

## 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<sub>2</sub> 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:

There are two main ways by which domestic consumers can play a role in delivering emissions reductions:

1. Through reducing the amount of energy that they use overall
2. By switching to a lower carbon heating source

For fuel poor households, there are two large barriers to achieving these.

Firstly, reducing emissions on a large scale, or switching heating source requires an upfront capital investment to do so (for example to insulate a home, install a heat pump, or switch to a hydrogen boiler). Fuel poor homes typically cannot afford to do this, and so require an incentive, in the form of a grant or equivalent, to be able to achieve this.

Secondly, fuel poor households are significantly more likely to be using less energy than is required to keep their home at an adequate temperature level. The BEIS special article “Comparison of theoretical energy consumption with actual usage” shows that “The gap between theoretical and actual energy consumption is negatively correlated with income, with households in the highest income decile using on average £27 more than the theoretical consumption, and those in the lowest income decile using on average £189 less”.

Put simply, higher income households will find it easier to reduce their carbon emissions than lower income household, as it is more likely that they are using energy that they don't need.

To credibly assess the role that households can play, the BEIS analysis must be taken into consideration. Households that are under-heating their properties cannot be reasonably expected to reduce their consumption in the same way as a higher income household. However, fuel poor households are more likely to be living in the least thermally efficient properties with the highest potential for increasing energy efficiency, so this might be offset.

**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:**

There are many uncertainties in the future of the energy system affecting end consumers, but none affect fuel poor households more than the uncertainty surrounding how domestic heating will be decarbonised. A long-term view must be taken about how this will be done, and how costs will be attributed to different system users.

Government can help to reduce these uncertainties through increasing investment in energy efficiency. The Committee on Fuel Poverty has calculated that to meet the UK Government's statutory 2030 fuel poverty strategy, a funding shortfall of £15.1 billion currently exists. This is the shortfall after considering the impacts of the two policies that are currently approved and in place - ECO3 for 2018 to 2022 and the amended Private Rented Sector (PRS) regulations that require properties to reach EPC Band E. Upgrading the energy efficiency of homes both reduces the carbon impact of current sources of heating, and can reduce the impact of moving to a different source of heating, for example to direct electric heating which has a high unit cost, or to a heat pump, which needs an energy efficient home to work adequately.

The low regret option of investment in energy efficiency also maintains optionality,

contributing to lower emissions whilst being a must-have in every decarbonisation pathway. The Government should continue along the path of focussing on fuel poor homes when it comes to funding support for these measures, as these homes are the least likely to benefit from increased energy efficiency without financial support.

**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: n/a

**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:

Energy efficiency has many important co-benefits that are important not just to saving emissions, but to other strategically important aspects of society

Several co-benefits have been identified in the BEIS Select Committee's recent inquiry on energy efficiency, that are not currently captured by BEIS or HMT. These include:

- Economic Growth: This 'cost-effective' approach would require an estimated £85.2 billion investment but would deliver benefits (reduced energy use, reduced carbon emissions, improved air quality and comfort) totalling £92.7 billion—a net present value of £7.5 billion;
- Optimises infrastructure investment: Energy efficiency can prevent expensive investments in generation, transmission and distribution infrastructure and reduce reliance on fuel imports—with a present value of avoided electricity network investment of £4.3 billion; and
- Competitiveness: The UK is a net exporter of insulation and energy efficiency retrofit goods and services.

NEA has identified further areas that should be explored with regards to the value that energy efficiency schemes could present, but have not yet been assessed:

- The direct value of reductions in bills and energy arrears for households, and how this would increase spending within poorer communities;
- The avoided cost of reducing carbon emissions or improving air quality via alternative actions;
- The avoided costs of investment in non-efficient forms of embedded power generation which can increase local air pollution;
- The value of reductions in rent arrears, void periods for landlords and higher stamp duty yields to HMT;
- Uplifts in VAT yields to HMT for energy efficiency measures compared to the lower rates applied to VAT on gas and electricity;
- The positive impact of reducing inflation, gas imports and the effect on the UK's balance of payments;
- The extent of the creation of a healthier workforce and jobs from a more buoyant energy efficiency industry;

- The value to the UK economy of wider benefits such as up-skilling the workforce;
- The value of avoided costs to energy consumers of reducing network reinforcement by DNOs.
- More comfortable internal temperatures in homes meaning fewer premature winter deaths
- Reduced costs to mental health and social; and
- The cost effectiveness of zero-capital interventions such as advice which can also create less damp and mould growth within homes, in turn reducing respiratory problems at little or no cost.

### 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: n/a

**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:

The impact of the transition on fuel poverty can be managed through policy which delivers both an equitable allocation of the costs of meeting net zero, and the equitable allocations of the benefits of achieving decarbonisation.

This will require policy that understands the distributional impacts related to where funding comes from (i.e. energy bills or central funding), and will also require a targeted approach to interventions, where the households at most risk of suffering the effects of fuel poverty are most likely to receive support.

This approach has been taken at a high level within the current Energy Company Obligation scheme, where the scheme is now focussed on 'affordable warmth' (although targeting has been problematic, with only 30% of the eligible group being fuel poor). At a high level, this approach should be taken wherever capital funding for measures is being offered to the general public, for example in relation to any future energy efficiency funding, or incentives for low carbon technologies (e.g. the feed in tariff or renewable heat incentive).

**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:**

To achieve a just transition, there are three areas in need of urgent consideration: prioritisation of measures; distribution of costs; and distribution of benefits.

Net zero cannot be reached without ensuring that every single home is well insulated and emitting as little carbon as possible. Insulating the homes of fuel poor households has many added benefits: lowering bills; better health due to living in a warmer home; reduced air pollution; and benefits to the wider economy. If fuel poor homes are not prioritised, there is a risk that years of benefits will be missed, and thousands of people will continue to die each year from living in a cold home. These homes must be better insulated, and it makes sense to do this as an absolute priority.

Decarbonisation will cost billions, and there is a requirement to understand where the money will come from. Up to now, much of the funding for decarbonisation has come out of energy bills in the form of levies. This is true for the Feed-in-Tariff, Contracts for Difference and carbon taxes. Our carbon tax is ultimately paid for through energy bills too. The UK Energy Research Council has shown that this is a very regressive practice. This has been problematic up to this point and will become unbearably so if it continues to be the preferred way of raising funds.

NEA has therefore welcomed HM Treasury's commitment to "identify mechanisms to create an equitable balance of contributions" – effectively assessing fair ways to pay for the transition. This needs to be completed as a matter of urgency in order to avoid an exponential increase of policy costs in energy bills. This review must consider impacts on poor households in terms of both the equitable allocations of the costs of meeting net zero, and the equitable allocations of the benefits of achieving decarbonisation.

#### **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: 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 £/tCO<sub>2</sub>e 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:

There is a clear case for making fuel poor homes as energy efficient as possible as quickly as possible, with multiple co-benefits (see answer to question 8). Decarbonising heat in these fuel poor homes needs more careful thought, as this can significantly increase costs to the detriment of the householders, risking a further plunge into fuel poverty. Moving to decarbonise the heating source in these homes more quickly than is necessary could result in them carrying an additional cost where it is not necessary to do so.

We believe the pathway of decarbonisation of heat, and the allocation of costs to achieve this, is something that the CCC must wholly consider as part of the sixth carbon budget review.

**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: 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 CO<sub>2</sub>?

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<sub>2</sub> transport and storage infrastructure over the period to 2030?

ANSWER: n/a