All Party Parliamentary Climate Change Group (APPCCG) event

Negative emissions technologies: a necessary step or a false hope?

May 22nd 2019, 17.30-18.30, Committee Room 4

Chair: Professor Lord Martin Rees, Emeritus Professor of Cosmology and Astrophysics at the University of Cambridge and Chair of the All-Party Parliamentary Group for Future Generations

On the 22nd May 2019 the All-Party Parliamentary Group on Future Generations and the APPCCG ran a joint event in Parliament entitled 'Negative emissions technologies: a necessary step or a false hope?' chaired by Professor Lord Martin Rees. This event was held to consider the role of negative emissions technologies in meeting the UKs decarbonisation targets. This summary has been produced as a follow up to this event.

Panel

Dr Naomi Vaughan, Senior Research Associate at the University of East Anglia
Charlotte Morgan, Chair of the Carbon Capture Use and Storage Cost Taskforce
Dr David Reiner, Senior Lecturer in Technology Policy at the University of Cambridge

Introduction from Lord Martin Rees

Professor Lord Martin Rees opened the event with a brief overview of the role of the APPG for Future Generations. Whereas other countries have legislative arrangements to account for the needs of future generations, the UK currently does not (with the exception of Wales). This gap in legislation is one of the reasons that the APPG for Future Generations was brought into being.

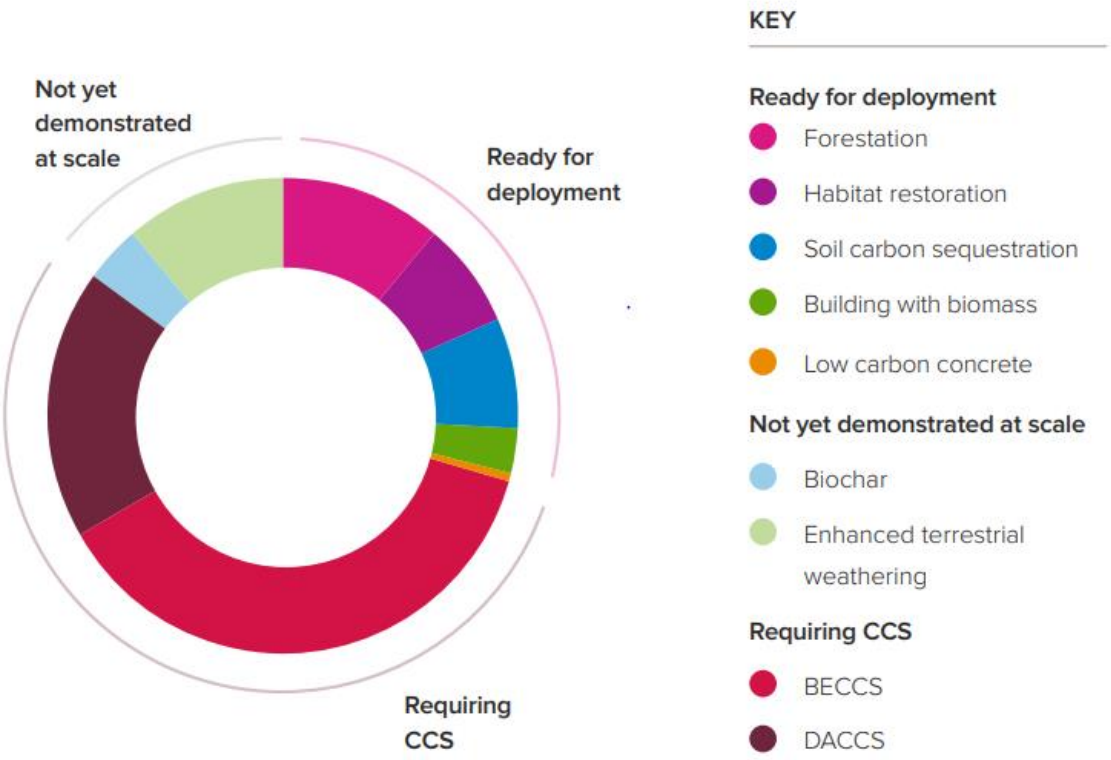
Lord Rees referred to the recently released Committee on Climate Change (CCC) report ('Net Zero – The UK's contribution to stopping global warming') which recommends the UK moving to net zero emissions by the 2050. This report makes clear that negative emissions technologies will have to form a part of the UK strategy, yet Lord Rees suggested that policy makers are not yet prepared for the challenges this will pose.

Dr Naomi Vaughan

Dr Vaughan focused her contribution on the need for negative emissions technologies, and an overview of the different types of technologies that existed. She emphasised that in any

decarbonisation scenarios, there will be some emissions that are very hard to remove – such as emissions from aviation, agriculture and some parts of industry. It is therefore essential that negative emissions technologies are deployed to mop up these residual emissions.

Dr Vaughan made use of an image from the Royal Society (provided below) to talk through the different types of negative emissions technologies.



The total diagram corresponds to 130Mg of CO_2 removal. The following points were made:

- **Just over half of potential come from just two technologies** – both involve carbon capture and storage (CCS) – i.e. capturing carbon and transporting it to be stored underground
    - Biggest is **biomass energy with CCS** (BECCS)– this involves using energy crops or wastes from agriculture or forestry, burning them to produce energy, and capturing CO_2 from flue gas for storage
    - Next is **direct air capture and storage** (DACCS) – involving the capture of CO_2 directly from the air. This requires energy, as opposed to BECCS that generates energy
    - Both of these techs dependant on CCS – **currently this is not being done at scale in the UK**, but there are 18 cases globally that are capturing over half a Mt of CO_2 per year
- Two further technologies/ approaches are not yet proven at scale
    - **Biochar** – this involves burning biogas in low oxygen environments, turning it to a charcoal that can be added to soil that keeps the carbon stored (as it

doesn't get broken down easily). There are still questions about wide scale application
    - **Enhanced terrestrial weathering** – breaking down rocks, which react with water and store carbon – this carbon eventually ends up in the sea. Speeding this up requires crushing up lots of rocks which requires significant energy input
- A further tranche of approaches are ready for deployment and have significant scope for upscaling
    - **Forestation** – this involves planting trees or improving management of existing forest. The **UK has averaged 9000 new hectares per year** in last few years and needs to get to 20000 a year. **Getting to this level is possible, has been done historically, but requires dedicated policy mechanisms.**
    - **Habitat restoration** – this involves the restoration any high carbon content habitat such as wetlands or peatlands
    - **Soil carbon sequestration** – improved land management practices can increase carbon storage in soil
    - **Building with biomass** – using high carbon building materials ensures this carbon is locked up rather than released
    - **Low carbon concrete**

In summary, Dr Vaughan suggests that either we need large CCS infrastructure, or land practices that involve adding things to the soil/ using land differently.

Charlotte Morgan

Charlotte Morgan gave a summary of the work of the Government's Carbon Capture Use and Storage (CCUS) Cost Taskforce. The following points were made:

- The UK has some of the best geology in the world for storing carbon, and this sector has the potential to contribute to the UK economy
- The Government has yet to make a formal commitment to pursue CCS – this will be needed to plug the anticipated decarbonisation gap
- The CCUS have developed a 'cluster' based model for the deployment of CCS
    - Each cluster will be based in an area of high industrial activity and consist of a network of capture plants at relevant sites (power plants, BECCS, cement manufacturers, etc.), served by centralised transportation and storage operations
    - The CCUS has identified 5 areas that are most suitable to develop a CCS cluster
- This cluster model as laid out in a report from the group released in July 2018, and the Government is now looking to carry this model forward
- A recent BEIS select committee report recommended that the Government be supporting 3 clusters by 2025

Charlotte stressed that lots of companies are keen to invest in these projects and there is lots of momentum and engaged groups of policymakers.

Dr David Reiner

Dr Reiner spoke about public perceptions of negative emissions technologies based on research undertaken at the University of Cambridge. David questioned the perception amongst some that negative emissions technology detracts from decarbonisation efforts, and stressed that meeting Paris Agreements targets will require both decarbonisation and negative emissions technologies.

Dr Reiner then presented the results of survey work undertaken amongst 2000 members of the British public last year. He warned that many people are unfamiliar with negative emissions technology, and this should be considered when interpreting peoples stated opinions on the subject.

The main results of the survey work (and other similar research) showed:

- The amount of people placing the environment as a top-three concern jumped from 10% to 33% last May
- People tend to read the most about solar energy, wind energy and fracking, only 12 to 17% pay attention to CCS, and even less to geoengineering
    - This pattern holds for popularity of different approaches – renewables most popular, then CCS, then geoengineering
- Renewables are traditionally cited by the public as the key funding priority in this area, however there has been a recent doubling in the number of respondents stating CCS as a spending priority
- The majority of people still have not heard of CCS
- When asked specifically about CCS, responses can be segmented as follows (proportions should be taken cautiously and are not necessarily stable)
    - 10% are climate sceptics and don't see the point of spending money on this
    - Small group this CCS diverts attention from real problem of decarbonisation
    - Largest segment have concerns around environment impacts of transportation and storage of carbon/ the sustainability of biomass feedstocks
    - Some are entirely neutral
    - Some are supporting with a few caveats
    - Around 15% are fully supporting of widespread deployment
    - *Presenting people with more information on CCS did not seem to impact on this segmentation*