

The Fifth Carbon Budget - Call for Evidence

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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.

Questions for consideration:

A. Climate Science and International Circumstances

Climate science and international circumstances are important criteria in setting carbon budgets.

- The science indicates the impacts associated with different levels of climate change and the limit on emissions globally if these risks are to be contained.
- International circumstances inform the prospects of future action to reduce emissions globally, potential requirements of the UK to contribute to those actions, and prospects for low-carbon technology development and carbon pricing.
- The EU places obligations on Member States to reduce emissions to contribute to reductions in the bloc as a whole. These imply a minimum level of effort for the UK's carbon budgets.

The Committee intends to draw primarily on the work of the IPCC, as published in the Fifth Assessment Report, in assessing the implications of climate science for the budget advice

The Committee's advice is based on a climate objective to limit central estimates of temperature rise to as close to 2°C as possible, with a very low chance of exceeding 4°C by 2100 (henceforth referred to as "the climate objective"). This is broadly similar to the UNFCCC climate objective, and that of the EU.

In order to achieve this objective, global emissions would have to peak around 2020, before decreasing to roughly half of recent levels by 2050 and falling further thereafter.

The UNFCCC is working toward a global deal consistent with such reductions. Individual parties are submitting pledges for effort beyond 2020, with the details of the agreement to be discussed in Paris late in 2015.

The EU has agreed a package that requires a reduction in emissions of at least 40% on 1990 levels by 2030, on the way to an 80-95% reduction by 2050. The UK Government supported this package, while arguing for an increase to 50% in the context of a global deal.

The US and China have jointly made pledges for the period beyond 2020. The US has pledged a reduction of 26-28% by 2025 versus 2005, requiring a doubling of the rate of carbon reduction compared to 2005-2020 and on a trajectory to economy-wide cuts of the order of 80% by 2050. China has pledged to peak CO₂ emissions around 2030, and to make best efforts to do so earlier.

Question 1 The IPCC's Fifth Assessment Report will form the basis 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:

No response intended

Question 2 To what extent are the UN talks in Paris likely to have implications for the Committee's advice beyond the pledges and positions announced in advance of the talks?

ANSWER:

No response intended

Question 3 Based on the available evidence, does the EU 2030 package reflect the best path to its stated 2050 ambition? How might this package change, specifically its targeted emissions reduction, either before the end of Paris or after Paris?

ANSWER:

The EU 2030 Package includes a set of targets for emissions reductions, however does not include a dedicated legally binding renewable energy target. As the main policy for reaching our emissions targets is decarbonising energy supplies, this is a considerable gap. A commitment to reduce transport emissions must also be included in the UK's Action Plan to implement the 2030 Package

Question 4 *How does the UK's legislated 2050 target affect its ability to support international efforts to reduce emissions, including its position in negotiations? Does the level of UK carbon budgets have any additional impact (over-and-above the 2050 target) for the UK in international discussions?*

ANSWER:

The UK's legislated target is strongly supportive of international efforts to reduce emissions. The commitment shown by taking such action is a strong indication that the UK is prepared to act and therefore adds backbone to our calls for others to take action. We warmly welcome the new Government's commitment to the Climate Change Act.

The fact that the targets are ambitious is also highly positive as it helps to justify the UK's call for other countries to commit to the stretching targets required to stay within the 2 degrees warming threshold the IPCC has made clear is the tipping point for irrevocable climate change.

B. The cost-effective path to the 2050 target

The carbon budgets need to set a path that is achievable from today without being over-optimistic about what is achievable in later periods to prepare for the 2050 target.

The Committee has previously set out scenarios for 2030 that balance effort before 2030 with potential opportunities from 2030 to 2050. The scenarios aim to include ways of reducing emissions that are likely to be relatively low cost and actions that will develop options that may need to be deployed at scale by 2050.

These scenarios, reviewed in detail in the Committee's report *The Fourth Carbon Budget Review – the cost-effective path to the 2050 target*, include substantial investment in low-carbon power generation, roll-out of low-carbon heat (heat pumps and district heating), development of the markets for ultra-low emissions vehicles and a combination of energy efficiency measures and fuel switching in industrial sectors.

The scenarios also reflect detailed assessments of what is practically deliverable, and the Committee monitors progress towards them as part of its statutory duties. The *2014 Progress Report to Parliament* indicated that current policy would not be enough to meet the fourth carbon budget, but that the 'policy gap' could be closed at affordable cost.

The set of policy options required to close the gap include:

- Strengthening the EU Emissions Trading System.
- Setting a clear objective for Electricity Market Reform (EMR) beyond 2020.
- Focusing on low-cost residential energy efficiency.
- Simplifying policies targeting commercial energy efficiency.
- Tackling financial and non-financial barriers to low-carbon heat.
- Pushing for strong EU targets for new vehicle efficiency in 2030.

The Government has subsequently published various documents, including its formal response, as required under the Climate Change Act, and the National Infrastructure Plan. The Plan includes investments of around £100 billion in low-carbon power generation in the 2020s, in line with the scenarios from the EMR Delivery Plan that reach 100 gCO₂/kWh by 2030. It also has significant investments in offshore oil and gas and in the road network. This includes £15 billion of new spending on roads and around £50 billion on offshore oil and gas.

Question 5 *In the area(s) of your expertise, what are the opportunities and challenges in reducing emissions to 2032, and at what cost? What may be required by 2032 to prepare for the 2050 target, recognising that this may require that emissions in some areas are reduced close to zero?*

ANSWER:

We believe there is great potential for significant and cost effective carbon reductions from the energy sector, providing the right policies are in place. Recent data from the industry, contained in the REA's 'ReView' report published this month, shows considerable growth in renewables, of over 20% in renewable electricity in the past year for example and it is vitally important to prevent any slow down or plateauing of this progress if we are to meet our targets. Policy support and consistency must be applied.

Further data on renewables capacity, investment and jobs can be found in the electronic version of the report, [available here](#).

Over the next decade energy storage will have an increasingly significant role to play in UK's infrastructure. It will allow wider deployment of low-cost intermittent renewables such as wind, and solar PV which will become the cheapest method of generating power whether derived from renewables, low carbon generation or fossil fuel. Storing hydrogen in the gas grid will also play a major role and will be

increasingly used over the next decade.

Growth is not limited to electricity emissions, as some of the greatest potential savings come from the heat and transport sectors. Heat accounts for almost half of the UK's carbon emissions and is therefore a sector that must be tackled to reduce our emissions. There has been considerable progress in heat technology cost efficiencies in the past two years and biomass heating can now be sourced at a cost as low as 2p/kWh, which is considerably cheaper than most forms of energy. Renewable heat capacity has grown 13% year on year for the most recent time period we have data for (to 2013) and therefore this sector is starting to deliver.

Although the coalition government committed to keeping the RHI open to applicants to 2020, funds beyond April 2016 have not yet been allocated, which does not back up the commitment.

With renewable heat capacity, there is no need for accompanying grid infrastructure upgrades (with the exception of electrically fuelled heat pumps or district heating networks) to accommodate new renewable heat capacity, which comes at a lower overall cost to the UK.

In the Renewable Heat Incentive two technologies are now demonstrating significant growth in the non-domestic RHI:

- Biomass heating accounts for 95% (10,928) of applications by number to end Dec 2014 and 54% of the projected short term forecast non-domestic RHI spend (£160m from Feb 2015 to Jan 2016)
- Biomethane injection accounts for 44% (£129m) of projected short term non-domestic RHI spend from just 27 projects.
- The remaining technologies account for <5% of the applications and 2% of projected short term (£12m) spend.

We should not be surprised by the success of biomass heating – it is also the leading renewable heat technology in the rest of Europe based on very different support structures. It represented 89.9% of the renewable heat in the EU in 2012. There is an assumption in CCC's heat forecasts that biomass heat, which is currently the most successful technology, will become limited by the availability of sustainable biomass. We challenge this assumption, as our forests in Europe and the US are growing more rapidly than they are being used. Bioenergy encourages the further investment in forestry. In Europe, the annual forest harvest corresponds to only 62% of the annual Forest increment. In the US a strong market for wood helps to maintain and increase forest volumes. According to the USDA Forest Service, the US forest stocks have grown by 31% since 1990 during a period of intensive forest products activity. Looking forward, the projected increase in demand from pellet exports does not keep up with the projected decline in pulpwood demand as paper is increasingly recycled. We therefore believe that

biomass heat (and power) has a huge potential to reduce carbon emissions – both short term (until 2030) and long term (2030 – 2050).

The transport sector also provides a considerable opportunity for emissions reductions given the size of carbon emissions from the sector (nearly 25%). Stability and clarity of policy, together with effective regulation, is essential if transport emissions are to be tackled. A commitment to reduce transport emissions must be included in the UK's Action Plan to implement the 2030 Package. An added benefit of tackling transport emissions is the resulting improvements in air quality in cities and towns. The IMF have produced a report on fossil fuel subsidies that outlines how the fossil fuel industry are receiving trillions in effective subsidies by avoiding paying for the costs associated with ill health caused by air pollution. Transport air quality can uniquely tackle this issue as the pollutants largely occur in population centres rather than outside them (with power generation).

The Levy Control Framework (LCF) must be evaluated in terms of its ability to meet our 2020 targets, and an extension beyond 2020 must be committed to in order to fund future energy sector decarbonisation.

The energy sector is one part of the economy which can theoretically reduce its emissions to zero, as numerous reports have shown, therefore continued investment and support for renewables can clearly help meet our targets, while the falling cost of renewables will make this even more cost effective as an option.

Question 6 *What, if any, is the role of consumer, individual or household behaviour in delivering emissions reductions between now and 2032? And, separately, after 2032?*

ANSWER:

A considerable role can be played by individuals in reducing emissions, such as energy efficiency, micro-generation installations and behaviour change. However there is a certain part of every individual's carbon footprint that is dependent on wider societal change and government action, such as being able to access public transport and the fuel mix of the energy system.

There is a clear case for the use of renewables to be written into building regulations. New and refurbished buildings should be some of the most energy efficient in the country and therefore adding renewables could reduce these buildings to virtually zero. These buildings will also be around when we get to 2050 so the sooner we start the less the buildings will be need to be remedied as we

approach 2050.

Question 7 *Is there evidence to suggest that actions to further reduce emissions after 2032 are likely to be more or less challenging to achieve than actions in the period up to 2032?*

ANSWER:

From an energy perspective, the majority of renewable electricity technologies may be at or approaching grid parity by 2032, with solar PV for example possibly having been at parity for over a decade, and will also be cheaper than fossil fuel generation. However energy production will remain expensive if a strategic approach is not taken to decentralised energy production.

Therefore reducing emissions from the energy sector may become even more cost-effective after this date. The task of reducing emissions becomes ever harder the later effective measures are put in place, especially in those sectors with significant infrastructure investment required, such as transport.

Question 8 *Are there alternatives for closing the 'policy gap' to the fourth carbon budget that could be more effective? What evidence supports that?*

ANSWER:

A re-emphasis on transport emissions would be effective at reducing our emissions and policy should be re-examined in this respect as at present the sector is not progressing due to ineffective policy and lack of political will. The emphasis on electrification should be complemented by support for low carbon liquid transport fuels as the internal combustion engine will still be significant in the vehicle fleet to 2030 and beyond.

Bioenergy as a whole offers very cost-effective opportunities to reduce emissions, for example from biomass conversions of existing fossil fuelled stations and beyond 2020, from 'carbon negative' biomass plants equipped with Carbon Capture and Storage (BECCS).

It should be noted that the UK now has sustainability regimes in place which is among the toughest in the world and will prevent unsustainable biomass supplies

from being used which could risk the viability of the sector.

Similarly, biomass heat has proven to be a very cost effective solution for carbon reductions, as the current subsidy levels offered in the Renewable Heat Incentive are on par or lower than the lowest subsidies offered under the Renewables Obligations. As very little has been done so far to transform the heating sector from fossil to low carbon, it provides an excellent opportunity to reduce carbon emissions cost-effectively.

Regarding the need for a gas grid beyond 2030 in the light of heat from electricity becoming more prevalent, the shape of the load duration curve is such that peak heat (e.g. the peak 100+ days) would be very expensive to replace with electricity alone. It is important to keep the gas option open in respect of the need for high temperature process heating for industry. Green gas is growing in the UK and has considerable potential.

What is needed is a strategic plan to meet the UK's energy needs. With fossil fuels limited and nuclear power unpopular and expensive it is likely to be a largely decentralised renewable energy system that will be needed by 2050. To make this happen, and to deliver a low cost energy generation, decisions need to be taken now, particularly with regard to grid and the role of energy storage.

Question 9 *Are the investments envisaged in the National Infrastructure Plan consistent with meeting legislated carbon budgets and following the cost-effective path to the 2050 target? Would they have wider implications for global emissions and the UK's position in international climate negotiations?*

ANSWER:

We welcome the investment signalled for low carbon generation, however would point to evidence that the Levy Control Framework is approaching being over spent therefore extra investment may be required to meet the aims of energy sector decarbonisation.

We also believe there is a strong case for energy storage to be considered as 'infrastructure' and included in future infrastructure plans, as it can play a similar role in many cases to transmission equipment and new capacity.

C. Budgets and action

The UK's statutory 2050 target requires actions across the economy to reduce emissions. Many of these actions will be driven by (UK and devolved) Government policy and implemented by businesses and consumers. There will be an important role for Local Authorities in successful delivery.

Although the carbon budgets do not require specific actions, they provide an important indication of the overall direction that policy will take in future. Once set, carbon budgets can only be changed if there has been a significant change in the relevant circumstances set out in the Climate Change Act.

Feedback from businesses as part of the Committee's 2013 Call for Evidence for the review of the fourth carbon budget was that stability is an important and valuable characteristic of carbon budgets.

Question 10 *As a business, as a Local Authority, or as a consumer, how do carbon budgets affect your planning and decision-making?*

ANSWER:

No response proposed

Question 11 *What challenges and opportunities do carbon budgets bring, including in relation to your ability to compete internationally? What evidence do you have for this from your experience of carbon budgets to date?*

ANSWER:

No response proposed

Question 12 *What would you consider to be important characteristics of an effective carbon budget? What is the evidence for their importance?*

ANSWER:

No response proposed

D. Other issues

The Climate Change Act requires that in designing the fifth carbon budget we consider impacts on competitiveness, fiscal circumstances, fuel poverty and security of energy supply, as well as differences in circumstances between UK nations. High-level conclusions on these from our advice on the fourth carbon budget were:

- **Competitiveness** risks for energy-intensive industries over the period to 2020 can be addressed under policies already announced by the Government. Incremental impacts of the fourth carbon budget are limited and manageable.
- **Fiscal impacts.** The order of magnitude of any fiscal impacts through the 2020s is likely to be small, and with adjusted VED banding and full auctioning of EU ETS allowances could be neutral or broadly positive.
- **Fuel poverty.** Energy policies are likely to have broadly neutral impacts on fuel poverty to 2020, with the impact of increases in electricity prices due to investment in low-carbon generation being offset by energy efficiency improvement delivered under the Energy Company Obligation. Incremental impacts through the 2020s are likely to be limited and manageable through a combination of further energy efficiency improvement, and possible income transfers or social tariffs.
- **Security of supply** risks due to increasing levels of intermittent power generation through the 2020s can be managed through a range of flexibility options including demand-side response, increased interconnection and flexible generation. Decarbonisation of the economy will reduce the reliance on fossil fuels through the 2020s and thus help mitigate any geopolitical risks of fuel supply interruption and price volatility.
- **Devolved administrations.** Significant abatement opportunities exist at the national level across all of the key options (i.e. renewable electricity, energy efficiency, low-carbon heat, more carbon-efficient vehicles, agriculture and land use).

Question 13 *What evidence should the Committee draw on in assessing the (incremental) impacts of the fifth carbon budget on competitiveness, the fiscal balance, fuel poverty and security of supply?*

ANSWER:

In terms of security of supply and the cost of decarbonisation, attention should be given to the impact and benefits of new technologies, particularly energy storage and hydrogen generation as they can act as an enabler for renewable energy and the smarter, more efficient decarbonisation of the energy system.

The fifth carbon budget will be positive for energy security as renewable energy production will deliver home-grown UK supplies.

For example, the cost of a domestic solar and energy storage installation has fallen by around 75% in the past two years, and large scale battery storage systems have reduced in price with an increase in supply. Energy storage therefore offers great promise as it can better balance supply and demand on the system from variable generation and provide associated benefits to the grid network (for example voltage optimisation and frequency response).

Question 14 *What new evidence exists on differences in circumstances between England, Wales, Scotland and Northern Ireland that should be reflected in the Committee's advice on the fifth carbon budget?*

ANSWER:

On 27 May 2015 the Queens Speech announced Government's intentions to change the current planning regime for onshore wind. Applications of all size will be decided at the Local Planning Authority level, instead of by the Secretary of State for applications above 50MW in capacity. This will apply in England, but different approaches will be taken in Wales, Scotland and Northern Ireland.

As this technology has the potential to deliver significant low carbon capacity, and much of the potential is outside England, this could potentially be a material consideration beyond 2020.

There could also be differences in approach related to the Government's

commitment to end new subsidies for onshore wind in relation to the new devolution settlements and the impact this could have on the development pipeline.

Question 15 *Is there anything else not covered in your answers to previous questions that you would like to add?*

ANSWER:

The new EMR Contracts for Difference policy introduces significant changes to renewable energy generation in the UK.

There are significant uncertainties which have now been introduced which mean there is no guarantee of receiving support for generators and emerging technologies may lose out compared to more established ones.

As large scale projects will need to rely solely on CfDs from 2017, this could start to impact delivery of renewable energy capacity.

New research on emissions from biofuels/bioenergy

Over the period July 2009 to April 2015, the DEFRA Sustainable Arable LINK programme sponsored a multi-industry original research project on “Minimising nitrous oxide intensities of arable crop products”. The report on the project, which has now closed, will be published shortly, and as far as biofuels produced from UK arable crops are concerned, concludes:

- N₂O emissions across UK arable land are significantly less than predicted in the IPCC guidelines
- Fertiliser abatement measures have reduced the GHG intensity of biofuels products substantially – by 15% for wheat ethanol and by 16% for oilseed rape biodiesel
- Emissions are reduced by over 20% in the MIN-NO modelling compared to PAS 2050 methodology
- UK arable produced biofuels are more effective at reducing GHG emissions than was previously thought

This therefore reinforces the need for a progressive renewable transport target and effective accompanying policy.

