REA Response: CCC Proposed methodology for the Seventh Carbon Budget Advice

1) Pathway considerations:

Have we captured the main technological, social, economic and commercial factors we should be considering in our pathways? Do you have any evidence for barriers in specific sectors and technologies?

The main technological, social, and economic and commercial factors are broadly, at a high level, captured within the methodology document. We would however provide further emphasis to the below:

Grid Capacity Constraints

Grid Capacity constraints remain the single largest barrier to the deployment of all low carbon assets that rely of grid infrastructure, this includes renewable generators, EV charging points, heat pumps and energy storage assets. Members regularly report receiving connection dates more then 10 years in the future and having to pay significant amounts in reinforcement costs following Statements of Works. This remains the case for both the transmission and distribution Grids. It is recognised that Government, national Grid ESO and the DNOs published in 2023 significant commitments to addressing constraints. Given the timeframes involved, the CCC should ensure that commitments to improvements are maintained and applied clearly and consistently across the different organisations.

Planning Reform

Time scales for receiving planning permission remains a critical barrier to deployment of all forms of low carbon assets, from new solar generation to composting sites. We welcome Government stated intentions to speed up planning processes, as well as expanding definitions of permitted development so that necessary infrastructure can be prioritised. A side from the regulations themselves, there remains a very significant skills and resource constraint within planning offices that needs to be addressed. Members regularly report it taking more than year to even have a planning application initially considered and then many months to get to a final decision. Ensuring planning offices are appropriately staffed and trained will help address planning barriers, even before the rules themselves are reformed.

Tax Regime

Government should do more to ensure that low carbon developments have access to favourable tax environments, especially where there is now low or no subsidy support. Some existing tax arrangements including VAT, business rates and the Electricity Generator Levy (introduced in 2023) are actively disincentivising renewable energy investment. This is particularly pertinent given generous tax rebates provided in competitive economies, for example the Inflation Reduction Act in the USA.

Route to Market

In some cases, especially in relation to innovative technologies, barriers to route to market remain a key limiting factor. For example, CCS business models are still being developed and there remains little clarity around future allocation process. Elsewhere Thermal Storage still lacks a clear route to market, especially now that it falls outside of the definition of electricity storage in the 2023 Energy Act.

2. Additional Action Pathway and contingency plans:

What types of government measures do you think should be included in the Additional Action Pathway and/or as contingency options rather than in the Balanced Pathway? Please explain why.

All renewable technologies across power, heat and transport should be included within the balanced pathway. The UK will require a comprehensive range of low carbon technologies to be able to decarbonise all areas of the economy, right across power, heat and transport.

Innovative technologies also need to be highlighted within the balanced pathway as having a critical role to play. This includes technologies like long duration energy storage, hydrogen, thermal storage and bioenergy carbon, capture, and storage, acknowledging that it will not be possible to get to net zero without them. As such, Government measures should focus on ensuring such technologies become commercially established within the balanced pathway, rather then suggesting that they should be in anyway reserved only for the Additional Action Pathway, which would risk leaving it too late to see such technologies established.

Within both plans we would also stress the importance of government maintaining a position of technology neutrality, with policy focus being on achieving carbon reductions. This should allow the market to determine which technologies work best in which sectors and ensure value for money from any government support.

We also note that the Additional Action Pathway should also recognise that if the balanced pathway is not achieved, then technologies like Carbon Capture and Storage and energy storage will be expected to play an even greater role in achieving net zero. It is therefore critical that such technologies are established now as part of a balanced pathway to provide that insurance policy, should they be required to an even greater extent than within the balanced pathway.

3. Uncertainty:

Are there any major sources of uncertainty that should be considered in our uncertainty analysis? For example, for which technologies are costs or performance likely to be particularly uncertain?

The REA would highlight that most areas of perceived uncertainty are well modelled and understood. As such, while there may be an element of uncertainty to the below, they should in no way be cause for inaction or slowing deployment of technologies, especially in areas of innovation where we know they are critical to the delivery of net zero and must become established commercially as early as possible. However, ongoing policy uncertainty, with Government taking a long time to confirm final policy decisions against which investors can make final decision will be by far the biggest limiting factor in delaying delivery, and therefore creates uncertainty, in the factors listed below:

Bioenergy with Carbon Capture and Storage – The publication of the Governments Biomass Strategy was accompanied by a report led by the DESNZ Chief Scientific Adviser's Task and Finish Group which sought to establish an evidenced-based position on the validity of BECCS as an option for delivery of negative emissions. Overall that report *"did not identify any insurmountable scientific barriers to the net removal of CO_2 from the atmosphere and subsequent permanent geological storage via BECCS"*. As such it is in accurate to label the technology as 'uncertain'. The limiting factor in the establishment of the technology in the UK will be the speed at which Government finalises the Power BECCS and GGR business model, as well as allocate projects through the cluster sequencing process.

Biomass feedstock availability and Sustainability– As part of the Biomass Strategy the Government have updated their UK and Global Bioenergy Resource Model which considers both the level of sustainable domestic and international biomass resource. Overall, the strategy concludes that Carbon Budget 6 biomass demand is estimated to be within the range of overall biomass availability and that, if managed correctly, this should also be the case for net zero in 2050. This is further supported by analysis of the International Energy Agency. The CCC has also previously highlighted the need for Government to properly support delivery of domestic biomass feedstocks including crops like miscanthus and willow, this remains an area that the Government is slow to progress despite clear evidence on its deliverability.

Long duration Energy Storage and the amounts thereof. - Latest LDES policy positions are progressing now. However, the ongoing debate on how much, what type and where are still fiercely being debated at an academic level. CCC must play a role in ensuring this important net zero enabler is not allowed to slip into further policy debate but acted upon in the near term and market mechanisms established.

Hydrogen Production – low carbon hydrogen production will have a role to play in the decarbonisation of several sectors. Low carbon production pathways are now well proven, including when using biogenic feedstocks. Again, policy providing a route to market and definitive offtake contracts remains the most prominent limiting factor in seeing the level of hydrogen production that can be delivered.

4. Speculative technologies:

In our carbon budget advice, we take a low-risk approach by avoiding reliance on speculative technologies, to ensure that our pathways are deliverable. Is there any new evidence on the feasibility of technologies that support decarbonisation since our 2020 advice on the Sixth Carbon Budget that we should consider?

As described above in question 3 it is inaccurate to term BECCS and Hydrogen as 'speculative', However, like all innovative technologies, these are proven technologies that need firm policy support in order to be delivered. Further evidence for this and other innovative technologies represented by the REA are provided below, all published since the CCC's 2020 advice on the sixth Carbon budget.

We would also urge the CCC to avoid the use of labels such as 'speculative' when previous analysis by the CCC has highlighted that these technologies have an important role to play in the delivery of net zero. The fact that a technology still needs support to become commercially established should not be used as a reason for suggesting that it can't be delivered (as had been the case for Off-shore wind a decade ago), or as a reason for slowing policy decisions to see them established. They are only 'speculative' in the sense that the policy environment has to date been inconsistent and decision making has been slow. A strong policy environment will see these technologies delivered and enable them to play their role in delivering net zero.

BECCS

Government Task and Finish Group on the ability of BECCS to Generate negative emissions, published alongside the Biomass Strategy, concluded that they *"did not identify any*

insurmountable scientific barriers to the net removal of CO_2 from the atmosphere and subsequent permanent geological storage via BECCS".

https://www.gov.uk/government/publications/ability-of-bioenergy-with-carbon-capture-and-storage-beccs-to-generate-negative-emissions

Other evidence sources:

Fajardy, M., Morris, J., Gurgel, A., Herzog, H., Mac Dowell, N., Paltsev, S., (2021), "*The economics of bioenergy with carbon capture and storage (BECCS) deployment in a 1.5 C or 2 C world",* Global Environmental Change DOI: 10.1039/C7EE00465F

IEA (2023) CCUS Projects Database, demonstrates the extent of CCUS projects both operating and underdevelopment across the globe. https://www.iea.org/data-and-statistics/data-product/ccus-projects-database

Biochar

There are now also several research projects relating to the role that Biochar could play in carbon sequestration. It is worth considering the evidence of the Biochar Demonstrator. The project is led by Professor Colin Snape at the University of Nottingham, in collaboration with other universities. https://biochardemonstrator.ac.uk/about-us-demonstrator/

Innovative Biomass Feedstocks

We would also encourage the CCC to consider the results of the DESNZ Biomass Feedstocks Innovation Programme, which highlight the ongoing potential for a range of biomass feedstocks in the UK. https://www.gov.uk/government/publications/biomass-feedstocks-innovation-programme-successful-projects/biomass-feedstocks-innovation-programme-phase-2-successful-projects

Long Duration energy Storage

The REA have long promoted the role of Long Duration energy Storage, including our report on how to establish the market, published in 2021. https://www.r-e-a.net/resources/rea-longer-duration-energy-storage-report/

We also highlight the recently published work of Dr Ian Staffell and Dr Oliver Schmidt on Monetizing Energy Storage, https://global.oup.com/academic/product/monetizing-energy-storage-9780192888174?cc=us&lang=en&

Geothermal Energy

The UK continues to underutilise its Geothermal potential for both renewable heat and power. Recent publications on this include:

REA and Arup Report: https://www.r-e-a.net/government-urged-to-help-deliver-a-world-leading-deep-geothermal-sector-to-secure-the-uks-green-recovery/

Dr Kieran Mullan MP led repot on Geothermal "Dig Deep Opportunities To Level Up Through Deep Geothermal Heat & Energy On The Way To Net Zero" https://www.drkieranmullan.org.uk/sites/www.drkieranmullan.org.uk/files/2023-06/Dig%20Deep%20June%202023.pdf

10. Social impacts and distributional analysis:

What are the most important elements of social impacts and the distribution of costs and benefits society that should be considered in our analysis?

The REA annual report, REView, provides a regional breakdown of how jobs in renewable energy industries due to their decentralised nature are spread across the country. As such, it should be noted that renewable technologies are by their nature dispersed and therefore good for distributing jobs and economic growth across the country. In addition, we are also seeing the transition of predominantly fossil energy focused communities transitioning to new low carbon industries, this includes refineries looking to biofuels, and oil and gas workers looking towards developments in geothermal, marine and offshore wind projects.

The 2023 version of Review can be read here: https://www.r-e-a.net/resources/review23/

Regional analysis of jobs starts on page 51. We would also be happy to share the excel workbooks for this information on request.

12. Engagement:

How best can we engage with experts and stakeholders to build our evidence base and test our emerging thinking?

The REA is the UK's largest trade body for renewables and clean technologies. We have member forums representing stakeholders involved in nearly all renewable and clean technology sectors of the UK and at all scales. The REA would be very happy to arrange suitable roundtable discussions between industry and the CCC on all of the below areas:

- Electric Vehicles
- Renewable Transport Fuels (Including Sustainable Aviation Fuel)
- Landfill Gas
- Organic Recycling and Circular Bioresources
- Compostable packaging and non-packaging products
- Biomass Heat
- Biomass Power (Inc. Bioenergy Carbon Capture and Storage)
- Energy from Waste (Inc. Gasification and Pyrolysis)
- Net Zero Hydrogen Production
- Green Gas (including Anaerobic Digestions)
- Energy Storage (Including Long Duration Energy Storage)
- Thermal Storage
- Solar
- Geothermal Energy
- Decentralised Energy – covering the built environment and connected/interdependent systems
- Grid Connection Issues
- Review of Electricity Market Arrangements

13. Sharing our advice:

What would help make our advice accessible to wider stakeholders, such as citizens, financial institutions, businesses and local government? For example, video explainers, stakeholder specific briefings or social media threads.

The REA would be happy to help disseminate any materials to our members coming from the seventh carbon budget.

We would also encourage the CCC to continue to hold online webinars and workshops, as industry often find it easier to engage with such presentations and discussions rather than long reports. The REA would also be happy to help promote such meetings to our members through our regular newsletters.

We would also recommend that the CCC look at how they can make the Seventh Carbon Budget Report as accessible and usable as possible. While the report is correctly and necessarily in-depth, this could be used to produce a number of shorter summary documents relating to specific sectors or issues that may be more instantly accessible for different bits of industry. Again, the REA would be happy to partner/assist in both the production and dissemination of such documents. We are also happy to use our COP Observer status to represent UK's standing in the areas of renewable energy and clean technologies and the landscapes they need to be deployed in for Net Zero