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 UNEP Emissions Gap report, published 28/11
UK Climate Projections 2018, published 26/11
ETC Report 'Mission Possible' , published 19/11

Friends of the Earth has also published a pathway to net zero by 2045. WWF commissioned Vivid Economics to map a pathway as well, which also illustrates the feasibility of the UK achieving net zero by 2045.

It is clear that from the IPCC Special Report on 1.5ºC the scale of impacts resulting from 2 degrees of warming is significantly higher than from 1.5ºC (including a greater risk of crossing thresholds of some tipping points). The impacts from 1.5ºC of warming are already very significant to both humans and nature.

In considering the possible pathways to net zero the Committee will need to identify and consider the likely different impacts on humans and nature between the pathways (if other countries were to adopt pathways consistent with the UK's).

Friends of the Earth's research, and the research published by WWF, suggests net zero is technically possible by 2045 at the latest. Both organisations advocate net zero by 2045.

If the Committee suggest a later date for net zero, we and others will be looking to see if this is for technical reasons (i.e. the Committee does not think net zero before 2050 is technically possible) or for other reasons. If the Committee recommends a later date for net zero for economic reasons we will be keen to understand the moral and ethical choices behind this choice.

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:

A net zero target date for all greenhouse gases should be set.

The Committee should also identify, even if only at a headline level, the trajectory for the years and decades following the achievement of net zero. It is clear that to bring temperatures back to 1.5 degrees after a likely over-shoot will require countries, especially developed/wealthy countries, to have net negative emissions during the second-half of the century (potentially significantly so). This needs to be acknowledged as it will influence the choices made to achieve net zero.

The pathway to achieving net zero GHGs will need to consider the most cost-effective route to do so but also be cognisant of other sustainability concerns (i.e. cost cannot be the only factor in determining which pathway to follow). While the pathway may indicate different dates for net zero CO2 and net zero for non-CO2-GHGs these are better left as indicative only and effort focused on achieving net zero GHG. In addition, more than one target will lead to confusion whereas experience suggests that the clarity of the CC Act 2050 target has helped the many actors involved in delivering it orientate towards it.

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:

Friends of the Earth has long argued that an ethical approach to effort sharing needs to recognise our historical contribution to climate change and our capability as a country. From the 5 equity approaches identified by the IPCC the Constant Emission Ratio is not tenable in our view (the UK maintains a disproportionately large share of the global budget). We argue the Equal Per Capita approach also fails to recognise our capability and historical responsibility. The Capability approach also fails to recognise historical responsibility. We recommend the CCC first use the IPCC equity approaches to identify what the UK's fair share of the global carbon budget is and only then begin mapping how it might be achieved.

Friends of the Earth welcomes the progress made towards meeting the first few carbon budgets but it needs to be recognised this does not accurately capture the GHGs that result from the UK's activities, including its consumption. For example, the likely substantial GHG footprint from the UK's consumption of those bio-materials which are leading to deforestation (for example, soya, palm oil, etc.) is not properly accounted for, nor are emissions from imported food, in particular livestock products.

While the CC Act is primarily concerned with territorial emissions - and logic therefore suggests this is what the net zero target should be concerned with – the CCC's pathways

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?

for achieving the target should be cognisant of these non-territorial emissions and report on the likely consequences. A pathway which reduces the UK's territorial emissions but increases its non-territorial emissions should not be provided. Ideally a pathway is provided that delivers on net zero domestically and substantially reduces our non-territorial emissions significantly. DEFRA's research (and ongoing work by Prof John Barrett at Leeds University, http://www.emissions.leeds.ac.uk/) in this area will clearly be of importance.

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:

The GDR equity approach (1 of the 5 identified by the IPCC) attempts to identify what the UK's financial contribution to developing countries should be, taking into account the UK's historical contribution to climate change and a strong equity approach. Regardless of the approach chosen, the need for wealthier countries to support poorer countries to leapfrog a dirty development pathway is well recognised (including through the UNFCCC process). Climate finance from developed countries to developing countries already falls woefully short of agreed levels and needs to be both substantially increased and better targeted.

In addition, developing countries are also hindered in their ability to fund this transition, in part because as a new Imperial College report shows they face higher costs of capital because of their vulnerability to climate change. This reinforces the need for much greater contributions to the Global Climate Fund.

Development of low-carbon technologies and driving their costs down is also an important contribution that can be made to global efforts. The UK particularly has the potential in the field of offshore wind to drive down costs further, but also areas such as electrolysis for the production of hydrogen. The ETC report (cited in Q1) identifies the need and potential to drive down costs in this area. This aspect needs to be considered in developing UK pathways (i.e. the chosen pathway that has more of technology Z because development of the technology aids the global pathway, even if it isn't the cheapest pathway).

The UK also has the potential to act as a role model in action on climate change given its strong relationships with countries across the globe through the Commonwealth and the significant economic and political power it wields globally. The setting on a legally-binding net zero goal at 2045 would be noted and influential in capitals across the globe. But also would action in areas such as sustainable lifestyles, for example through actions to promote healthy, sustainable and low carbon diets.

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:

The Committee's own 2008 report said that the use of offsets from outside of the EU should be limited. During the passage of the Climate Change Bill through parliament Friends of the Earth and others argued against the use of offsets (except from within the EU ETS). Our reasoning was that the UK needed to make deep structural changes to its economy in order to deliver on all the carbon budgets up to 2050, and the use of offsets in the near term would hinder the progress towards later budgets. Our position has not changed. The CCC's reports make clear most sectors across the UK have yet to transition to low carbon (e.g. transport, heating). Offsetting will hinder this transition not aid it.

In addition, in practice offsetting simply does not work. A recent report for the European Commission found that "Only 2% of the [Clean Development Mechanism] projects ….. have a high likelihood of ensuring that emission reductions are additional and are not over-estimated".

The EU ETS has also suffered from many years of over-supply which has suppressed its effectiveness. There is no reason why carbon trading in other jurisdictions will be less problematic. Linking trading schemes across jurisdictions are likely to fraught with difficulties.

In other words, the UK should not rely on offsetting for any of its emissions, including for the international aviation sector. Offsetting does not work. It is rarely additional to what is already planned or committed to, e.g. through Nationally Determined Contributions, and it hinders the structural changes are needed for future carbon budgets.

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:

The ETC report (cited in Q1) provides a useful analysis of some of these sectors, which undoubtedly you will be studying closely. This illustrates greater progress is possible in hard to treat sectors. Among the many approaches the ETC identified was an important role for hydrogen, and they stated that electrolysis will need to be the predominate route for hydrogen production. We were disappointed to see that the recent CCC report on hydrogen poured cold water on electrolysis and instead backed hydrogen from natural gas as the route forwards as a cheaper route, despite the emissions from this approach and, in our view, its incompatibility with net zero. The economics of hydrogen from natural gas look very different when a carbon price set at a level necessary for net zero is used, or if

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?

the full costs of the harm of GHG emissions are included (the social cost of carbon). We urge the CCC to revisit its views on the production of hydrogen, particularly paying attention to the ETC report and using net-zero compatible estimates of carbon price, and recognising the importance of electrolysis for global decarbonisation.

Hydrogen will not support the decarbonisation of aviation, and while some welcome technological developments will improve efficiency these will be nowhere fast enough nor deep enough to compensate for the growth in this sector. Much more demand management will be needed, including capacity constraints at UK airports. As stated earlier, offsets must not be used as a 'get out of jail free' card for this sector.

Agriculture will be another sector where demand management is necessary, even though changes in farming practices can reduce emissions (for example through enhancing soil carbon). Meat consumption to healthy diet levels is both necessary and desirable, obviously while hand in hand with reductions in overall levels of production and improvements in production systems. While such a shift to healthy diets will take time it is necessary for the government and others to work with the health sector and behavioural experts to actively facilitate such a change. The benefits to the NHS from this shift also needs recognising and sharing, for example, research for Friends of the Earth found that shifting to lower meat diets could save the NHS 1.2bn and reduce early deaths by 45,000 a year.

There is a huge amount of work ongoing in this area, particularly by organisations involved in Eating Better, the sustainable diets alliance, including policy recommendations, practical behaviour change approaches and work with food businesses to create a more enabling food environment. See for example policy recommendations from Eating Better and the UK Health Forum.

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:

The Royal Society report on Greenhouse Gas Removal provides some estimates of what is possible in this area. Research for Friends of the Earth (yet to be published, and submitted with this response) suggests greater levels may be possible, particularly through greater quantities of Direct Air Capture. Friends of the Earth also believes that the afforestation estimates made by the Royal Society, and by the CCC in your recent land use report (of increasing UK forest cover from 13% to 19%), are on the low side, and that instead we should be aiming for a doubling of UK forest cover (to 26%). The Royal Society's figures, in particular, appear to make only minimal allowance for the freeing up of land through dietary changes.

The Royal Society report should give confidence that the UK could commit to net zero by 2045 or earlier (if the CCC pursue its 'max scenario' which it completed for the 5th carbon

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?

budget, and updates this in line with technological developments in electric vehicles and other technological developments outlined by the ETC).

But it is important to stress that these removals must not be used to reduce the pressure on reducing GHG emissions as far as possible. The scale of the challenge to deliver on the aspirations in the Paris Agreement will require large quantities of net negative emissions in the second-half of the century.

In addition, the cost of securing these negative emissions requires not insignificant funding and a determined joined-up strategy. This will require a new joined-up strategy and approach from government.

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:

Please see our answer to Q4 – the UK can take a lead in particular areas. Targeted support for offshore wind is making a significant reduction to costs which will bring benefits globally. Further support is needed here and on newer technologies such as electrolysis. These technologies will not only help in the global effort on emissions reductions but could also help the UK develop new export opportunities, but it requires rapid and sustained support. The recent activity of chopping and changing support for renewables does not help.

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:

Friends of the Earth is not an expert on behaviour change, although we promote it alongside our policy campaigning. However it is clear that behaviour change is necessary and possible (e.g. the UK's experience of reducing smoking rates) if there is sustained effort to promote it.

However, public promotion of behaviour change can be swamped by private sector activity. For example according to obesity charities the government spent £5.2 million on its 'change4life' food campaign yet the junk food industry spent £143 million on advertising in the same year.

It is critical that there is a sustained effort of behaviour change – from diets to recycling – but it is important that this is accompanied by policies and regulations to further drive and

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?

support change and prevent these efforts being undermined by vested interests. The supportive framework on smoking regulation illustrates how public awareness and regulatory controls can go hand in hand.

It is disappointing, particularly in the area of sustainable diets, that the Government is keen to be seen as not acting like a 'nanny state' in areas where the state can usefully facilitate action on public health and environmental issues. This framing is unhelpful, outdated and counterproductive.

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:

Government policy will be central but there is also no doubt that the existence of the legally-binding CC Act 2050 target also helps others to orientate their activities and efforts with a degree of confidence. Investors, researchers, entrepreneurs, councils, civil society and existing business are all aided with a surety of direction and some long-term certainty (which is weakened when the government is recognised as off-track on future budgets and is seemingly unconcerned).

It will be very important that after the new net zero target is adopted that a coherent strategy and pathway is developed and measures included in this to give certainty to investors and thereby reduce costs of finance.

In our view councils need an enhanced role and the resources to deliver it. Previously we argued for the establishment of 'local carbon budgets' for councils and it remains our view this would still aid delivery. Local councils have a critical role in reducing emissions in the transport sector but should also play a central role in decarbonising housing (e.g. through facilitating an area by area housing refit that installs insulation and heat pumps, including hybrid heat pumps).

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:

Friends of the Earth has estimated the amount of additional public finance needed for the transition (forthcoming report). A summary is below. In addition some expenditure will need to be reallocated (for example, farming subsidies). The sums are substantial. But against this the damage caused by fossil fuels are substantial (£44bn per year from GHGs at a mid-range social cost of carbon at £120 per tonne, plus substantial health costs from air pollution). And this spending can generate economic benefits and deliver other social goods (e.g. reduced health costs from poor quality housing or more active travel).

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?

It is important that the CCC carries out or commissions a full economic appraisal of its pathways so that the media and policy debate isn't narrowly focused on the costs alone.

Summary expenditure table (Friends of the Earth not yet published)

What	**Estimate of *additional* annual expenditure**
Subsidy for electric cars and vans	£2 billion
Electric vehicle charging	£0.05 billion
Local authority electric bus subsidy	£0.25 billion
Cycle, walking and public transport	£4 billion
Renewable Energy	£1 billion
Home insulation and low carbon heating	£10 billion
Afforestation	£0.5 billion
Habitat restoration for carbon storage	£1 billion
Promotion of healthy low meat diets	£0.01 billion
Extreme weather protection	£1 billion

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

Further work is needed in this area, but we argue that the framing of this question is problematic and it (probably unintentionally) implies that international impacts are not felt here in the UK or that we should discount these in some way.

The IPCC has identified the very significant difference in impact on humans and nature between 1.5 degrees and 2 degrees globally, as well as an increased risk of crossing tipping points (such as melting of Greenland Ice Sheet). The physical and socio-economic implications of these will undoubtedly impact on the UK (such as through impacts on international supply chains and migration of people from more directly affected countries), in addition to the more direct impacts of wetter winters and hotter summers in the UK.

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:

Different parts of the UK will have different capabilities and opportunities to reduce GHG emissions. The Committee needs to consider these in identifying the contribution that the different countries can make.

There are also different legislative frameworks for cutting carbon emissions. For example in Wales there is a legal duty under the Well-being of Future Generations (2015) Act for Wales to be a globally responsible nation. In this context this entails consideration of Wales's fair share of global emissions, including its historic responsibilities as an early industrialised nation. This unique Act and its ambition and direction needs to be reflected in any targets the Committee recommends. In Wales, there is also a requirement on the Committee under the Environment (Wales) Act 2016 (Section 50(3)) to have regard to reports on the state of natural resources and the future trends report as well as scientific knowledge and international agreements relating to climate change when advising on targets and budgets. In addition "Emissions of greenhouse gases attributed to the consumption of global goods and services in Wales." is a National Indicator for Wales.

In other words, the recommendations for the different nations of the UK need to recognise their capabilities and different legislative environments and requirements.

In addition, the Committee needs to recognise that London and some combined city regions also have enhanced powers and may have greater potential to drive change.

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:

The CC Act has so far been successful in that the first budgets have been delivered, cross-party consensus has been maintained, and there is a clear trajectory for investors and others. But it has been unsuccessful in ensuring that all parts of government contribute fully to its delivery, and the Dept. for Transport continues to be particularly problematic. The Committee should, in our view, not only continue to rap the DfT on the knuckles but also consider whether there is a need for additional measures needed in the operation of government policy making that need to be instituted, for example statutory sectoral targets in problem areas (e.g. transport, agriculture).