Committee on Climate Change

Independent advice to government on building a low-carbon economy and preparing for climate change

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:

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:

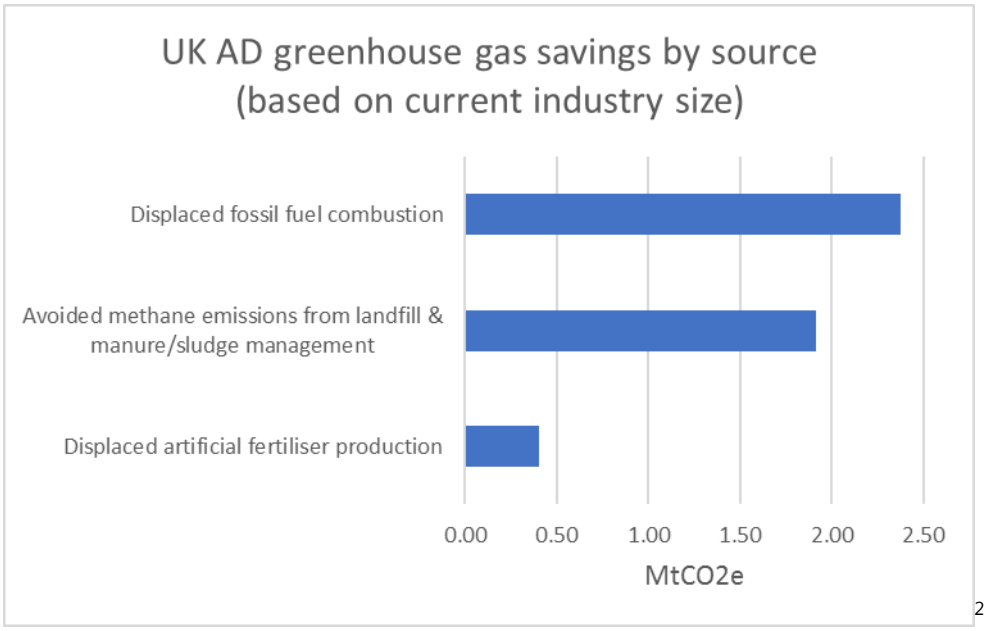
Question 5 (Carbon credits): Is an effective global market in carbon credits likely to develop that can support action in developing countries? Subject to these developments, should credit purchase be required/expected/allowed in the UK's long-term targets?
ANSWER:

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:
In the difficult to decarbonise **agricultural sector**, AD offers the only means of tackling emissions from manure management, which constitutes 1% of total UK greenhouse gas emissions. With just 2.3 million tonnes of indoor and collectable farm waste currently going to AD out of a potential 90 million tonnes the technology has far greater ambitions that would support agricultural climate change mitigation efforts[1].

As well as providing renewable energy to power farms and help decarbonise the agricultural sector, AD also delivers climate change mitigation by reducing emissions from rotting manure, farm wastes and slurries, and by replacing petrochemical derived artificial fertilisers, abating significant amounts of carbon. In addition to the emissions savings that can be achieved through manure management, on-farm AD displaces fossil fuel combustion and artificial fertiliser production. ADBA has quantified the current savings achieved by the AD industry, summarised below:



[2]

With the right policy support in relation to farming the AD industry can achieve emission savings from diverting manures to AD of 11.75 $MtCO_2e$[3]. This is 25% of the 46.5 MtCO2e sectoral emissions, a huge contribution from any one industry.

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[1] http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=14500

[2] ADBA analysis, Defra and BEIS data.

[3] If emissions from energy generation are taken into account, the contribution of the AD industry could reach 22.8 $MtCO_2e$.

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?

A growing AD industry would help deliver several of the milestones set out by the CCC in the 2018 Progress Report to Parliament. Namely:

- Linking financial support in a post-CAP framework to agricultural emissions reduction; and,
- Replacing the voluntary industry-led framework for reducing agricultural emissions with a stronger framework to deliver GHG abatement.

Biogas also has an important role to play in decarbonising the **aviation sector**. ADBA member Renovare Fuels for example, has been awarded support by Innovate UK for aviation fuel testing through the Sustainable Aviation Fuel (SAF) for Clean Growth programme. The company has developed a technology that converts waste into a biofuel that could replace traditional fossil fuels.

On emissions, Dr Kris Anderson, project manager at Renovare Fuels says, "we have created a fuel that is able to achieve a greenhouse gas reduction of 96.8 per cent and is practically identical to conventional fossil fuels with regard to its physical and chemical properties. This allows it to be used in engines without requiring design modifications and means it does not require blending with unsustainable fuels."[4]

On-site AD is also heling to decarbonise **industry**, and can reduce emissions to close to zero whilst also providing a waste management solution. For example, the Diageo distillery at Dailuaine use Clearfleau's AD technology to manage distillery co-products. This bio-energy plant is:

- Generating over 2 million m3 of biogas
- Delivering 8,000 MW hours of thermal energy
- Turning 1,000m3 of co-products into 1MW per hour
- Saving over 1,000 tonnes of carbon each year
- Cutting over 15 truck journeys daily, with a new pipeline supplying the AD plant.[5]

Another example of the role on-site AD can have in decarbonising industry is the Clearfleau AD plant Nestlé installed at Fawdon, Newcastle. The plant processes over 200,000 litres of wash-waters per day and 1,200 tonnes of residual products per year, to supply renewable energy to the site. This resulted in:

- 8% of power requirement supplied from biogas
- 10% reduction in site's overall carbon footprint
- £300,000 in incentive revenue / energy savings
- £200,000 savings on disposal and discharge costs
- Nestlé recognised in Dow Jones Sustainability Index's as industry leader.[6]

[4] http://www.renovare-fuels.co.uk/2018/11/07/member-press-release-biofuel-gets-go-ahead-for-testing/

[5] https://clearfleau.com/portfolio/diageo-glendullan-distillery-bio-energy-plant/

[6] https://clearfleau.com/portfolio/nestle-fawdon-factory-ad-plant/

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?

Finally, though it is not specified in the question, **heat** remains a sector with a significant decarbonisation challenge. As the CCC has recognised in numerous reports over the last few years, AD has an important role to play and further support for biomethane is a low-regret choice that government should take.

Biogas and biomethane plants already abate 4.73 $MTCO_2e$ per year. Having been supported by the Renewable Heat Incentive (RHI), nearly 1% of UK gas used for heating is now from biomethane.

Yet there is huge potential for growth, spurred on with the biomethane industry providing improved value-for-money for government with tariffs paid by under the RHI haven fallen by over 25% in the last five years. According to ADBA analysis, if the RHI was extended for another five years, biomethane would achieve carbon abatement to decarbonise building heating of 51 $MtCO_2e$ over 25 years (2020-2045), 2.04 $MTCO_2e$ per year.

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:

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?

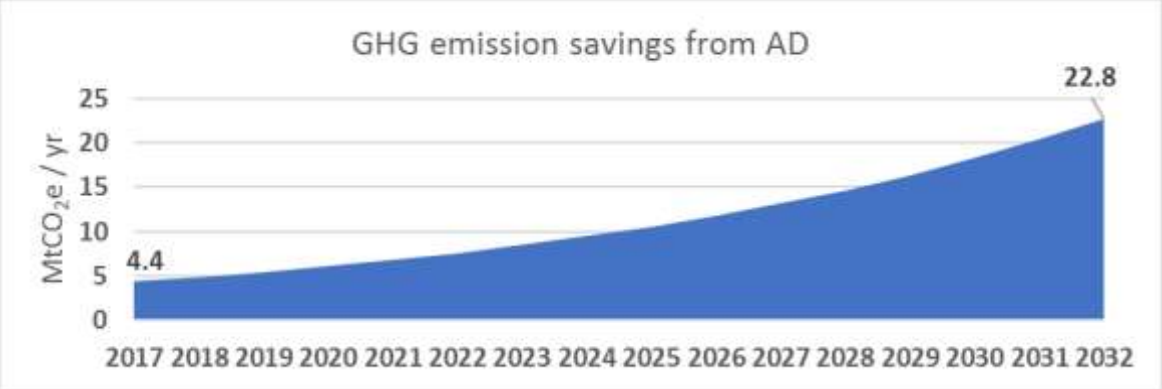
ANSWER:
As the CCC have identified, the UK has a 'policy gap' of 10 MT CO_2e to our existing obligations pursuant to the Climate Change Act 2008 and the 80% reduction in carbon emissions by 2050, relative to 1990 levels.

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?

If government does seek to go beyond this target and adopt a net-zero target far more policy measures will be required, much of it urgently. AD should be a part of this policy as it enables emissions reductions in multiple, often hard to decarbonise sectors:

- Reducing food waste and maximising the value it has a resource. ADBA estimates that the introduction of separate food waste collections would achieve a carbon saving of between 1-1.5 $MtCO_2e$ per year.
- Agricultural wastes. As detailed above in our response to question 6, we estimate that just 2.3 million tonnes of indoor and collectable farm waste currently go to AD out of a potential 90 million tonnes. If all were treated through AD, 11.75 $MtCO_2e$ could be abated per year (comprising displaced fossil fuel combustion and avoided methane emissions from manure management).

With the right policy support both in relation to farming and energy generation we believe sustainable growth of the AD industry could potentially deliver emissions savings of 22.8 $MtCO_2e$ for the Climate Change Act's fifth carbon budget.



[7]

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

[7] Our figures include AD greenhouse gas saving by sources: electricity generation (displaced fossil fuels), biomethane generation (displaced fossil fuels), farm waste non-energy, food waste non-energy, sewage non-energy.

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: We believe that the work plan should include a consideration of the costs of mitigation efforts now and in the future; as per the Stern Review which established the new economic paradigm for climate change mitigation that, "the benefits of strong and early action far outweigh the economic costs of not acting."[8] Such a focus would complement the findings in the CCC's most recent Progress Report to Parliament that noted how since 1990 UK emissions have fallen 43% while the economy has grown over 70%.

[8] http://mudancasclimaticas.cptec.inpe.br/~rmclima/pdfs/destaques/sternreview_report_complete.pdf vi.