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.

These responses are written by Bev Sedley, Chair, Cambridge Sustainable Food (CSF), on behalf of the CSF Partnership Board. Answers to questions 1,6 and 9 have been given.

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: "14.5% of global climate change gases are due to meat and dairy production (more than all forms of transport" (FAO UN Report *Tackling Climate Change through Livestock* (2013)). This means that any plan to reach net zero emissions must include measures to reduce meat and dairy consumption. The Special Report on 1.5 C emphasizes lack of evidence on effective policy interventions to tackle consumption but there is a growing body of evidence and research that is starting to fill this gap (see answers to questions 6 and 9 for references).

Professor Andrew Balmford (question 6), says (personal email) "A key point here is that the CCC is talking about 2050, not tomorrow. 30y ago it was…unlikely that smoking rates would have fallen to current-day levels … things change, and substantially lowered levels of meat eating are certainly possible. 3y ago we did an analysis of how UK agriculture might lower its overall emissions by 80%, 1990-2050, in line with its commitments under the Climate Change Act. The Royal Society has already concluded that in terms of efficiency savings to on-farm activities (more efficient tractors, smarter use of fertilisers etc) this is completely impossible. We instead examined the scope for higher-yielding production systems…to both reduce the emissions-intensity of production and free up land for carbon-sequestering habitat restoration. We concluded aggressive pursuit of yield increases could…meet the 80% target, just; and that **meeting about half of the yield growth potential combined with a ~30% cut in meat consumption could do the same**. Again, neither is immediately deliverable, but certainly possible within the next 30y."

There is a win-win aspect to measures to reduce people's meat and dairy consumption – in most ways meat reduction and an accompanying increase in plant-based foods improve health as well as reducing GHGs and public health measures. This provides an incentive for policy-makers to act: "Taxes and subsidies are demonstrably effective at driving diet change." ("Regulating the purchase of meat in public procurement" (full reference in question 6))

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?

The climate of opinion is changing in the UK. The number of vegans has increased fourfold in the last 10 years and many more people identify as 'flexitarians', eating meat and dairy much less often than previously. Supermarkets are selling more vegan food. If this trend continues, there will soon be much more public willingness to embrace dietary change.

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:

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:

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: Chapter 3.6 of The Centre for Alternative Technology's *Zero Carbon Britain: Rethinking the Future* (Paul Allen et al (2013) includes a net-zero scenario for UK land use, in which land use changes will provide food, energy resources and carbon capture. A reduction in agricultural emissions to 17MtCO2e per year is brought about "via a combination of dietary change, waste reduction, elimination of land conversion for agricultural purposes and improved land management practices. There is much less protein in the diet from meat and dairy sources, and more from plant sources (beans, legumes, cereals and veg). This results in a healthier and more balanced average diet for the population."

Andrew Balmford et al, Cambridge University: "Reducing meat consumption seems to offer greater mitigation potential than reducing food waste. Coupling even moderate yield growth with land sparing and reduction in meat consumption has the technical potential to surpass an 80% reduction in net emissions." (*The potential for landsparing to offset greenhouse gas emissions fro agriculture*, in Nature Climate Change, 4 Jan 2016). Footnote 17 references evidence that "taxes and subsidies… are demonstrably effective at driving diet change. A recent systematic review of 38 studies found that taxes (on unhealthy foods) and subsidies (on healthy foods) are consistently effective at changing consumption patterns." (Supplementary information includes technical information and comprehensive references.)

He also says that "meat consumption could in principle be reduced through direct regulation, for example … by regulating the purchase of meat in public procurement." (Nordgren, A. Ethical Issues in Mitigation of Climate Change: The Option of Reduced Meat Production and Consumption. J. Agric. Environ. Ethics 25,563–584 (2012). This is a route that Portugal has already taken: all schools, universities, hospitals, prisons and other public buildings must now serve at least one vegan option.

An FCRN report concludes that research shows that leaving things to individuals or industry doesn't work by itself; government needs to set a strong regulatory and fiscal framework. (Garnett T, et al (2015) *Policies and activities to shift eating patterns: What works?"*, review of evidence of effectiveness of intervention aimed at shifting diets in more healthy and sustainable directions. Food Climate Research Network, University of Oxford Research Network.)

The success of Hodmedod's, which sells UK-grown peas, beans, lentils and grains, often having persuaded farmers to switch, indicates the increasing appetite for non-

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animal-based protein sources. They won Best Food Producer Award, BBC Food, Farming Awards 2017.

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: Emma Garnett, Cambridge University PhD student, is investigating choice architecture ('nudge' methods) in university and college canteens as a means of increasing pro-environmental behaviour. Her work is still unpublished, but a presentation of early results shows:

• doubling vegan/vegetarian options leads to 15-23% increase in sales

• the least vegetarian quartile responds most strongly to vegetarian availability (ie meat eaters willingly increase their consumption of vegan/vegetarian food)

She concludes caterers are key policy makers for sustainable diets and create demand for vegan meals. They can create big shifts in diet without education campaigns or information provision. A summary of Emma's research findings can be found in the university's entry for Solution Search for "Climate Change Needs Behaviour Change", which also includes the University of Cambridge's recently introduced Sustainable Food Policy, promoting meat reduction, in particular ruminant meat (the highest GHG-emitter). This entry is listed as a finalist. No ruminant meat is now served in the Graduate Centre and other outlets and more vegan options are routinely offered. In November 2018 the Colleges Catering Managers Committee agreed a similar Sustainable Food Policy and are rewriting their group procurement criteria for suppliers to reflect this. The University has

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demonstrated significant GHG emission savings from its policy change. The University Dept of Environment and Energy actively engages students in sustainable food issues.

Although, according to the Vegan Society, strict vegans form only 1% of the country's population, number have increased fourfold in the last 10 years; there is anecdotal evidence that a much larger number of people are reducing their meat consumption on both health and environmental grounds. Research done for Comparethemarket found that 7% of respondents identified as vegan, 14% vegetarian, 31% as eating less meat. Major supermarkets are reporting increased sales of vegan food.

Plant-based eating is becoming increasingly popular, particularly among young people. When Cambridge Sustainable Food first started working with college catering managers five years ago, vegan meals were spoken of as 'special diets': vegans often had to register with their college and tell the kitchen when they were 'eating in' (a much-resented practice!). Now most colleges routinely offer plant-based dishes and non-vegans often choose vegan options. Vegan training for chefs is popular. At public stalls 5 years ago even well-informed people had very little understanding of the role played by meat-eating in climate change. Now there is much more awareness; many people tell us they have reduced their meat 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:

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?
ANSWER: