Committee on Climate Change

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

The Sixth Carbon Budget and Welsh emissions targets – Call for Evidence

Background to the UK's sixth carbon budget

The UK Government and Parliament have adopted the Committee on Climate Change's (CCC) recommendation to target net-zero emissions of greenhouse gases (GHGs) in the UK by 2050 (i.e. at least a 100% reduction in emissions from 1990).

The Climate Change Act (2008, 'the Act') requires the Committee to provide advice to the Government about the appropriate level for each carbon budget (sequential five-year caps on GHGs) on the path to the long-term target. To date, in line with advice from the Committee, five carbon budgets have been legislated covering the period out to 2032.

The Committee must provide advice on the level of the sixth carbon budget (covering the period from 2033-37) before the end of 2020. The Committee intends to publish its advice early, in September 2020. This advice will set the path to net-zero GHG emissions for the UK, as the first time a carbon budget is set in law following that commitment.

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).

The Act also specifies other factors the Committee must consider in our advice on carbon budgets – the advice should be based on the path to the UK's long-term target objective, consistent with international commitments and take into account considerations such as social circumstances (including fuel poverty), competitiveness, energy security and the Government's fiscal position.

The CCC will advise based on these considerations and a thorough assessment of the relevant evidence. This Call for Evidence will contribute to that advice.

Background to the Welsh third carbon budget and interim targets

Under the Environment (Wales) Act 2016, there is a duty on Welsh Ministers to set a maximum total amount for net Welsh greenhouse gas emissions (Welsh carbon budgets). The first budgetary period is 2016-20, and the remaining budgetary periods are each succeeding period of five years, ending with 2046-50.

The Committee is due to provide advice to the Welsh Government on the level of the third Welsh carbon budget (covering 2026-30) in 2020, and to provide updated advice on the levels of the second carbon budget (2021-25) and the interim targets for 2030 and 2040. Section D of this Call for Evidence (covering questions on Scotland, Wales and Northern Ireland) includes a set of questions to inform the Committee's advice to the Welsh Government.

Question and answer 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 answers to 400 words per question and provide supporting evidence (e.g. academic literature, market assessments, policy reports, etc.) along with your responses.

AIC is the primary trade organisation for the agri-supply sector covering animal feed manufacturing and distribution, fertiliser manufacture and distribution, the distribution of plant protection products & associated agronomy advice to farmers, the production, processing and sale of agricultural seeds and the purchase and marketing of combinable crops from UK farms. The sector – (£9 billion turnover) invests over £50 million annually in research and knowledge exchange and our companies are involved in over 40,000 face to face conversations with UK farmers and growers weekly.

A. Climate science and international circumstances

Question 1: The climate science considered in the CCC's 2019 Net Zero report, based on the IPCC Special Report on Global Warming of 1.5°C, will form the basis of this advice. What additional evidence on climate science, aside from the most recent IPCC Special Reports on Land and the Oceans and Cryosphere, should the CCC consider in setting the level of the sixth carbon budget?

ANSWER: n/a

Question 2: How relevant are estimates of the remaining global cumulative CO_2 budgets (consistent with the Paris Agreement long-term temperature goal) for constraining UK cumulative emissions on the pathway to reaching net-zero GHGs by 2050?

ANSWER: n/a

Question 3: How should emerging updated international commitments to reduce emissions by 2030 impact on the level of the sixth carbon budget for the UK? Are there other actions the UK should be taking alongside setting the sixth carbon budget, and taking the actions necessary to meet it, to support the global effort to implement the Paris Agreement?

ANSWER: We are receiving a strong signal from our sector, and others, that there is now a pressing need for a supportive UK Production and Consumption policy, and carbon border adjustment mechanism to underpin the effected domestic industries during the transition of the next 10-30 years. This would enable the most carbon exposed sectors to decarbonise avoiding an uncompetitive position created by imported goods with higher embedded emissions.

Case example (analysis of AIC, EA, ONS data): The UK (and EU) manufacturers of primary nitrogen (N) fertiliser are amongst the lowest in the world, as a result of investment in emissions abatement. Since 2010 UK production emissions have been reduced by 40%

(alongside efficiency savings in N fertiliser use (as a result of 27% improvement in GB Nitrogen Use Efficiency in last 30 years). Similarly, since the introduction of Climate Change Agreements, animal feed compounders have reduced carbon emissions by over 30% and consumption emissions (on-farm) similarly. There is still more to do by way of investment and action by the agri-supply trade and in farming and land use alongside import trade equivalence.

There is a risk that existing carbon trading mechanisms affecting nitrogen fertiliser production, the forecast rise in electricity and carbon prices affecting animal feed producers will place further financial pressure on a mature but essential industry which has minimal scope for growth/restructuring. Without the presence of a solid UK supply base for feed and Nitrogen fertilisers (also sold to other fertiliser producers) - required for feeding crops and animals - the UK's sustainability credentials in food production would be undermined, significantly.

It is important that UK companies are given the opportunity to decarbonise through UK regulatory drivers which also recognise/allow for the value of any domestic or off-shore investments or UK/International CSR efforts in the process of achieving carbon reduction in the UK. In this way, safe transition could be secured by allowing 'tax breaks', for recognised activity in or outside of the UK.

Question 4: What is the international signalling value of a revised and strengthened UK NDC (for the period around 2030) as part of a package of action which includes setting the level of the sixth carbon budget?

ANSWER: n/a

B. The path to the 2050 target

Question 5: How big a role can consumer, individual or household behaviour play in delivering emissions reductions? How can this be credibly assessed and incentivised?

ANSWER: To a large extent the consumer expects and may still expect the industry (energy, manufacturing, construction, food, farming etc) to own the responsibility on their behalf (social opinions are not necessarily reflected in buying habits (British Retail Consortium). However, 60% of consumers currently want to buy British food (Defra Evidence Compendium). This percentage could realistically rise with awareness of food miles etc.

A greater awareness of making informed choices about food and reducing food waste is however highly likely to grow (policy and consumer push and pull) alongside trends to prepare less food in the home. Food procurement services are expected to take a greater proportion of responsibility for the role of the consumer by 2030 (Assured Food Standards).

A degree of loyalty to domestic producers and trading with (equivalent standards) will need to be encouraged/ incentivised assuming that consumers will become more conscious of their role. Clearer guidelines and enforcement of environmental claims are required (BSI 14021:2016: Environmental labels and declarations – self declared environmental claims). It is likely that smarter data tracking systems will help inform purchasing decisions in the future and enabling assessment of buying patterns. WRAP report that big data systems (by retailers) are not delivering these assessments currently.

If consumers could be encouraged to respond in a balanced way, as suggested in the CCC's Land use policies, this would deliver the best outcomes.

Question 6: What are the most important uncertainties that policy needs to take into account in thinking about achieving Net Zero? How can government develop a strategy that helps to retain robustness to those uncertainties, for example low-regrets options and approaches that maintain optionality?

ANSWER: n/a

Question 7: The fourth and fifth carbon budgets (covering the periods of 2023-27 and 2028-32 respectively) have been set on the basis of the previous long-term target (at least 80% reduction in GHGs by 2050, relative to 1990 levels). Should the CCC revisit the level of these budgets in light of the net-zero target?

ANSWER: The carbon budgets offer stability for planning purposes. This need for certainty for industry is essential, particularly in the light of Brexit. Changing and updating Budgets 4 and 5 would run the risk of increasing uncertainty at a critical time.

Moreover, industry is already planning its investments/options in response to Net Zero.

Question 8: What evidence do you have of the co-benefits of acting on climate change compatible with achieving Net Zero by 2050? What do these co-benefits mean for which emissions abatement should be prioritised and why?

ANSWER: n/a

C. Delivering carbon budgets

Question 9: Carbon targets are only credible if they are accompanied by policy action. We set out a range of delivery challenges/priorities for the 2050 net-zero target in our Net Zero advice. What else is important for the period out to 2030/2035?

ANSWER: Consumption emission reduction targets: Monitoring of UK consumption emissions is equally important against a clear UK Production and Consumption policy framework. Doing so would underpin a market for low carbon goods, thereby levelling the playing field for UK businesses and helping to reduce and prevent the offshoring of emissions.

b. Climate policy cost-mitigation measures: If a carbon price is levied on sectors exposed to carbon leakage and with no remaining economic abatement options, climate policy cost-mitigation measures such as offsets through Article 6 of the Paris Agreement, benchmark adjustment and cost-containment measures will need to be provided.

c. Carbon Capture & Storage (CCS): There is a sense of urgency that BEIS needs to finalise the business frameworks, recognising industry cannot pay for CCS and remain competitive internationally. There is a pressing requirement for Government to deliver two or three CCS projects by 2030 to ensure that the technology is available to those that have

no other economic low carbon pathways. Where projects have not been developed for these industries, additional support will be required, to level the playing field. Government could consider benchmark changes to reflect those emissions that cannot be abated until CCS or cost containment measures for affected industries are available.

d. Ongoing policy support for new technological solutions, innovations: When technological solutions and innovations are developed for the market underpinned by robust scientific evidence, it is important that they are reviewed and recognised by regulators without delay, so that they can be properly accounted in regulatory reviews. This will help to help drive uptake and incentivise further investments.

e. Government Impact Assessment of the Cumulative Impact of its decarbonisation policies on Sector.
UK/EU energy polices have evolved over time. A fresh look at what is required today would be hugely beneficial and welcome. Many companies are burdened by multiple reporting obligations which are not necessarily constructive to driving change. Brexit offers the Government the opportunity to step back and align policies with the EU while supporting business transition.

Question 10: How should the Committee take into account targets/ambitions of UK local areas, cities, etc. in its advice on the sixth carbon budget?

ANSWER: We suggest that the committee advises Central Government to formulate both regional decarbonisation roadmaps to 2050 highlighting to government the nature of the support required to achieve this as a starting point.

Question 11: Can impacts on competitiveness, the fiscal balance, fuel poverty and security of supply be managed regardless of the level of a budget, depending on how policy is designed and funded? What are the critical elements of policy design (including funding and delivery) which can help to manage these impacts?

ANSWER: It will be exceptionally difficult to balance all of these. For industry, the key will be to develop low carbon markets and standards for the UK that will create a pull for low carbon products before increasing ambition in the 6th carbon budget. Industry will also need to be protected both from excessive policy cost using mechanisms like the cost containment mechanisms used in some of the Canadian Schemes that have been devised in Alberta and Saskatchewan for example. (see 22a)

Question 12: How can a just transition to Net Zero be delivered that fairly shares the costs and benefits between different income groups, industries and parts of the UK, and protects vulnerable workers and consumers?

ANSWER: n/a

D. Scotland, Wales and Northern Ireland

Question 13: What specific circumstances need to be considered when recommending an emissions pathway or emissions reduction targets for Scotland, Wales and/or Northern Ireland, and how could these be reflected in our advice on the UK-wide sixth carbon budget?

ANSWER: n/a

Question 14: The Environment (Wales) Act 2016 includes a requirement that its targets and carbon budgets are set with regard to:

- The most recent report under section 8 on the State of Natural Resources in relation to Wales;
- The most recent Future Trends report under section 11 of the Well-Being of Future Generations (Wales) Act 2015;
- The most recent report (if any) under section 23 of that Act (Future Generations report).

a) What evidence should the Committee draw on in assessing impacts on sustainable management of natural resources, as assessed in the state of natural resources report?

b) What evidence do you have of the impact of acting on climate change on well-being? What are the opportunities to improve people's well-being, or potential risks, associated with activities to reduce emissions in Wales?

c) What evidence regarding future trends as identified and analysed in the future trends report should the Committee draw on in assessing the impacts of the targets?

d) Question 12 asks how a just transition to Net Zero can be achieved across the UK. Do you have any evidence on how delivery mechanisms to help meet the UK and Welsh targets may affect workers and consumers in Wales, and how to ensure the costs and benefits of this transition are fairly distributed?

ANSWER: n/a

Question 15: Do you have any further evidence on the appropriate level of Wales' third carbon budget (2026-30) and interim targets for 2030 and 2040, on the path to a reduction of at least 95% by 2050?

ANSWER: n/a

Question 16: Do you have any evidence on the appropriate level of Scotland's interim emissions reduction targets in 2030 and 2040?

ANSWER: n/a

Question 17: In what particular respects do devolved and UK decision making need to be coordinated? How can devolved and UK decision making be coordinated effectively to achieve the best outcomes for the UK as a whole?

ANSWER: n/a

E. Sector-specific questions

Question 18 (Surface transport): As laid out in Chapter 5 of the Net Zero Technical Report (see page 149), the CCC's Further Ambition scenario for transport assumed 10% of car miles could be shifted to walking, cycling and public transport by 2050 (corresponding to over 30% of trips in total):

a) What percentage of trips nationwide could be avoided (e.g. through car sharing, working from home etc.) or shifted to walking, cycling (including e-bikes) and public transport by 2030/35 and by 2050? What proportion of total UK car mileage does this correspond to?

b) What policies, measures or investment could incentivise this transition?

ANSWER: n/a

Question 19 (Surface transport): What could the potential impact of autonomous vehicles be on transport demand?

ANSWER: n/a

Question 20 (Surface transport): The CCC recommended in our Net Zero advice that the phase out of conventional car sales should occur by 2035 at the latest. What are the barriers to phasing out sales of conventional vehicles by 2030? How could these be addressed? Are the supply chains well placed to scale up? What might be the adverse consequences of a phase-out of conventional vehicles by 2030 and how could these be mitigated?

ANSWER: n/a

Question 21 (Surface transport): In our Net Zero advice, the CCC identified three potential options to switch to zero emission HGVs – hydrogen, electrification with very fast chargers and electrification with overhead wires on motorways. What evidence and steps would be required to enable an operator to switch their fleets to one of these options? How could this transition be facilitated?

ANSWER: n/a

Question 22 (Industry): What policy mechanisms should be implemented to support decarbonisation of the sectors below? Please provide evidence to support this over alternative mechanisms.

a) Manufacturing sectors at risk of carbon leakage

b) Manufacturing sectors not at risk of carbon leakage

c) Fossil fuel production sectors

d) Off-road mobile machinery

ANSWER:
a) Manufacturing sectors at risk of carbon leakage
Primary nitrogen fertiliser production using natural gas as a feedstock. BEIS have been advised of the need for measures to allow an installation relief if the unavoidable compliance costs exceed a threshold percentage of sales or profitability for the affected business. We propose a highly focused, transitional relief to 2030, for companies within the top tier exposed sectors to emission trading.

Question 23 (Industry): What would you highlight as international examples of good policy/practice on decarbonisation of manufacturing and fossil fuel supply emissions? Is there evidence to suggest that these policies or practices created economic opportunities (e.g. increased market shares, job creation) for the manufacturing and fossil fuel supply sectors?

ANSWER: See above answer to 22a regarding the Cost Containment Measures that have been utilised in some of the Canadian Schemes together with their treatment of process emission within the Ammonia Benchmark. The treatment of exothermic heat within the EU schemes is inconsistently applied and should be re-examined in any UK scheme to ensure logic is consistent throughout.

Question 24 (Industry): How can the UK achieve a just transition in the fossil fuel supply sectors?

ANSWER: n/a

Question 25 (Industry): In our Net Zero advice, the CCC identified a range of resource efficiency measures that can reduce emissions (see Chapter 4 of the Net Zero Technical Report, page 115), but found little evidence relating to the costs/savings of these measures. What evidence is there on the costs/savings of these and other resource efficiency measures (ideally on a £/tCO2e basis)?

ANSWER: n/a

Question 26 (Buildings): For the majority of the housing stock in the CCC's Net Zero Further Ambition scenario, 2050 is assumed to be a realistic timeframe for full roll-out of energy efficiency and low-carbon heating.

a) What evidence can you point to about the potential for decarbonising heat in buildings more quickly?

b) What evidence do you have about the role behaviour change could play in driving forward more extensive decarbonisation of the building stock more quickly? What are the costs/levels of abatement that might be associated with a behaviour-led transition?

ANSWER: n/a

Question 27 (Buildings): Do we currently have the right skills in place to enable widespread retrofit and build of low-carbon buildings? If not, where are skills lacking and what are the gaps in the current training framework? To what extent are existing skill sets readily transferable to low-carbon skills requirements?

ANSWER: n/a

Question 28 (Buildings): How can local/regional and national decision making be coordinated effectively to achieve the best outcomes for the UK as a whole? Can you point to any case studies which illustrate successful local or regional governance models for decision making in heat decarbonisation?

ANSWER: n/a

Question 29 (Power): Think of a possible future power system without Government backed Contracts-for-Difference. What business models and/or policy instruments could be used to continue to decarbonise UK power emissions to close to zero by 2050, whilst minimising costs?

ANSWER: n/a

Question 30 (Power): In Chapter 2 of the Net Zero Technical Report we presented an illustrative power scenario for 2050 (see pages 40-41 in particular):

a) Which low-carbon technologies could play a greater/lesser role in the 2050 generation mix? What about in a generation mix in 2030/35?

b) Power from weather-dependent renewables is highly variable on both daily and seasonal scales. Modelling by Imperial College which informed the illustrative 2050 scenario suggested an important role for interconnection, battery storage and flexible demand in a future low-carbon power system:

   i. What other technologies could play a role here?

   ii. What evidence do you have for how much demand side flexibility might be realised?

ANSWER: n/a

Question 31 (Hydrogen): The Committee has recommended the Government support the delivery of at least one large-scale low-carbon hydrogen production facility in the 2020s. Beyond this initial facility, what mechanisms can be used to efficiently incentivise the production and use of low-carbon hydrogen? What are the most likely early applications for hydrogen?

ANSWER: n/a

Question 32 (Aviation and Shipping): In September 2019 the Committee published advice to Government on international aviation and shipping and Net Zero. The Committee recognises that the primary policy approach for reducing emissions in these sectors should be set at the international level (e.g. through the International Civil Aviation Organisation and International Maritime Organisation). However, there is still a role for supplementary domestic policies to complement the international approach, provided these do not lead to concerns about competitiveness or carbon leakage. What are the domestic measures the UK could take to reduce aviation and shipping emissions over the period to 2030/35 and longer-term to 2050, which would not create significant competitiveness or carbon leakage risks? How much could these reduce emissions?

ANSWER: n/a

Question 33 (Agriculture and Land use): In Chapter 7 of the Net Zero Technical Report we presented our Further Ambition scenario for agriculture and land use (see page 199). The scenario requires measures to release land currently used for food production for other uses, whilst maintaining current per-capita food production. This is achieved through:

- A 20% reduction in consumption of red meat and dairy
- A 20% reduction in food waste by 2025
- Moving 10% of horticulture indoors
- An increase in agriculture productivity:
  - Crop yields rising from the current average of 8 tonnes/hectare for wheat (and equivalent rates for other crops) to 10 tonnes/hectare
  - Livestock stocking density increasing from just over 1 livestock unit (LU)/hectare to 1.5 LU/hectare

Can this increase in productivity be delivered in a sustainable manner?

Do you agree that these are the right measures and with the broad level of ambition indicated? Are there additional measures you would suggest?

ANSWER:

- **20% reduction in red meat, dairy consumption:** The outcome is likely to be uncertain depending on the resulting import/export balance and changing attitudes/understanding of the merits of UK meat/crops and the value of carbon sinks in grasslands rearing beef and lamb and dairy cows. Note: Dairy and beef farms will fall under the Environmental Permit Regime by 2025 (triggered Clean Air

Strategy). A marked effect on efficiencies of beef (and milk) production by 2033 can be projected, with continuous improvement towards 2050, to levels typical of the permitted pig and poultry sector presently. The link between meat consumption and health is recognised by the CCC in its recommendation for low regret actions: although this message is lost in the headline. If not already known, these references may be helpful in guiding future intergovernmental discussions around modest and sustainable consumption.
See: 'Growing a Healthy Society'. Professor Alice Stanton:https://www.ofc.org.uk/video/prof-alice-stanton https://www.ofc.org.uk/conference/2020/papers and:
Murray et al, 2019 (attached)
Abete et al, 2014 (attached)
Hall et al, 2019 (attached)

- **20% reduction in food waste:** This is realistic/conservative, given the ambitions in the UK wide Waste Strategy to 2050. There is potential to grow the waste food stream to i) animal feed and ii) land through adoption of necessary protocols and controls. Ref: UKFFPA currently recover 650,000 tonnes per annum from food waste and convert it to animal feed –it is anticipated that this level will grow by 10%.

- **Moving 10% of horticulture indoors:** n/a

- **Increase in agricultural productivity:** 8 to 10t/ha av. wheat yields: this is realistic, based on genetic potential. Modern wheat varieties have genetic potential to yield 12-15t/ha. See results of Yield Enhancement Network. Key is to drive yield (with best management techniques) only on land which is capable of supporting the untapped yield potential of latest seed varieties. Factors such as crop resilience to pest and disease and water availability will have a bearing on what is deliverable in practice. Growers with lower yields (on more marginal land) can be more carbon efficient than those pushing to achieve higher yields, when the farm management, soil or situation is the limiting factor. Therefore "yield" should be linked with the calculated productivity that land is capable of producing.

  See: Regional Agricultural Land classification maps. It's important that that the yield uplift is not confined to wheat but driven (alongside farm-led targets for continuing improvements in Nitrogen Use Efficiency (NUE) for all main crops and incl grass. Grass seed breeders are growing yield potential by 1-2% annually supporting the scope to release less productive grasslands for building carbon capture. Reseeding, resulting in improved grassland productivity, can stimulate greater microbial activity in the soil and promote carbon storage. Ref: EU Sustainable Dairy Combatting the Climate Challenge Northern Ireland 2019. Current grass utilisation estimates that on average only 5 tonnes of dry matter per hectare per year are being utilised, whereas there is potential to reach at least 9.5 tonnes or 12 tonnes on reseeded land or even 15 tonnes in ideal conditions. Ref: Delivering our future, Valuing our Soils.

- **Productivity increase in a sustainable manner:** Best performing/outstanding farmers demonstrate that productivity and the broader aspects of sustainability (economic, social and environment) are feasible and compatible. It is possible to increase production sustainably.

  The results of the change to agricultural policy – focussed on productivity improvements for the wider public good (value of soil, air and water etc) and

ambitions for carbon, biodiversity in policy and from the market place, should be notable and measurable by the start of the 6Th Carbon budget. The policy signals provide some clear need for longer-term farm planning, improving farming practice/systems and more a more integrated approach to rural land use. The permit regime for dairy and beef and reviews of existing regulations affecting farming will also be in place, setting the scene for post 2030.

- **An increase in stocking density from 1.0 to 1.5 LU/ha:** is not without risk and would need rigorous standards of practice/assurances to be in place to avoid pressure on animal welfare and biodiversity, and to guard against the potential for increased emissions to air and water. Best Available Techniques will be essential to the delivery of this measure.

- **An additional, useful measure**: would be increasing Nitrogen Use/utilisation efficiency, by average of 10% (crop type and animal species) and for industry to drive the ambition through setting management targets on farm and measuring change. See: Nitrogen Expert Panel reports on NUE models for cropping adaptable for use at farm, regional/ national scales.

Question 34 (Agriculture and Land use): Land spared through the measures set out in question 33 is used in our Further Ambition scenario for: afforestation (30,000 hectares/year), bioenergy crops (23,000 hectares/year), agro-forestry and hedgerows (~10% of agricultural land) and peatland restoration (50% of upland peat, 25% lowland peat). We also assume the take-up of low-carbon farming practices for soils and livestock. Do you agree that these are the key measures and with the broad level of ambition of each? Are there additional measures you would suggest?

ANSWER: The proposed measures are realistic and offer a clear direction of travel which is welcome.

Question 35 (Greenhouse gas removals): What relevant evidence exists regarding constraints on the rate at which the deployment of engineered GHG removals in the UK (such as bioenergy with carbon capture and storage or direct air capture) could scale-up by 2035?

ANSWER: A change in mindset is required from single issue thinking largely resulting from CAP to integrated farm and landscape management.

Question 36 (Greenhouse gas removals): Is there evidence regarding near-term expected learning curves for the cost of engineered GHG removal through technologies such as bioenergy with carbon capture and storage or direct air capture of CO_2?

ANSWER: n/a

Question 37 (Infrastructure): What will be the key factors that will determine whether decarbonisation of heat in a particular area will require investment in the electricity distribution network, the gas distribution network or a heat network?

ANSWER: n/a

Question 38 (Infrastructure): What scale of carbon capture and storage development is needed and what does that mean for development of CO_2 transport and storage infrastructure over the period to 2030?

ANSWER: n/a