

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: Pihl, E., Martin, M.A., Blome, T., Hebden, S., Jarzebski, M.P., Lambino, R.A., Köhler, C., Canadell, J.G., Ebi, K.L., Edenhofer, O., Gaffney, O., Rockström, J., Roy, J., Srivastava, L., Payne, D.R., Adler, C., Watts, S., Jacobsson, L., Sonntag, S., 10 New Insights in Climate Science 2019, Future Earth & The Earth League, Stockholm, 2019 <https://futureearth.org/wp-content/uploads/2019/12/10-New-Insights-in-Climate-Science-2019.pdf>

International Energy Agency (2019) World Energy Outlook

Question 2: How relevant are estimates of the remaining global cumulative CO₂ 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: Very relevant. In order for the UK to deliver a 'just' transition, it needs to take into account its fair share of the burden of reduction. Therefore, only by considering global cumulative budgets, can it be ensured that the UK is on track to meet its long term Paris commitments. One caveat here is that the 2050 target is insufficient – giving only a 50% chance of limiting temperature rise to 1.5°C. The sooner net zero is reached, the greater the likelihood that this extent of heating will not be exceeded. Therefore, the UK Government should reconsider its target to be net zero by 2030.

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: The Government should be ramping up the current efforts to ensure that the existing commitments it has made will be met. It should empower local authorities with the resources they need to enact plans following declarations of climate emergencies, enabling them to set their own local carbon budgets, to ensure that across the UK, action is fair and transformation is occurring to deliver against the reduction targets. It should also actively engage in the provisions laid out in Articles 9,10 and 11 of the Paris Agreement and voluntarily "support the efforts of developing country Parties to build clean, climate-

resilient futures.” This action is especially important given that COP26 will be held in Glasgow in 2020 – a positive signal to other developed Parties to step up and facilitate action would be a powerful outcome for the summit.

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: Tying the domestic commitments and timeframe into closer alignment with the NDC requirements of the Paris agreement would make sense and would be another demonstration to the international community that the UK Government is committed to delivering – a demonstration of the ‘ratcheting process’ in action. Strengthening the measures outlined in the NDC/6th carbon budget is necessary for the UK Government to meet its existing commitments.

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: There is so much opportunity to engage with individuals through the delivery of a Green New Deal. There are major mitigation opportunities within the domestic sector, including in terms of energy efficiency retrofitting and in new builds, but they need to be financed and facilitated by local and national governments. Community renewable energy generation can play a huge role, and this should be encouraged over other policy suggestions in the Government’s Clean Growth Strategy – gas and nuclear included. This can be facilitated and incentivised by adopting at a local level the so-called ‘Preston Model’ which can localise procurement and deliver new skills, training and employment opportunities within local communities. In terms of assessment, monitoring of progress against local carbon budgets in terms of number of households reached is one simple metric.

Establishing citizen assemblies to ensure that action decided upon is collaborative is fundamental.

In terms of consumers, whilst the UK continues to keep consumption emissions out of domestic scope, it is difficult to do anything about these decisively. Given they contribute over a third of total UK emissions, it is extremely important that the government take steps to include these emissions in future plans and put them in the scope of the accounting for future carbon budgets

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: Climate impacts that scientists predicted were still likely decades away are starting to be felt. This leads to realisations that there is an inherent unpredictability about what the coming decades hold and the level of resilience we need to plan for, and the urgency with which we need to react. The Government’s plans should therefore be agile

and able to respond as new/updated information comes in. Policy measures should be iterative, opening up the scope for improvement or alteration as necessary. The low-regrets options should be reframed so as to not only consider their cost-effectiveness in terms of implementation, but also allocate a social/environmental cost of not being implemented – this would favour the measures that better get to the crux of the issue and enable faster decarbonisation and resilience to be built into the system.

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: Yes – and it should also run scenario budgets for net-zero for 2030 and demonstrate the case for the more ambitious level of action.

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: Taking just one example, that of fuel poverty: Action outlined in the Footprint Trust's annual report demonstrates that outreach to communities has led to over £108,000 of annual energy savings identified, 297 home visits provided for 551 people identifying on average £306 per household of annual energy cost savings, and over 500 tonnes of CO₂ cut from households. Scaling up these activities, alongside an expansion in renewable energy could deliver significant savings and social benefits for those 7300 households in fuel poverty, and potentially be applied to other households at risk of becoming fuel poor.

But the co-benefits for other sectors are also well documented. Promoting active travel and public transport has health benefits, not just in terms of exercise, but because there are fewer vehicles emitting pollutants, air quality improves which in turn reduces the impacts to peoples' lungs, hearts, brains etc. Moreover, the quality of life that can be enjoyed once the dangers of motor vehicles are removed from urban settings open up opportunities for a whole range of other co-benefits – new uses for street space, more community engagement, more active play outdoors for children etc.

Both these examples demonstrate that least cost options are actually some of the most effective. Deliberate effort to make houses, energy generation, transport use etc. more efficient would deliver significant emission reductions if adequately supported by Government resources. The benefits brought about in terms of healthcare and social welfare cost savings and those from other policy areas should be considered with a more longer term and holistic view to make the case of the co-benefits much clearer.

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: The establishment of community/citizen assemblies to help ensure that implementation takes place across the country and that action is accountable and credible. Additionally, there are a number of policy measures in the Net Zero advice/current Government plans which run entirely counter to delivering on the reductions needed. Road-building, the ambiguity surrounding non-conventional oil and gas exploitation permits in the UK, plans to reopen nuclear facilities. Unless climate change mitigation and resilience is factored in to all decision making and policy development across all levels of the UK, the targets won't be met.

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: They need to be central. And the CCC should offer guidance to local authorities about how best to enact policy to deliver action against the climate emergency declarations that have been made.

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: If the correct policy measures are chosen. And in the current Net Zero plans, this is simply not the case. Core measures include nuclear power and gas generation with CCS. It is illogical to include CCS in the 'core' measures category when the technology is still largely untested. We cannot rely on burying emissions; we need to stop burning fossil fuels and embedding them further into the system.

'Further ambition' measures again rely on largely unavailable and costly fuel sources – hydrogen for example. It is the so-called speculative options such as wave and tidal power, which the Net Zero report suggests 'have not yet been commercially proven' and in conventional renewable generation where the solutions actually lie. To take just one example from many to demonstrate that this information is inaccurate, the Eastern Scheldt storm-surge barrier in the Netherlands has been operational for 4 years and since 2016 its five turbines have been producing 1.2MW of tidal energy (enough to power around 1,000 homes), whilst at the same time protecting the area against storm risk.

The Government is prioritising the wrong policy measures to reach the targets and therefore the critical elements of policy design required are to invest in the most appropriate measures from the outset.

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: My work in setting up a Green New Deal Intergroup in the European Parliament has been to ensure that any transition to a low carbon future is fair, inclusive and just. The following 10 actions can be seen as a blueprint for ensuring that social justice and inclusion are factored in to the Government's net zero plans.

1. Government must invest in renewable energies 2. Government must ensure that all empty buildings and homes are brought back into use 3. Government must ensure that at a local level, participatory budgeting takes place and is as inclusive as possible 4. Government must ensure that women, LGBTQI+ communities, people of colour, as well as those with a disability are at the heart of any Green New Deal 5. Government must promote reducing and reusing before ensuring that all recyclable waste is recycled 6. Government must invest in research and innovation into carbon technologies and invest in education and training 7. Government must properly fund local and regional governments 8. Government must work closely with the trade unions to offer people working in high carbon industries the option to either retire on a decent pension or retrain for new 'climate jobs' 9. Government must bring public transport back into public ownership, run more frequent bus (night and day) using vehicles running on 100% renewable energy

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: Provision of higher quality, public owned public transport is required in order to ensure that adequate, reliable alternatives to the car exist – enabling people to make the switch. All journeys need to be considered in travel behaviour surveys, so that the nuances in travel behaviour between groups in society are adequately reflected in policy planning. The commute, which only covers one mode, does not reflect the reality of how people travel. End-to-end journeys should be thought about instead of trips. Once a better quality level of data about what people's travels needs are emerges, it will become evident at the

local, regional and national level where the most potential exists for mode switching and what is required to deliver it.

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: Affordability of alternatives, opposition from the car industry, loss of jobs in the second hand car market, viability of alternatives in terms of infrastructure. Restrictions and bans in urban areas sooner will enable behaviour change away from the car, so long as adequate alternatives are in place.

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: This is not the most effective way to reduce freight emissions. First, offering a level playing field between all freight modes would likely deliver more emissions reductions at lower cost. Ramping up the potential of rail and waterways to take freight would be a more effective and less expensive option. Hydrogen is better served in stationary sources; mobile sources are likely to be inefficient within the timeframe under consideration.

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: By removing fossil fuel subsidies to enable other renewable alternatives to thrive. Unconventional oil and gas extraction should be permanently banned.

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: The recent reports (2020) commissioned by my colleague Catherine Rowett MEP goes into detail using the latest available data on decarbonising the Eastern region's domestic stock. With a 2030 timeframe.

https://catherinerowett.org/wp-content/uploads/2020/01/EastofEnglandEnergyReport_LAYOUT_interactive-2-1.pdf

https://catherinerowett.org/wp-content/uploads/2020/01/GREEN_TechReport_Layout_05.pdf

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: Gateshead council has provided an area-wide heat and energy system to domestic, commercial and public sector customers: it also offers peak power generation to help balance the grid through a mixture of 3MW of battery storage and combined heat and power with heat storage.

www.gateshead.gov.uk/article/2993/Gateshead-District-Energy-Scheme

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: n/a

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: n/a

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 CO₂?

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 CO₂ transport and storage infrastructure over the period to 2030?

ANSWER: n/a