

Title: CCC zero-carbon economy

Date: 7th December 2018

Ref:

Circulation: communications@theccc.gsi.gov.uk

Contact: Dr Jonathan Scurlock, Chief Adviser, Renewable Energy and Climate Change

Tel:

Deadline: 1200 on 7th December 2018

Email:

Committee on Climate Change call for evidence: building a zero-carbon economy

The National Farmers' Union of England and Wales (NFU) believes that, given the long-term impact of climate change on our sector, farmers and growers are willing to play our part in a zero-carbon economy. We are committed to reducing agricultural and land-based emissions, and we have a special role in creating 'negative emissions' since most of these pathways begin with the plants that we grow capturing carbon from the air.

The NFU represents 55,000 members in England and Wales, involved in 46,000 farming businesses. In addition, we have 55,000 countryside members with an interest in farming and the countryside.

The NFU is the largest farming organisation in the UK, providing a strong and respected voice for the industry and employing hundreds of staff to support the needs of NFU members locally, nationally and internationally. We are engaged with government departments covering agriculture, rural affairs, environment, energy, climate change, employment, infrastructure and transport issues, directing policy into real economic opportunities for rural diversification and job creation. The NFU champions British agriculture and horticulture, to campaign for a stable and sustainable future for our farmers and growers.

With 75 per cent of national land area in the agricultural sector, NFU members have a significant interest in land-based renewable energy production, where they can benefit directly as energy producers themselves or as hosts for energy plant developed by others. Our own market research, as well as that of other organisations, suggests that nearly two-fifths of farmers and growers have already invested in some form of renewable energy production for self-supply or export to other users. We estimate that farmers own or host about 70% of Britain's solar power capacity, over half of AD capacity and the majority of wind power, while playing a significant role in the supply or fuelling of renewable heat.

The NFU believes that domestic land-based renewable energy will be delivering about a quarter of UK clean energy needs by the early 2020s, faster and cheaper than many other low-carbon energy options. This message is consistent with our vision for farming delivering a wide variety of goods and services to the UK economy, centred upon but not limited to food production. We are especially supportive of farmer-owned small and medium scale renewables projects, particularly schemes which deliver multiple benefits from the land or which help farmers to achieve local environmental objectives (e.g. resource protection, biodiversity).

General comments

Farmers and growers in the UK are already starting to see the impact of climate change upon our sector, and the past year's extreme weather events have served to remind us how vulnerable farming is to a changing climate.

The NFU has engaged with staff and members of the Committee on Climate change (CCC) since 2008, on the evidence base for reducing agricultural and land-based emissions (mostly through increased productivity and improved management), on how farmers and growers can contribute to the decarbonisation of other parts of the economy, on the CCC's 2011 and 2018 bioenergy reviews, and on land use and potential greenhouse gas removals.

Greenhouse gas emissions from UK agricultural production have decreased 16% since 1990, and now comprise about 10% of the UK total – mostly methane (5.7%) and nitrous oxide (3.2%). Soil and woodland carbon storage (a small C sink) is counted separately from agricultural production, as is the contribution of land-based renewable energy to national needs. Implementing measures to increase the productive efficiency of livestock management and crop nitrogen management, and to make improvements to soil health (i.e. enhanced soil carbon storage) will help to further reduce GHG emissions from agriculture and horticulture, but there are no 'silver bullets' to deliver a net-zero-emissions farming system.

British farmers and growers are already helping to decarbonise other parts of the UK economy by installing or hosting renewable energy projects, and by supplying bioenergy feedstocks – and we expect these opportunities for clean energy supply to increase further in the future. Agriculture is therefore already offsetting some of its intractable GHG emissions, achieving a partial balance between emissions produced and emissions avoided. New opportunities for 'negative emissions' (i.e. greenhouse gas removals) include bioenergy with carbon capture and utilisation, carbon storage in soils and trees, and greater use of bio-based products and materials – all of which are likely to present additional income opportunities for agriculture.

The recent report by the Intergovernmental Panel on Climate Change emphasises the need for a joined-up approach to minimising the global temperature rise to 1.5C. British farmers are committed to playing their part in minimising climate change, by striving to achieve net zero emissions, reducing agricultural emissions and initiating negative emissions. A joined-up approach to building a zero-carbon economy is absolutely essential, and will need to involve farmers and landowners in formulating new policy, working with them to make it happen. We will take responsibility for our part in a global move to net zero, but this must not be at the expense of producing food for the nation.

For example, if Government promotion of healthy eating leads to a shift in consumer preferences towards sources of dietary protein with a lower carbon footprint (e.g. from red meat towards white meat and plant-based protein) then farmers will follow market trends over time. However, the NFU does not support a deliberate reduction in livestock numbers as a policy aim. This would risk losing many of the environmental benefits of grass-fed beef and sheep production, and may erode the UK's strategic capacity to transfer improved livestock management techniques and technology to farmers overseas.

The NFU particularly endorses tailored livestock productivity measures that build upon our already strong standards of production and high welfare standards, transferring best practice to make the sector more market focussed, profitable, resource-efficient and delivering across a range of environmental benefits, including a reduced GHG footprint. We are aware of promising research being undertaken to better understand the genetics of low-methane emitting animals.

We welcome new practical and profitable diversification opportunities for farmers in enhancing carbon stores on farm, producing bio-based substitute materials for buildings and industry, and coupling bio-energy to carbon capture and storage. However, future farming policy must enable farmers to meet the food production needs of the nation alongside our wider environmental goals.

The voice of British farming

Although every effort has been made to ensure accuracy, neither the NFU nor the author can accept liability for errors and or omissions. © NFU



Detailed response to selected consultation questions

Climate Science

Question 2 (CO₂ 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?

The NFU is aware of [recent work by Prof. Myles Allen and colleagues](#) at Oxford University which makes a distinction between ‘short-lived climate pollutants’ (SLCPs) such as methane, which turns over relatively rapidly in the atmosphere, and long-lived greenhouse gases such as CO₂ and N₂O. We understand that while this does not reduce the imperative to manage ruminant methane emissions, it amplifies the impact on global warming potential of making progressive improvements to livestock productivity. Thus a steadily declining rate of emission of an SLCP becomes equivalent to a negative sustained rate of emission of CO₂. This raises the hopeful prospect that sustained innovation in livestock production may be compatible with a future zero-carbon economy. We would welcome the critical input of the CCC towards such differential treatment of SLCPs and longer-lived greenhouse gases.

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?

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?

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?

We believe it is right for the UK to show international leadership in setting an ambitious and stretching timeline for building a zero-carbon economy (see also Q14 below). Consistent with previous advice presented to government by the CCC themselves, the NFU agrees that Britain should continue to aim to meet its climate obligations on a ‘territorial’ basis (i.e. based solely on emissions arising in the UK and GHG removals attributable to the UK). However, we understand that some initiatives for greenhouse gas removal may require international trading of materials and national allocation methodologies which are yet to be developed and agreed (see also Q7).

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?

In previous years, the NFU led extensive agricultural industry discussions with Government which established realistic goals for reducing agricultural GHG emissions towards a minimum future level, through a wide range of technologies and changes to farm practice, leading to improved management systems and increased productivity. However, there will still be a limit beyond which it may not be biologically possible to make further reductions. Within the constraints of our farming systems and practices, the NFU does not believe that agriculture could get close to net zero emissions. Agricultural GHG emissions are very different from other sectors of the economy (such as electricity generation, transport, manufacturing, etc.) since they depend upon biological processes, human nature (changing farm practice at scale and speed), a changing climate and the limitations of measurement. There are also well-understood risks that any measures that reduce our competitiveness as food producers would merely export the GHG emissions associated with meeting UK food needs, and potentially even increase emissions at a global level (see also Q9). The NFU nevertheless remains open to future technological breakthroughs or innovative production systems that might enable further reductions in agricultural emissions in the longer term.

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?

The NFU has participated in previous discussions and preparation of reports on the potential of greenhouse gas removals (GGR) organised by [the CCC](#), [the Royal Society](#), and others. We agree with the Royal Society's conclusions that around 130 Mt CO₂ per annum of GGR, involving the deployment of a portfolio of methods as well as the importing of biomass feedstock, would be required to offset the UK's residual emissions, including those from agriculture. Recognising such a cross-sectoral approach to our national GHG inventory, we note that an increased supply of domestic agricultural feedstocks (as well as forest biomass) will be needed to fuel a growing bio-based economy, including potentially a large fleet of AD biomethane plants and new processes such as synthetic gas from biomass.

Both large-scale and small-scale deployment of BECCS or BECCUS (Bio-Energy with Carbon Capture, Utilisation and Storage) is likely to be required, such as [adaptation of an AD biomethane plant to convert biogenic CO₂ into extra methane](#) using renewable hydrogen and catalysing the Sabatier reaction. Another example would entail converting into methane the relatively concentrated CO₂ waste stream from ethanolic fermentation of biofuel. We note that bio-ethanol production has already been coupled to CCS at the Archer Daniels Midland facility in Decatur, Illinois, capturing 1.1 million tonnes of CO₂ per year.

In order to have the readiness to deploy BECCUS in the future, as well as to have a domestic source of important by-product animal feed, the NFU believes it is necessary to support the existing biofuels industry. The current level of demand needs to be lifted, both in the short term and in the decade 2020-2030, to enable further investment in both crop-based and 'advanced' biofuels. At present, the main barrier to deployment of advanced biofuels seems to be uncertainty around Government policy-making.

We also support the potential for agricultural residues such as cereal straw to be used to produce cellulosic ethanol, and for so-called '3rd generation' synthetic renewable fuels (electro-fuels / ReFinBOs) to be made using low-cost surplus renewable electricity combined with previously captured biogenic carbon, potentially as a route to low-carbon aviation fuel. We anticipate that bio-ethanol (and its derivative ethylene) as well as methane, both bio-based and synthetic, are likely to be important platform chemicals for fuels and other products in the future bioeconomy.

Lastly, alongside increased use of wood in construction, the NFU believes there are significant opportunities for agricultural feedstocks (fibre crops, straw) among the prospects for engineered or chemically-modified bio-based structural materials which have long lifetimes and low carbon losses in production. These include acetylated wood, gluelam, cross-laminated timber, hemp-lime biocomposites, and other bio-based panel products and insulation products, many of which have struggled over the past decade to break into the traditionally very conservative construction sector.

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?

As already described above, if Government promotion of healthy eating leads to a shift in consumer preferences towards sources of dietary protein with a lower carbon footprint (e.g. from red meat towards white meat and plant-based protein) then farmers will follow market trends over time. However, the NFU does not support a deliberate reduction in livestock numbers as a policy aim. Our upland farmers may choose instead to produce for export. Directly targeting upland grazing would risk losing many of the environmental benefits of grass-fed beef and sheep production. It would erode the UK's strategic capacity to transfer improved livestock management techniques and technology to farmers overseas, in support of a sustained global effort to tackle climate change. [According to FAO data](#), the average GHG footprint of beef produced in Western Europe is 1.5x smaller than the global average and 2.5x less than beef produced in South Asia¹.

[26 November 2019: The NFU has requested a revision to their earlier published figures, based upon more detailed examination of the original statistics. According to the UN FAO GLEAM model (FAO, 2013), the average GHG footprint of beef produced in Western Europe is 2.5x smaller than the global average and 4x less than beef produced in South Asia.]

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?

The NFU understands that the existing 4th and 5th Carbon Budgets will need to be tightened if decarbonisation of the UK economy is to progress faster and further, consistent with a trajectory towards net zero around 2045 to 2050.

Costs, risks and opportunities

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?

Based upon our reading of the IPCC Special Report on global warming of 1.5°C, and the most recent UKCP18 climate projections, the NFU is convinced of the need to move to net zero emissions as soon as possible, since the impact of 2°C is substantially worse than 1.5°C and British farmers and growers are already beginning to experience the effects of extreme weather events. UKCP18 shows that climate change made last summer's European heatwave substantially more likely, and a cold winter followed by a summer drought has impacted UK production of crops and animal forage.

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?

The CCC should also take into account the recent European Commission draft strategy for a climate neutral Europe by 2050. The UK has shown a degree of leadership on climate change action over the past decade or more, and it will need to set an ambitious and stretching zero-carbon goal to maintain this record - perhaps setting an aspiration to attain this by 2045, and by 2050 at the latest.

¹ FAO (2013) Tackling climate change through livestock: a global assessment of emissions and mitigation opportunities. Food and Agriculture Organization of the United Nations, Rome. 116pp.