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Question 1 - Climate science

ANSWER: Those reports are the central ones to consider, but in the UK/devolved administrations context you clearly need to consider what targets are compatible with 1.5 degrees average increase globally. Net zero GHG by 2040-2060 would arguably be consistent with this so consideration of your own current carbon budgets and previous reports, recognition of cumulative emissions, and the UKCCRA all need to be well integrated in the response. The new WWF report on net zero in the UK is worth a read too.

Question 2 - CO2 and greenhouse gas emissions

ANSWER: Though GWP (100) is imperfect, it is the universal reporting metric for CO2e and so your analysis should be based on this, but with a clear explanation of the assumptions inherent in this and the potential bias with short-lived GHGs (esp. methane). Non-CO2 GHGs will be a vital part of your report as some will be impossible to mitigate entirely. For a net zero GHG target, this should be as CO2eq (GWP100) using AR5 values in my view as it will aid clarity and consistency.

Question 3 - Effort share

ANSWER: Again, to aid clarity, the existing UNFCCC approach should be taken. So, production based accounting, but including international aviation and shipping. Consumption based estimates will be useful to give context, along with a clear explanation of the barriers to using these effectively (not least the data estimation) and the need to integrate UK assessment and targets with those internationally. Likewise, the 1990 baseline (1995 for F gase) should be explained and justified, with acknowledgement given to pre-1990 emissions for context.

Question 4 - International collaboration

ANSWER: Through ODA and the GCF (and many other routes) the UK is aiding mitigation and adaptation overseas. Going above and beyond current GCF commitments is required for all nations given the inevitability of negative impacts even with 1.5 degrees (and the huge current shortfall in the $100 billion per year from 2020 commitment). The UK's role in capacity-building is already large and has the potential to be world-leading – GCRF is an important mechanism for this, but greater investment in overt provision of climate change capacity building by UK HEIs (via FCO and similar is required). Indeed, assisting in the development of organisations like the CCC in all nations is vital in my view – there is no point in doing a great job in the UK of most other nations are hobbled by the availability of objective and expert advice on which to base policies.

Question 5 - Carbon credits

ANSWER: Depends what you mean by 'effective'. With China on board the global market will continue to grow, but in terms of price per tonne and so effective carbon pricing it is more likely to remain more of a national or regional mechanism for helping to deliver on NDCs rather than to deliver all the support required in the developing world. Removing fossil fuel subsidies would be a more effective market-based measure in my view. Purchase of credits by the UK to meet our C targets is not compatible with our taking our fair share of action and should be unnecessary given 5 year budget periods and so the ability to smooth out the anomalies of cold years and similar.

Question 6 - Hard-to-reduce sectors

ANSWER: My expertise is in agriculture and land use so I have briefly summarised some suggestion on this sector here:

The UK's exit from the EU and replacement of the CAP represent an opportunity to improve support for farmers right across the UK which simultaneously raises profitability, the long-term sustainability of the agri-food sector and, crucially, can help the UK achieve its climate change targets. In light of the Paris Climate Agreement and the IPCC's latest assessment of the emissions reductions required to limit global average temperature increase to 1.5 degrees, the UK will need to achieve deep and rapid cuts in the agri-food sector. Central to this will be support and incentives that derive from a robust evidence base, avoid unintended consequences, and that are applicable to local contexts. Progress to date in this sector has been poor – as we successfully decarbonise our energy system, so the lack of progress in the agri-food sector is becoming increasingly stark.

Awareness and application of 'low carbon' farming practices is sparse. For instance, only around half of UK farms currently use nutrient management plans, calibrate their spreaders or attach any importance to

greenhouse gas emissions (Farm Practices Survey 2017). With the Agriculture Bill there is an opportunity for a renewed emphasis on support for farming practices that deliver on climate change and environmental protection goals, alongside increases in profitability. The current Bill provides little in the way of detail on how such alignment of financial support and climate change objectives will be achieved. I would urge the Committee to scrutinise this aspect in depth. In particular, I would suggest the below elements are overtly acknowledged and, where necessary, strengthened:

Recommendations

• More overt integration of the Agriculture Bill with UK climate change targets, acknowledging the diversity of local contexts, and clearer integration with wider land-use policy such as forestry.
• Assessment of the impact of existing voluntary measures to support low-carbon farming in the UK, identifying successes and overtly questioning whether their speed and scale is fit for purpose in the context of the current and future climate change targets
• Consideration of whether mandatory measures are required and appropriate, and how any such measures could be integrated with financial and extension support programmes planned under the Bill
• Ensure that the agri-food sector is not treated as the problem in delivering on UK climate change targets, but actually the solution. Investment in capacity-building that focuses on the multiple benefits to farmers and the nation, through increased profitability, resilience, and reduced emissions at the same time (i.e. the climate-smart approach).

Question 7 - Greenhouse gas removal

ANSWER: It can deliver net zero GHG (as CO2e) by 2050 if we can get mitigation and sequestration ramped up to the levels required – afforestation and soil C enhancement can deal with much of the sequestration required with rapid and sustained emissions cuts. BECCS and DAC will be increasingly required if we delay such concerted action.

Question 8 - Technology and innovation

ANSWER: CCS is the prime example – it is vital for the UK and the world in decarbonising our economies. The UK boasts world-leading expertise and has the history in O&G to deliver the engineering developments required. The UK could become the global hub for this technology, its innovation, and global uptake (with big wins for our economy and employment too)

Question 9 - Behavioural change

ANSWER: They can change beyond recognition. The precedents are everywhere from human health and education, to mobile phones and the internet. Getting the supportive policy env. and sustained global effort is no easy task mind.

Question 10 - Policy

ANSWER: Through the UK Climate Change Act and its C budgets. Each sector requires support and regulation to deliver these, but they cannot act without clear targets, and this needs the revised C budgets in place asap.

Question 11 - Costs, risks and opportunities

ANSWER: Short-term costs will go up (a lot in some cases), long term costs (esp. externalities) will plummet. It's a balance, but again with precedent (i.e. the banking crisis)

Question 12 - Avoided climate costs

ANSWER: Very little published to date. Few studies have examined the specific temp window and its impacts – more should be commissioned (cue the CCC).

Question 13 - Devolved administrations

ANSWER: Scotland is ahead of the other nations, but has different challenges too. Our agriculture sector is more important (around ¼ of our GHG emissions) so that needs the most attention. Scotland also has the greatest potential for C sequestration through land use policy in my view (inlc. Peatland restoration and afforestation)

Question 14 - Work plan

ANSWER: Examine the capacity building mechanisms in more depth – these include in-country ability to train stakeholders, technical capacity, policy capacity, and the extension of UK expertise overseas (and vice versa). Having something like the CCC in every nations would go a long way to achieving Paris.