Building a zero-carbon economy – Call for Evidence

Background

On 15 October 2018 the governments of the UK, Scotland and Wales asked the Committee on Climate Change (CCC) to provide advice on the UK and Devolved Administrations' long-term targets for greenhouse gas emissions and the UK's transition to a net zero-carbon economy. Specifically: when the UK should reach net zero emissions of carbon dioxide and/or greenhouse gases as a contribution to global ambition under the Paris Agreement; if that target should be set now; the implications for emissions in 2050; how such reductions can be achieved; and the costs and benefits involved in comparison to existing targets.

The advice has been requested by the end of March 2019.

The UK's long-term emissions target is currently for at least an 80% reduction in greenhouse gas emissions from 1990 to 2050. It covers all sectors, including international aviation and shipping and is measured on a 'territorial' basis (i.e. based on emissions arising in the UK). On a comparable basis, emissions in 2017 were estimated to be 38% below 1990 levels.

The current target was set in 2008 based on advice from the Committee. That advice considered that to avoid the worst impacts of climate change, the central expectation of global temperature rise should be limited "to, or close to, 2°C", while the probability of crossing "the extreme danger threshold of 4°C" should be reduced to an extremely low level. That meant global emissions would roughly have to halve by 2050. The 2008 advice made the assumption that the UK should not plan to have a higher level of per capita emissions in 2050 than the global average.

The long-term target guides the setting of carbon budgets (sequential five-year caps on emissions that currently extend to 2032 and require a reduction in emissions of 57% from 1990 to 2030). Both the 2050 target and the carbon budgets guide the setting of policies to cut emissions across the economy (for example as set out most recently in the 2017 Clean Growth Strategy).

Any change to the long-term targets would therefore be expected to have significant implications, not just in the long-term but on current policies to drive the transition.

The CCC will advise based on a thorough consideration of the relevant evidence. We expect that to cover:

- The latest climate science, including as contained in the IPCC Special Report on 1.5°C.
- The terms of the Paris Agreement.
- Global pathways (including those reported by the IPCC) consistent with limiting global average temperature rise in line with the goals of the Paris Agreement.

- International circumstances, including existing plans and commitments to cut emissions in other countries, actions to deliver on those plans and opportunities for going further.
- An updated assessment of the current and potential options for deep emissions reductions in the UK and emissions removals from the atmosphere, including options for going beyond the current 80% target towards net zero.
- An appraisal of the costs, risks and opportunities from setting a tighter long-term target.
- The actions needed in the near term that would be consistent with achieving the long-term targets.

This Call for Evidence will contribute to that advice.

Responding to the Call for Evidence
We encourage responses that are brief and to the point (i.e. a maximum of 400 words per question, plus links to supporting evidence, answering only those questions where you have particular expertise), and may follow up for more detail where appropriate.

You do not need to answer all the questions, please answer only those questions where you have specific expertise and evidence to share. It would be useful if you could use the question and response form below and then e-mail your response to: communications@theccc.gsi.gov.uk using the subject line: 'Zero carbon economy – Call for evidence'. Alternatively, you can complete the question and answer form on the CCC website, available here.

If you would prefer to post your response, please send it to:

The Committee on Climate Change – Call for Evidence
7 Holbein Place
London
SW1W 8NR

The deadline for responses is 12 noon on Friday 7 December 2018.

Confidentiality and data protection
Responses will be published on our website after the response deadline, along with a list of names or organisations that responded to the Call for Evidence.

If you want information that you provide to be treated as confidential (and not automatically published) please say so clearly in writing when you send your response to the consultation. It would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded by us as a confidentiality request.

All information provided in response to this consultation, including personal information, may be subject to publication or disclosure in accordance with the access to information legislation (primarily the Freedom of Information Act 2000, the Data Protection Act 1998 and the Environmental Information Regulations 2004).

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:

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:

Per capita emissions rate represents a valuable tool for assessing both the impact and the evolutions in greenhouse emissions, hence potentially being an appropriate instrument to measure a country's contribution to reach global temperature goals.
Thank to the strict correlation linking per capita emissions levels with countries' Human Development Index (HDI), with higher per capita emissions levels usually corresponding to higher performances in the HDI, the former may be applied not only to evaluate the appropriate climate-based contribution of a country, but also for a more general view on its carbon footprint, as well as for an objective evaluation of equity and justice in defining countries' efforts for tackling with climate change.
Per capita emissions calculation may take into account emissions embodied in imports, as well as exclude export-based emissions (which would require to be reflected on the per capita emissions level of importing partners to safeguard environmental integrity), by this objectively reflecting the real carbon footprint of countries.
The use of per capita emissions as a reference for evaluating countries' performances would release all its potential if adopted beyond a single country scale, hence possibly becoming an effective tool in international cooperation on climate change (see also answer to question 4).
Costs related to a widespread and detailed calculation of per capita emissions could be compensated by the adoption of digital technologies like blockchain. Similar technologies

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would support countries in effectively calculating their carbon registries and stocktake, while possibly interacting with other elements related to a more efficient implementation of mitigation ambitions and pledges worldwide.

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:

An international adoption of a per capita emissions system for distributing mitigation efforts would guarantee equity and justice, whilst setting a stable and quantifiable demand for mitigation, by this favouring a steady growth for carbon markets and other mechanisms facilitating mitigation. To fully unleash its potentials, this adoption should be used for distributing quotas of quantified international mitigation targets, aligned with the Paris Agreement's objectives.
Based on these considerations and on answers to question 3, the UK may promote a per capita international application and aggregate global effort definition. In doing so, the UK may gain a prominent role in the international policy efforts for an effective implementation of a worldwide net-zero target. Moreover, the UK could promote two elements instrumental for setting up the climate finance system (including carbon markets) necessary for the target's achievement, as well as for guaranteeing justice, environmental integrity and equity in the whole system's functioning.
Secondly, the UK may benefit from promoting digitalisation in international climate change governance. The adoption of digital and blockchain technologies for registering emissions, certifying mitigations and/or monitoring report and verification (MRV) would support the UK, as well as and any other country adopting these technologies, in reducing to close-to-zero related transaction costs, while at the same time guaranteeing transparency in each of these processes.
Finally, there is little doubt about the interest that carbon markets may raise in the UK and, more in general, in the international framework on climate change. Whilst not directly representing efforts to mitigate emissions, carbon markets and other mitigation mechanisms could increase the positive impact of proposals like the per capita adoption and the wide digitalisation. Therefore, moved by a general interest towards international markets and finance and the need for defining its own Emissions Trading System in a post-Brexit context, the UK should support efforts for an effective and efficient operationalization of the Article 6 of the Paris Agreement, which represents the framework for carbon markets and mechanisms implementation.

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?

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ANSWER:

An effective global market should stimulate mitigation worldwide, hence including developing countries. In a global carbon market, carbon credits purchase should find its rationale in economic, social, environmental and/or political interests. Given whole freedom in credits purchase as a fundamental principle for a global carbon market, this could be modified within specific domains through policies, strategies and actions taken by stakeholders acting in those domains (i.e.: countries, coalitions and/or sub-national entities may stimulate specific mitigation sectors and/or geographic areas by the adoption of ad hoc economic incentives). In principle, these modifications may address support for developing countries, when agreed by stakeholders.
The UK should adapt its credits purchasing system to its own interests. Accessing to credits coming from developing countries may fulfil part of these interests, such as the adoption of cost-effective mitigation pathways or the establishment/enhancement of alliances with the credits producing countries. Yet, an excess of low prices credits' purchase may have negative effects for the UK by destabilising its domestic sources of mitigation's performance and competitiveness inside the global carbon market.
On the other side, a global carbon market per-se may represent a source of significant interest for developed and fast developing countries, while making least developed and less structured realities lagging behind. For a global carbon market to represent a real benefit for all participants, hence also all developing countries, this should be coupled with additional technical and policy support.
Ideally framed within wider strategic alliances, effective technology transfer promotion would represent a powerful support for developing countries and the UK would significantly benefit from promoting similar initiatives, especially in a post-Brexit context.
Expanding sectors recognised by the global carbon market for the production of tradable carbon credits would also represent a support for developing countries. For instance, a wider inclusion of natural greenhouse gases removals and emissions avoidance would allow for many developing countries that are rich in natural resources to be significantly supported in managing these resources by adopting climate-friendly actions and strategies.
The adoption of per capita emissions to define the distribution of aggregate mitigation targets would also be beneficial for developing countries traditionally registering low or very low per capita emissions levels.
Finally, a wide adoption of digitalisation for MRV, credits certification and emissions registries would support developing countries in extensively increasing their mitigation capabilities and related transparency for their initiatives.

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:

Forestry management as a source for carbon sequestration is far from being fully exploited, both in the UK and at international level.
Forest-based and blue carbon (management of underwater flora) greenhouse gases removal has been virtually excluded from Emissions Trading Schemes, with only few projects in developing and least developed countries producing forest-based carbon credits (throughout the UN-REDD+ system).
Yet, sequestration from forests and natural resources has high potentials in terms of cost-effectiveness for greenhouse gases mitigation. To some extent, these high potentials have caused forestry management exclusion from international carbon markets and other climate finance mechanisms. With still limited mitigation targets pledged by countries, the mitigative power of forestry management, which may lead to the production of significant quantities of cost-effective mitigation, has often been seen as a potential source for carbon pricing distortion.
With a significant increase in mitigation pledges, required for the fulfilment of the Paris Agreement objectives and to reach net-zero targets, countries should fully recognise the benefits of a natural carbon sequestration and include it within the portfolio of recognised mitigation initiatives.
Coupled with its positive effects on biodiversity, a wider engagement of the UK in managing forests and other carbon sequestration natural resources would be beneficial for the country natural environment, whilst supporting related economic and social initiatives.
While still debated as a mitigation resource, artificial carbon capture and sequestration (CCS) may also become a significant tool for countries going for higher ambitions in tackling with climate change. Due to its advanced status in terms of technological innovation in artificial CCS, the UK would greatly benefit from its inclusion between recognised mitigation resources at international level.
Finally, including any form of carbon capture and sequestration within carbon markets and other carbon offsetting mechanisms would provide these ones with virtually unlimited resources for their contribution to global GHG mitigation. For instance, expanding REDD+ implementation to any country of the world, regardless their developed/developing status, would grant countries like the UK with new tools for enhancing their mitigation ambitions.
When applied to carbon sequestration, digital and blockchain technologies (including the use of satellites) would both reduce transaction costs for their Monitoring, Report and Verification (MRV) and allow for an objective evaluation of their effective sequestration performances.

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:

There is no doubt that well-designed media campaigns coupled with the adoption of facilitative policies may trigger behavioural change for stimulating emissions mitigation. Yet, these actions may face timings challenges, by requiring long-term perspectives to fully recognise their impacts. In addition, some of these actions may face further constrains in side effects and indirect costs, as well as by producing rebound effects.
For an ideal effort towards behavioural and decisions change, traditional approaches may find support in strategies meant to increase targeted stakeholders' convenience in changing behaviour and decisions.
Convenience represents a general concept that may be declined both in qualitative and quantitative terms. As for qualitative terms, convenience may have a variety of origins, holding economic social, environmental, political and/or ideological characteristics. Such a variety requires high adaptive capabilities for using convenience in behavioural and decisions change.
Equally challenging is the convenience scale, where this may be applied to any kind of stakeholder, from international institutions to national governments, from firms to environmental movements, from local communities to individuals. Convenience as an instrument to accelerate behavioural and decisions changes again requires high flexibility degrees to effectively impact the largest possible number of actors at different scales.
Carbon markets and mechanism inclusion, digitalisation, capacity building, education, definition of ad hoc sets of incentives/disincentives, represent altogether the mix of instruments that may lead to a widespread and effective change in people's behaviours and decisions.

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 UK should exploit those climate-related advantages coming from the post-Brexit regime. In a post-Brexit context, the UK would enjoy a new status inside the international framework on climate change. With the opportunity to independently express its mitigation ambitions through its own Nationally Determined Contribution (NDC), the UK would obtain freedom to develop its climate strategies. With the UK being able to design its own NDC, this may become the tool for revising and updating the 10-year-old national climate plan and adapting its provisions to the post-Paris international climate change framework.
Moreover, the ongoing Paris Agreement's operationalization process may offer the UK with the opportunity to directly influence its development. As an independent actor at climate change negotiations, the UK may directly address the operationalization of legal elements of the Paris Agreement towards its own interests. For instance, the traditional UK interest for international finance and the need to substitute the European Union Emissions Trading Scheme (EU-ETS) with a UK-based alternative should stimulate the UK to actively participate in the ongoing debate concerning the market and finance mechanisms of the Paris Agreement. In particular, the UK should participate to the ongoing discussion concerning mechanism described by the Paris Agreement's Article 6, widely recognised as the key for governing investments' flows in climate change mitigation and setting up related carbon markets.
A careful management of the newly gained freedom in climate change policy would then

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become a powerful driver for the UK in delivering strategies and actions for meeting a net-zero target over the next three decades.
International cooperation represents a second driver towards a net-zero target. This includes opening to carbon markets linking and/or a global carbon market, as well as bilateral/multilateral agreements in fields like technology transfer, research and innovation, aggregate targets definition, MRV and carbon mechanisms other than markets. While supported and stimulated by private initiatives and/or public sub-national actions, this international cooperation would require significant strategic efforts from the UK national government.
Expanding recognition of sectors for carbon mitigation and including them in future carbon markets and mechanisms would represent another driver facilitating the process towards a net-zero target. In particular, sectors linked to carbon removals (see answer to question 7) should be supported.
Finally, due to its potentials for reducing transaction costs and increasing transparency (see answers to questions 4 and 5), the UK should support digitalisation' adoption inside the international framework on climate change.

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

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?

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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?

Based on the answers provided for questions 3, 4, 5, 7, 9 and 10, the Committee on Climate Change (CCC) cover four main areas of evidence:
1) Post-Brexit context. By focusing on the most significant consequences of Brexit in relationship with the international framework on climate change, the CCC should be able to deliver a clear strategy tor the UK to obtain the highest possible advantages from the newly gained condition. These should include the opportunities related to: (a) the design of an independent Nationally Determined Contribution; (b) the development of a domestic Emissions Trading Scheme; (c) the support to international initiatives for net-zero targets and carbon markets linking; and (d) the establishment of a new international leadership in climate change negotiation.
2) The CCC should initiate a detailed feasibility study concerning the adoption of per capita emissions based systems to design instruments for an equitable, technical and dynamic distribution of aggregate net-zero targets domestically and internationally.
3) Due to the specific UK interests and requirements concerning carbon markets, climate change finance and other mitigation mechanisms, the CCC should significantly increase its work for a direct involvement of the UK in the operationalization of Article 6 of the Paris Agreement, as well as of its immediate implementation.
4) Based on the UK's own natural resources and technological capabilities, the CCC should promote the full inclusion of sectors like greenhouse gases removals and emissions avoidance within the internationally recognised sources for mitigation and net-zero target's achievement.
5) Thanks to the UK's advanced technological development and to the potential benefits (cost-effectiveness and transparency) linked to their adoption, the CCC should undertake initiatives to promote and increase the application of digitalisation and blockchain-based technologies inside the international framework on climate change and for an effective operationalization of the Paris Agreement.