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.

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: n/a

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: We believe that consumer, individual and household behaviour has an important role to play in delivering emissions reductions.

Although we do not have any research that proves this, in our interaction with our community over 12 years we believe that we have positively influenced decisions about energy efficiency improvements in housing including loft and wall insulation; choice of consumer appliances; travel choices in terms of mode between walking, cycling and public transport; renewable energy and heat installations; purchase of electric cars (We have held 6 annual electric car shows in Church Stretton and installed the first public charge point in Shropshire) and have carried out over 400 household energy checks which provides a carbon footprint for each household and made recommendations how this can be reduced.

Public information is important and this can now be communicated through social media as well as other channels showing how and why to live more environmentally sustainable lives. The information available when choosing to buy services and products should identify the greenhouse gas emissions/climate change consequences of choices whether it is buying a car, a holiday, a house a consumer product or food. Current labelling is inadequate. The Energy Performance Certificate is inadequate in terms of information provided as is the information provided on cars and appliances.

No information is currently required to be provided on the carbon emissions/ climate consequences of flights and cruises. A carbon tax would make a big impact and it would need to be accompanied by a free allowance for every person/household with financial support for the income of vulnerable households. Any incentives must not chop and change simply for fiscal reasons as it gives the wrong message to both the industry and potential clients and investors. We know of many local renewable energy firms and insulation firms driven out of business by withdrawal and changes t government schemes.

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:

We believe this is important and necessary especially as the existing targets are not being met often as result of numerous cut backs to previous programmes. Buildings should have been well on the way to being completely decarbonised by 2030. As it is we are still building new houses which do not achieve net zero emissions. Adapting existing houses is going to be very complex and require a newly skilled work force. This was trained up for the Green Deal and ECO programmes which were not followed through or adequately incentivised. We need to progress these issues now as it cannot be achieved without a steady build-up of all the various resources necessary and implementing significant changes when there is an opportunity through change in ownership which may be

reasonably frequent on average but in some cases takes 20-30 years or more. Higher targets need to be drawn up for transport, energy production and land use.

More action needs to occur into in relation to shipping, aviation (where emissions are still forecast to grow considerably rather than reduce) and decarbonising surface transport in particular.

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: Air quality in towns and cities and other areas mainly polluted by road transport, also diesel trains and shipping would be a major beneficiary of switching to other sources of energy such as electricity and hydrogen. This has been demonstrated in Cities such as Oslo and Stockholm which have reduced car use and encouraged BEV's. This would result in fewer deaths and illness.

Changing our diet away from meat and dairy products will enable grazing land to be used for afforestation and wildlife. This would have multiple benefits including restoring our denuded wildlife and biodiversity and for additional outdoor leisure in proximity to urban areas without the need to travel as far as at present. There would also be water quality benefits as there will be less pollution from animal wastes. Imports of feedstuffs such as palm oils and soya which have often led to loss of tropical rainforest in terms of the environment and reduced imports will also be a benefit. It is likely also that resulting UK diet would have health benefits as well.

Improving the energy efficiency of our buildings will make them healthier to live in and more pleasant to live in if carried out properly and should at the same time address potential over heating issues which can adversely impact on health.
Improving public transport services as part of an effort to reduce car use will improve accessibility for those sectors of the population without access to cars.

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: We consider that it should be possible for investment to be made earlier so that heavy transport including shipping does not continue to increase its carbon emissions in the period up to 2050. There is a need to develop hydrogen power for this sector at an earlier date than forecast even in the high ambition scenarios.

We consider that further measures should be applied to reduce the level of flying, transferring passengers to high speed rail within the UK and Europe. The current estimates of transfers to HS2 from flying are significant under-estimates. See https://www.carbonbrief.org/eight-charts-show-how-aggressive-railway-expansion-could-cut-emissions

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: n/a

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: n/a

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: This is clearly important but some difficult changes will clearly be inevitable as fossil fuels, livestock and other sectors contract.

All the mechanisms of government and society will be required to address these challenges including re-training; household and community support; re-location support; and support for appropriate new developments.

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:

a) No comment
b) The modal share of cycling remains very low in the UK compared to most European countries. There must be considerable scope to increase this share by implementing infrastructure improvements making cycling safer and easier. This combined with the adoption of e-bikes could help this transition.

Increasing use of public transport needs a major change in bus networks and frequency and period of operation everywhere outside of London. Fares need to be considerably reduced as well with examples such as Vienna charging one Euro as a daily fare showing what can be achieved.

Increasing walking requires measures to put the pedestrian first in traffic management with safe crossings; convenient routes and 20 mph zones and implementation of further pedestrianisation and pedestrian priority schemes.

Major investment is required in our rail network and trains to provide decarbonisation, frequency, comfort and reliability in the use of these systems. Decarbonisation mainly through electrification would provide a long term more cost effective solution for our rail network rather than converting some half of the rail fleet to on board hydrogen generation and/or battery use. Overhead electrification would be more expensive in infrastructure but would produce a railway network that was more reliable, with less running costs and complexity in terms of variety of systems. As rail electrification progressed it should be possible to progressively reduce the costs as expertise develops.

Heavy freight trains are unlikely to be successful with hydrogen power and will reduce the speed of other trains. Increased speed and reliability from electrification will lead to increases in passengers diverting from other modes including flying which will continue to create carbon emissions. Source documents: Modern Railways December 2019 Pages 24-28 “Decarbonisation-Time to end Electrification Phobia”; Modern Railways August 2019 Pages 43-45 “Make Electrification Great Again”; Modern Railways April 2019 Pages 22-30 “Freight Diesel Traction Realities” and Modern Railways March 2019 and https://www.carbonbrief.org/eight-charts-show-how-aggressive-railway-expansion-could-cut-emissions

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: The barriers to phasing out conventional car sales by 2030 will include financing investment in new vehicle manufacture; making the necessary investment in charging infrastructure rapidly. This earlier ban is important as otherwise the vehicle pool

will contain far too many ICE vehicles bought in the decade up to 2040 resulting in continuing carbon emissions and continuing external and direct costs to the environment and our economy. Electric vehicles by 2030 will generally be both cheaper to purchase as well as run from at least 2030 if not earlier.
However it should be possible to overcome difficulties for the industry through the government support for this change.

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: n/a

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: n/a

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: With adequate, steadily rising and consistent investment it should be possible to achieve decarbonisation earlier than 2050 for 90% of buildings.

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: The structure of regional and local government needs to be rationalised to a more coherent structure. The pattern that has evolved has no consistent arrangement from area to area and leaves out some Counties from city based arrangements.

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: A carbon tax with allowances for individuals and companies.

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: A scheme such as the Swansea Barrage should be installed as a trial project at an early date so that its reliability and effectiveness can assessed for further deployment or not. Similarly wave powered generators should fully trialled at an early date.

The government should enable and financially support as necessary land based wind power and large scale solar power and storage systems.

The DNO's must be required to be responsive and facilitate the installation of low carbon power and storage. Alternatively they should be nationalised.

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: Given that the majority of long haul flights are for leisure purposes, and a small proportion of our population undertakes these flights, there are serious equity issues in allowing this small proportion of our population to continue to create such a high proportion of our greenhouse gas emissions which are leading to damaging climate change. In Sweden, flight shame has reduced demand for flying already. It should be possible to create this culture here in the UK, together with fiscal measures through taxation of air flights to reduce demand. It is not sensible that it costs so much more to go by train to Europe compared to flying. This cost differential must be tilted the other way given the environmental damage of aviation. A carbon tax with a basic free allowance could allow an occasional flight but require high payments for higher frequency. The concept of going for long distances for short leisure trips eg Venice for lunch must be stopped.

It should be possible to transfer more domestic and short haul flights to the rail network if it is enhanced with additional high speed lines and more convenient interchanges.
There should be a fuel duty imposed on aviation fossil fuels increasing in planned steps. Ideally this should be Europe wide but the UK should make a start. Special allowances may need to be made for the most remote areas of the UK such as the Highland and islands of Scotland where surface transport is inevitably restricted.

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: 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?

We consider that a target greater than a 20% reduction in red meat and dairy consumption can be achieved. Younger people are already embracing such a changing diet and technological advances in alternative food production will facilitate this. See “Apocalypse Cow”-George Monbiot-All 4.

This would enable a further increase in arable crops grown locally as well as further re-wilding and afforestation

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: We believe that it should be possible to increase afforestation in the later decades to 50,000 Hectares a year as was achieved previously. With the possible departure of Scotland from the UK in this period, a higher proportion than currently forecast will need to be located in the rest of the UK.

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: n/a

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