Question and response form

When responding, please provide answers that are as specific and evidence-based as possible, providing data and references to the extent possible. Please limit your response to a maximum of 400 words per question.

Part 1: Climate Science

Question 1 (Climate Science): The IPCC's Fifth Assessment Report and the Special Report on 1.5°C will form an important part of the Committee's assessment of climate risks and global emissions pathways consistent with climate objectives. What further evidence should the Committee consider in this area?

ANSWER:
The Committee should consider the following publications, and in particular the sections which I have specifically identified in each citation. Their relevance is made clear in my responses to questions 3, 4, 9, 10 and 14 below.

[1] Victor D. G., and others (2014). **Introductory Chapter. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change** (IPCC AR5) [Edenhofer, O., and others (eds.)]. Cambridge University Press, Cambridge and New York, at 111-150. ***Specifically sect 1.3.1***
https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter1.pdf

[2] Barrett J., G. Peters, T. Wiedmann, K. Scott, M. Lenzen, K. Roelich, and C Le Quéré (2013). **Consumption-based GHG emission accounting: a UK case study**. Climate Policy 13, 451 – 470.
https://www.tandfonline.com/doi/pdf/10.1080/14693062.2013.788858?needAccess=true (open access)

[3] United Nations (2017). **System of Environmental-Economic Accounting 2012— Applications and Extensions**, sections 2.3, 2.7 and 3. ***Specifically, paras 2.51 – 2.54, 2.77, 2.78, 2.96 & 3.4.***
https://unstats.un.org/unsd/envaccounting/seeaRev/ae_final_en.pdf

[4] Fleurbaey M., and others (2014). **Sustainable Development and Equity. In: Contribution of Working Group III to IPCC AR5** [full citation at [1] above] at 283-350 . ***Specifically section 4.4***.
https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter4.pdf

[5] Blanco G., and others (2014). **Drivers, Trends and Mitigation. In: Contribution of Working Group III to IPCC AR5** [full citation at [1] above], at 351-412. ***Specifically sections 5.2.3.7, 5.3.1, 5.3.3, 5.4 and 5.5.***
https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter5.pdf

Question 1 (Climate Science): The IPCC's Fifth Assessment Report and the Special Report on 1.5°C will form an important part of the Committee's assessment of climate risks and global emissions pathways consistent with climate objectives. What further evidence should the Committee consider in this area?

[6] Agrawala S., and others (2014). **Regional Development and Cooperation. In: Contribution of Working Group III to IPCC AR5** [full citation at [1] above] at 1083-1140. ***Specifically section 14.3.4.3***. https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter14.pdf

[7] UK Department for International Development (2017). **Agenda 2030: The UK Government's approach to delivering the Global Goals for Sustainable Development - at home and around the world.** ***Specifically p29*** https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/603500/Agenda-2030-Report4.pdf

[8] United Nations (2012). **10-year framework of programmes on sustainable consumption and production patterns**, A/CONF.216/5, Annex. ***Specifically 1(a), 2(a) 3(d), 3(e), 3(i) & 3(k).*** http://www.un.org/ga/search/view_doc.asp?symbol=A/CONF.216/5&Lang=E

[9] United Nations (2014). **Interim progress report prepared by the 10YFP [10 Year Framework of Programmes on Sustainable Consumption and Production Patterns] Secretariat** on behalf of the 10YFP Board for the High-Level Political Forum on Sustainable Development. ***Specifically preamble, 3, 6, 7.1.*** https://sustainabledevelopment.un.org/content/documents/1444HLPF_10YFP2.pdf

[10] United Nations (2015). **Transforming Our World: The 2030 Agenda for Sustainable Development** A/RES/70/1. ***Specifically SDG12, and SGD Targets 12.1, 12.6, 12.7 and 12.8*** http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

[11] Jakob M., and R. Marschinski (2012). **Interpreting trade-related CO2 emission transfers** Nature Climate Change 3 (2012), 19–23. https://www.nature.com/articles/nclimate1630 (subscription required) https://www.mcc-berlin.net/fileadmin/data/pdf/Publikationen/Jakob_Marschinski_Interpreting_CO2_emission_transfers_NCC_2012.pdf (open access).

Question 2 (CO_2 and GHGs): Carbon dioxide and other greenhouse gas gases have different effects and lifetimes in the atmosphere, which may become more important as emissions approach net-zero. In setting a net-zero target, how should the different gases be treated?

ANSWER:

Part 2: International Action

Question 3 (Effort share): What evidence should be considered in assessing the UK's appropriate contribution to global temperature goals? Within this, how should this contribution reflect the UK's broader carbon footprint (i.e. 'consumption' emissions accounting, including emissions embodied in imports to the UK) alongside 'territorial' emissions arising in the UK?

ANSWER:
The IPCC's Special Report on 1.5°C (at TS.4 final para) acknowledges that policies should reflect "principles of justice and ethics (including 'common but differentiated responsibilities ...')" [the reference is to Articles 2 and 4 of the UN Paris Agreement]. In the context of Q3, the principle of common but differentiated responsibilities entails considering evidence of the UK's historical responsibility for cumulative worldwide emissions.

Principles of justice and ethics also involve the UK taking into account all emissions for which it is currently responsible. Victor and others (see [1] under Q1, at section 1.3.1) observe: "Over the last two decades, a particularly striking pattern has been the globalization of production and trade of manufactured goods ... In effect, high-income countries are importing large embodied emissions from the rest of the world". In the context of Q3, this highlights the need to consider evidence on the extent to which the UK imports embodied emissions.

The IPCC's Special Report on 1.5°C (at TS.2 para 3) identifies "growing resource-intensive consumption" as one of the "key impediments to achieving 1.5°C-consistent pathways"

Barrett and others (see [2] under Q1, at sections 4.2 & 5) recommend that the UK aim to mitigate both consumption and production emissions: "Territorial emissions targets in isolation can unintentionally lead to weak carbon leakage". The authors demonstrate "the role that consumption-based emissions could play in monitoring progress in reducing emissions and ... to .... quantify additional climate mitigation strategies. The methodology is robust enough to support both roles."

The UK should therefore set emissions targets on a dual basis - both consumption based (or footprint) and production (or territorial) based. In "Reducing UK emissions: 2018 Progress Report to Parliament" (at Box1.2, p32), the Committee noted "A combination of UK and global action, as envisaged in the Paris Agreement, is required to cut both UK production and consumption emissions". The UK moving from merely monitoring consumption-based emissions, to including them in carbon budgets, would be one such action. This would prevent UK Government Ministers treating consumption-based emissions as 'a purely academic exercise', a 'distraction at best' and of 'limited policy application' (quoted in Barrett and others (see [2] under Q1, at 4.5).

UN guidance (see [3] under Q1, at para 2.54) notes "The appeal of consumption-based methods for calculating national-level intensity indicators rises with the degree to which environmental issues are … global ... Greenhouse gas emissions are the most prominent case ..."

Question 4 (International collaboration): Beyond setting and meeting its own targets, how can the UK best support efforts to cut emissions elsewhere in the world through international collaboration (e.g. emissions trading schemes and other initiatives with partner countries, technology transfer, capacity building, climate finance)? What efforts are effective currently?

ANSWER:

Beyond the current approach of setting and meeting its own targets on ***production*** emissions, the UK should set and meet additional targets on ***consumption-based*** emissions. The scope for such additional targets to support efforts to cut emissions elsewhere is underlined by three contributions to the IPCC Fifth Assessment report.

- Fleurbaey and others (see [4] under Q1, at final para of 4.4.1.2 and para 1 of 4.4.1.3): "A disproportionate part of the GHG emissions arising from production are linked to the consumption of products by a relatively small portion of the world's population, illustrated by the great variation in the per capita carbon footprint between countries and regions at different income levels … At the global level, … food is the consumption category with the greatest climate impact, ... followed by housing / shelter, mobility, services, manufactured products, and construction .... Food and services were a larger share in poor countries, while at high expenditure levels, mobility and the consumption of manufactured goods caused the largest GHG emissions"
- Blanco and others (see [5] under Q1, at Executive Summary): "In most developed countries, both consumption-related emissions and GDP are growing. There is an emerging gap between territorial, production-related emissions, and consumption-related emissions that include CO2 embedded in trade flows. The gap shows that a considerable share of CO2 emissions from fossil fuels combustion in developing countries is released in the production of goods exported to developed countries."
- Agrawala and others (see [6] under Q1, at 14.3.4.3): "With economic growth, households in less-developed regions are expected to 'westernize' their lifestyles, which will substantially increase per capita and global total carbon emissions (Stern, 2006)." In other words if the UK reduces its consumption-based emissions then it will contribute to lowering the consumption-based emissions of others elsewhere who aim for a UK-like lifestyle.

Beyond setting and meeting its own consumption-based emission targets, the UK should honour its claim to be "working to accelerate the shift towards sustainable consumption and production through engaging in the wider work developed under the UNEP 10 Year Framework of Programmes on Sustainable Consumption and Production." (see [7] under Q1, at p29).

The UN 10 Year Framework is clear (see [8] under Q1, at 1(a), my emphasis): "Fundamental changes in the way societies ... consume are indispensable for achieving global sustainable development. All countries should promote sustainable consumption ... patterns, ***with the developed countries taking the lead*** ..."

Question 5 (Carbon credits): Is an effective global market in carbon credits likely to develop that can support action in developing countries? Subject to these developments, should credit purchase be required/expected/allowed in the UK's long-term targets?
ANSWER:

Part 3: Reducing emissions

Question 6 (Hard-to-reduce sectors): Previous CCC analysis has identified aviation, agriculture and industry as sectors where it will be particularly hard to reduce emissions to close to zero, potentially alongside some hard-to-treat buildings. Through both low-carbon technologies and behaviour change, how can emissions be reduced to close to zero in these sectors? What risks are there that broader technological developments or social trends act to increase emissions that are hard to eliminate?
ANSWER:

Question 7 (Greenhouse gas removals): Not all sources of emissions can be reduced to zero. How far can greenhouse gas removal from the atmosphere, in the UK or internationally, be used to offset any remaining emissions, both prior to 2050 and beyond?
ANSWER:

Question 8 (Technology and Innovation): How will global deployment of low-carbon technologies drive innovation and cost reduction? Could a tighter long-term emissions target for the UK, supported by targeted innovation policies, drive significantly increased innovation in technologies to reduce or remove emissions?
ANSWER:

Question 9 (Behaviour change): How far can people's behaviours and decisions change over time in a way that will reduce emissions, within a supportive policy environment and sustained global effort to tackle climate change?

ANSWER:

I first consider a rephrased question. How far ***do*** people's behaviours and decisions ***need to*** change over time ***in order to sufficiently*** reduce emissions, within a supportive policy environment and sustained global effort to tackle climate change?

The UN 2014 Interim progress report on Sustainable Development recalled (see [9] under Q1, at preamble, my emphasis): "in June 2012, ... Heads of States adopted the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns (hereafter the 10YFP). This followed their reaffirmation that "***fundamental changes in the way societies produce and consume are indispensable for achieving global sustainable development***" (Johannesburg Plan of Implementation, 2002)".

The IPCC's Special Report on 1.5°C reinforces this point (at SPM D.6, my emphasis). "Sustainable development supports, and often enables, the ***fundamental societal and systems transitions and transformations*** that help limit global warming to 1.5°C. Such changes facilitate the pursuit of climate-resilient development pathways that achieve ambitious mitigation and adaptation in conjunction with poverty eradication and efforts to reduce inequalities (high confidence)."

Fundamental change in behaviours and decisions is therefore needed. This can happen if people have sufficient motivation to change, for example by sufficiently understanding why they need to.

To paraphrase an old saying, when climate science shows that we must "change", our response should be to ask "how much do we need to?". This is reflected in UN Sustainable Development Target 12.8 (see [10] under Q1), "By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature"

All that said, however, as the IPCC's Special Report on 1.5°C notes (at FAQ4.1), "While the pace of change that would be required to limit warming to 1.5°C can be found in the past, there is no historical precedent for the scale of the necessary transitions, in particular in a socially and economically sustainable way. Resolving such speed and scale issues would require people's support, public-sector interventions and private-sector cooperation."

The UN 10 Year Framework (see [8] under Q1) indicates why the UK has a particular responsibility to lead these changes. "1(a) taking into account ...the principle of common but differentiated responsibilities as set out in principle 7 of the Rio Declaration ... Governments ... should play an active role in changing unsustainable consumption ... patterns ... 2(a): … developed countries taking the lead in implementing measures to achieve more sustainable patterns of consumption."

Question 10 (Policy): Including the role for government policy, how can the required changes be delivered to meet a net-zero target (or tightened 2050 targets) in the UK?

ANSWER:
The UN 10 Year Framework outlines some strategies for change (see [8] under Q1, at 3(d, e, i & k) "the integration of sustainable consumption and production in decision-making at all levels, …. for example through strategic planning and policymaking; Raising awareness and engaging civil society, ... and integrating education for sustainable consumption ... in formal and non-formal education programmes … Promoting the engagement of the private sector in efforts to achieve a shift towards sustainable consumption ….Encouraging ... the promotion of repair and maintenance work as an alternative to new products;"

The UN 2014 Interim progress report on Sustainable Development notes that (see [9] under Q1, at 3, 6, and 7.1.): "An initial, non-exhaustive and indicative list of five programme areas were included in the 10YFP document adopted at Rio+20, namely: consumer information; sustainable lifestyles and education; sustainable public procurement; sustainable buildings and construction; and sustainable tourism, including ecotourism. At its second meeting in March 2014 the 10YFP Board approved a new programme area on Sustainable Food Systems". The same report went on to recommend that governments ensure that sustainable consumption is "integrated in the decision making processes, including ... the design ...of ... economic, development and sectoral policies, strategies and plans."

Among the UN Sustainable Development Goals and Targets (see [10] under Q1), Goal 12 is "Ensure sustainable consumption and production patterns". Among the targets for Goal 12 are:

- 12.1 "Implement the 10 Year Framework of Programmes on Sustainable Consumption and Production Patterns ... ***with developed countries taking the lead***" (my emphasis)
- 12.6 "Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle",
- 12.7 "Promote public procurement practices that are sustainable, in accordance with national policies and priorities"

Agrawala and others (see [6] under Q1, at 14.3.4.3) make similar suggestions: "changing lifestyles and consumption patterns (using taxes, subsidies, regulation, information, and other tools) can be an important policy option for reducing the emission-intensity of consumption patterns (Barrett et al., 2013). To the extent that carbon leakage (see Section 5.4.1) contributes to this increasing discrepancy between production and consumption-based emissions, border-tax adjustments or other trade measures (Ismer and Neuhoff, 2007) can be an option in the absence of a global agreement on mitigation." [Box 5.4: "Carbon leakage refers to phenomena whereby the reduction in emissions (relative to a benchmark) are offset by an increase outside the jurisdiction"]

Part 4: Costs, risks and opportunities

Question 11 (Costs, risks and opportunities): How would the costs, risks and economic opportunities associated with cutting emissions change should tighter UK targets be set, especially where these are set at the limits of known technological achievability?
ANSWER:

Question 12 (Avoided climate costs): What evidence is there of differences in climate impacts in the UK from holding the increase in global average temperature to well below 2°C or to 1.5°C?
ANSWER:

Part 5: Devolved Administrations

Question 13 (Devolved Administrations): What differences in circumstances between England, Wales, Scotland and Northern Ireland should be reflected in the Committee's advice on long-term targets for the Devolved Administrations?
ANSWER:

Part 6: CCC Work Plan /.... (on next page)

Part 6: CCC Work Plan

Question 14 (Work plan): The areas of evidence the Committee intend to cover are included in the 'Background' section. Are there any other important aspects that should be covered in the Committee's work plan?

ANSWER:

Fleurbaey and others note (see [4] under Q1, at 4.4.2.4, final para) "Jakob and Marschinski (2012) argue that a more detailed understanding of the underlying determinants of emissions is needed than what is currently provided by either territorial or consumption-based accounts, in order to guide policies that will effectively reduce global emissions in a fragmented climate policy regime. In particular, a better understanding of system interrelationships in a global economy is required in order to be able to attribute how, e. g., policy choices in one region affect global emissions by transmission via world market prices and associated changes in production and consumption patterns in other regions. Furthermore, as market dynamics and resource use are driven by both demand and supply, it is conceivable to rely on climate policies that target the consumption as well as the production side of emissions, as is done in some other policy areas"

Barrett and others make the same point (see [2] under Q1, at section 4): "reducing the emissions embodied in trade is complex and requires an understanding of how each policy affects the different determinants of international emissions transfers. Clearly, the picture is more complex than simply implementing polices to reduce trade, thereby leading to a reduction in emissions. This is clearly illustrated by Jakob and Marschinski (2012), who define four key determinants that explain net emissions transfers: the trade balance, energy intensity of production, carbon intensity of energy, and specialization of countries."

Jakob and Marschinski (see [11] under Q1, final para) conclude "previous research has provided valuable information that constitutes a necessary–albeit not sufficient–basis to guide policy design. ... we have indicated one way in which the currently available data can be used ... However, … the approach proposed by us not necessarily the most fruitful".

If the UK specific analysis of the type suggested by the above authors has not already been done, the Committee should now undertake or commission this analysis.

All my answers above point to the need for the UK to set a combination of emissions targets – both consumption (footprint) based and production (territorial) based. This is not inconsistent with the Committee's 2013 report "Reducing the UK's carbon footprint", which concludes that consumption-based targets should not replace production-based targets. Based on the evidence cited in my answers above, however, the Committee's work plan should include reconsidering its 2013 carbon footprint report and issuing revised recommendations.