of uncertainty and a series of challenges including the withdrawal of the Government competition in 2015.

11. CCUS has become even more important in the context of the UK's decision to sign up to the Paris Climate Accord. As a signatory of the Accord, the UK will likely have to tighten its emissions reduction targets even further than those that have been set by the Climate Change Act to limit global warming below 1.5 degrees. Analysis by the Energy Technologies Institute (ETI), the CCC and the European Academies Science Advisory Council all indicate these targets will be extremely difficult, if not impossible to meet without CCUS.

12. As recognised by the Clean Growth Strategy, Negative Emissions Technologies (NETs) or Greenhouse Gas Removal technologies (GGRs) also have a vital role to play in the long-term decarbonisation of the UK. The development of bioenergy with CCUS is one of the few NETs which have the potential to be deployed cost-effectively at scale in time to meet decarbonisation targets. NETs have the potential to offset emissions from difficult to decarbonise sectors such as aviation and shipping and flexibility into decarbonisation plans.

13. If CCUS becomes cost effective in the near future, then it could provide a source of firm and flexible generation alongside nuclear and renewables and reduce the reliance on unabated gas-fired generation. However, considering the significant cost reductions we have seen in a number of other low carbon technologies, we don't believe that CCUS plans should impact on the level ambition to deliver renewable energy in line with the Clean Growth Strategy and Fifth Carbon budget targets.

14. With the right government support, CCUS could make a significant contribution to further decarbonisation in the future. As CCUS is unlikely to achieve 100% removal of carbon emissions, this may limit its role in the final stages of getting power sector carbon emissions down to zero, but the deployment of BECCUS may have an important role in achieving this target.

15. The power sector has already seen how the right government support can underpin substantial cost reductions[1] in a number of low-carbon technologies. Although these technologies are now maturing, further cost reductions can be expected for onshore wind, offshore wind and nuclear as experience is gained and supply chains and technologies continue to develop. Similar savings could be possible if CCUS deployment is supported in the same way. In the future, CCUS will need to be competitive with other low carbon technologies including appropriate consideration of technologies taking account of system integration costs.

16. As an already large user of biomass for power, the UK is well placed to repurpose its existing biomass generating assets to enable BECCUS deployment, achieving negative emissions at scale. The CCC has concluded that negative emissions technologies such as BECCUS that capture carbon from the atmosphere are essential if the UK is to offset these difficult-to-cut emissions and meet its 2050 decarbonisation targets. Similarly, the ETI estimates that by 2050, BECCUS could deliver 55 million tonnes of net negative emissions per year – around half of our 2050 emissions target. The ETI also estimate that BECCUS could reduce the cost of decarbonisation by up to 1% of GDP.

[1] E3G, *'Plugging the Energy Gap'* (2016) available here.

How should the Government set targets for cost reduction in CCUS? How could CCUS costs be usefully benchmarked?

17. Any assessment of the affordability of CCUS should recognise that deployment in the UK is likely to be a multi-phase process. The first phase will likely involve the deployment of a series of 'anchor' projects that will facilitate learning, innovation and the emergence of new markets for low carbon products. For some industrial processes CCUS maybe the only route to decarbonisation. Anchor projects in the power sector could prove to be a viable way to reduce costs at a faster pace. Whilst an individual anchor project may prove more expensive than the next best alternative on a sector basis, on an economy wide basis it may prove the least costly and the best way to achieve decarbonisation. The second phase will be a gradual maturing of these markets, realisation of the associated commercial opportunities and accelerated decarbonisation in certain sectors. It is inevitable that costs will be higher in the initial phase, particularly if the projects are oversized for growth and targeted cost reductions.

18. In the power sector, historically the overall cost of a CCUS project has comprised of the cost of deploying and operating the capture technology and the cost of deploying the Transportation and Storage (T&S) infrastructure. Whilst the former is broadly speaking under the developer's control and technology specific, the T&S costs are determined by a range of factors including geography, size and the number of users sharing the T&S infrastructure once it's operational. Recognising this, Lord Oxburgh's report[2] recommended that rather than passing on the T&S costs and risks to the 'anchor' generation project (and developer), a T&S company should be created to deliver and manage the T&S infrastructure.

19. Any benchmarking of the cost of CCUS generation projects should be calculated on a whole system costs basis. As highlighted by analysis conducted by NERA for the CCC[3], CCUS provides additional flexibility to the power grid that could reduce the cost of integrating intermittent renewables onto the system. It is only by capturing this significant benefit to the power grid that a true assessment of its affordability against other available technologies can be made. However, for CCUS to deliver flexibility in practice, it will be essential that a high percentage rate of carbon capture can be maintained when operating flexibly instead of baseload. Additionally, CCUS in the power sector could help deliver cost savings across the economy by acting as an anchor project even if it does not deliver savings in the power sector alone.

20. Given that CCUS's value for money depends on delivery at scale with direct or indirect implications for the decarbonisation of all four of the major fossil fuel consuming sectors of the UK economy (industry, power, transport and heating), all sectors need to be explored in order to realise synergies of a common infrastructure. However, as these reductions may only be realised in practice if certain scale is achieved, planning for the development of CCUS needs to consider the required commercial agreements and risk sharing between areas with different interests and expertise that large-scale cross sector projects may need.

What would be a realistic level of cost reduction to aim for – and by when?

21. As per our answer above, CCUS value for money depends on delivery at scale. Planning for the development of CCUS needs to consider the cost structures and risk sharing that large-scale cross sector projects may need. Accordingly, there needs to be a robust approach to any paper exercise that considers the cost structures, commercial agreements and risk sharing between areas of different interests.

[2] CCSA, *'Lowest Cost Decarbonisation for the UK: The Critical Role of CCS'* (2016) available here.

[3] NERA/Imperial College London, *'System Integration Costs for Alternative Low Carbon Generation Technologies – Policy Implications'* (2015) available here.

If CCUS costs do not come down “sufficiently”, what alternatives should the Government consider to meet the UK’s climate change targets? How might the cost of these compare with CCUS?

22. The CCC has assessed that the additional costs of current inaction on CCUS for UK consumers would be in the order of £1-2bn per year in the 2030s, rising to £4-5bn per year in the 2040s in order to meet targets under the Climate Change Act. Therefore, the cost of CCUS should be seen through a broader lens of the policy cost of achieving cost reduction through alternative measures. Furthermore, it is expected that future emissions reductions targets will need be even more ambitious. Not only could inaction on CCUS likely result in decarbonisation costs being significantly higher than those predicted to meet Climate Change Act targets without CCUS, it may be the case that the UK finds it impossible to meet Paris Climate Accord targets without CCUS and BECCUS.

23. On the basis of the above, UK energy policy should not become an ‘either/or’ with CCUS on the one hand and alternative technologies on the other – both should be pursued in parallel. This is important as in the nearer term (i.e. over the next decade), Energy UK believes that an affordable decarbonisation plan must include a route to market for the least cost forms of low carbon generation at scale. Furthermore, least cost technology deployment should be delivered through a revenue stabilisation CfD in locations where it is supported by the public. This would help to ensure that the low carbon transition is as cost-effective as possible.

24. It is important to recognise that CCUS and BECCUS can meet generation needs which are complementary to other forms of low-carbon generation such as wind and solar. Furthermore, both CCUS and BECCUS are able to provide vital flexibility services required by the transmission system operator to maintain a secure and stable grid.

25. As the UK increases decarbonisation efforts in both the transportation and heating sectors, it is likely that an increase in flexible low-carbon generation will be required to meet the increase in electrical consumption that will inevitably be required to support these decarbonisation efforts. Developing a smart and flexible energy system as envisaged by the government Smart and Flexible Energy System strategy will require a diverse range of technologies, CCUS could be part of that mix.

26. At present, there are no feasible alternatives to decarbonise industrial emissions. The development of CCUS in the power sector would provide anchor projects to enable the technology in the industrial sector. A failure to develop such options may result in industries moving their operations to countries with less stringent carbon targets or an advanced CCUS industry. This would result in carbon leakage, where emissions from UK consumption are simply moved overseas.