

## 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:

No answer

**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:

No answer

**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 setting of the sixth carbon budget needs to take into consideration the creation of international frameworks for carbon offsets. In accordance with the 'Paris Agreement', the CCC acknowledge that different industries and nations will be able to decarbonise at different rates. The majority of these frameworks have limited initial horizons, but with an ambition of permanence. The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) is an important part of the wider international decarbonisation framework. The UK should make every effort to extend the scope of CORSIA for as long as is necessary for global aviation to deliver wider decarbonisation.

At a national level, the Government should ensure consistent approaches to setting regional or local climate targets across the UK, setting a national target based on scientific evidence. While it is important to encourage greater levels of ambition locally, such as those announced in Greater Manchester (2038 net zero target), the scope to which these

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ambitions apply needs to be limited to where local decision makers can exercise control (e.g. planning).

Without this approach, a variety of targets, taxes and market altering measures have the potential to create an onerous business environment and encourage carbon leakage both within the UK and internationally. For example, if motorway emissions are included within local targets, local policy may be developed which create an incentive for hauliers to take longer routes to destinations via areas with less stringent carbon targets. This in turn could increase emissions nationally and also have negative economic impacts.

Government must therefore set out its national target and an appropriate framework to encourage local ambition. It should do this by setting out clearly which emissions are in scope for local authorities.

**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:

No answer

## 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:

Consumers can play a significant role in delivering emissions reductions, through personal choices and behavioural change (e.g. switching to renewable energy).

To incentivise this behaviour, sharing the carbon footprint of products and activities may help consumers to make informed choices and take carbon into consideration in their everyday choices.

However, the CCC should not pick and choose where it chooses to recommend the incentivisation of consumer behaviour, particularly through market altering measures like taxation. For example, a well-meaning tax on non-electric vehicles may help drive consumers away from traditional combustion engines, but it may also reduce the scale of the automotive market in the UK, and with it employment, GDP and automotive production, reducing the UK's influence and ability to produce lower emission vehicles for the wider world.

**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:

The greatest risk of uncertainty would come if individual countries were to adopt separate, unaligned approaches to achieving Net Zero within the aviation sector. CORSIA is a key part of the global decarbonisation framework that is already in place to maintain this alignment but it is currently only in place until 2035. To minimise uncertainty, it is important that CORSIA is able to continue to play its role beyond its original, 2035 timeframe. With the right policy support from Government, the ICAO General Assembly could reach the right agreement in 2022 to extend the CORSIA scheme. It is important that these discussions continue unhindered and the CCC should not consider a domestic approach to an international industry like aviation. It would though be appropriate for the CCC to lend its support to Government and Industry effort to prepare ICAO for this conversation.

Similarly, we do not believe that local carbon budgets – set by local authorities across the UK – should include aviation emissions. Such targets will simply serve to distort the market, potentially increasing emissions as passengers either travel on indirect, higher emission, flights or travel to another UK airport to commence their journey.

**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:

No, these budgets have already been adopted and have been a key part in business decision making. In previous publications and Section C of this call for evidence the CCC has already acknowledged that businesses have called for a stable policy environment. Businesses must have faith that carbon budgets will contribute to stable, long-term, policy – as such, we believe that they should not be retrospectively revised.

**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:

No answer

## 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 continuation and development of CORSIA past 2035
- Investment in improved public transport. Schemes like HS2 and Northern Powerhouse Rail to Manchester Airport, and earlier and later trains at Stansted and East Midlands Airport, will help reduce road vehicle journeys.
- R&D investment in sustainable aviation fuels, as well as a nationwide network for their delivery and use in aviation.

**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:

See answer to Question 3

**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 is not possible to separate out these elements from the impact and influence of the carbon budgets. An unrealistic target on carbon reduction would likely mean that airlines would need to fly elsewhere to prevent the UK breaching its budget obligations. This in turn impacts on the competitiveness of the UK economy and the ability of those living in the UK to travel and trade, without reducing global carbon emissions overall. Moreover, it has the potential to increase emissions, with budgets and policies incentivising inefficient indirect routing across airlines' networks.

Budgets and policies therefore both need to be evidence-based and take account of the time required for businesses, markets and consumers to react to change. Low carbon products produced in the UK and exported to the world should be encouraged. This is set against the potential need to export products with a high carbon footprint, with emissions vented elsewhere in the world, simply to hit a unilateral UK target.

**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:

All industries, including aviation, are already working to reduce their carbon footprint. Significant investment in R&D, Sustainable Aviation Fuels and fleet renewal are just some

**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?

of the examples of industry investment towards a greener aviation industry. The costs of these investments are passed onto all consumers as part of all aviation business models.

The CCC and the Government should not target measures specifically at individuals or industries, altering the market and driving investment away from the UK. Industries should be encouraged to produce their own decarbonisation plans and then held to the delivery of those plans.

## 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:

No answer

**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:

No answer

**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:

No answer

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

ANSWER:

No answer

**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:

No answer

## 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 answer

b)

Investment in improved public transport. Schemes like HS2 and Northern Powerhouse Rail to Manchester Airport, and earlier and later trains at Stansted and East Midlands Airport, will help reduce vehicle journeys to airports and encourage lower carbon public transport use. However, the development time for this infrastructure means work should start on projects

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

like these immediately. The CCC should also take into consideration the Williams Rail review, and encourage Government to adopt measures that will allow early morning/late evening commuting and travel (e.g. staff to airports, hospitals, ports, late night businesses etc).

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

ANSWER:

No answer

**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:

Infrastructure is or could be a blockage – technology needs to evolve so that range anxiety is reduced/removed, and there needs to be nationwide charging infrastructure that allows travel equivalent to the traditional network of petrol stations. This will require government investment in core backbone infrastructure and potentially facilitating installation in key sites of agglomerated demand (which should include airports). Integration of payment options to avoid having to sign up for myriad accounts to use different chargers is also important.

**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:

Tax break incentives for low carbon specialist vehicles and equipment will help encourage their uptake and bring down long term costs. Large, specialist, vehicles also operate at airports. These airside vehicles, such as push-back tugs, can be electrically powered.

**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?

Present low-emission vehicle incentives focus on road vehicles. Incentives are required to support the widespread introduction of low-emission non-road vehicles such as those used in industrial applications, including airside vehicles.

**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)

No answer

b)

No answer

c)

Sustainable aviation fuels have the potential to make an important contribution to mitigating the environmental impacts of aviation. Regular flights using blends of bio-based aviation fuel are flying limited routes from the EU already, and the first commercial flight using sustainable jet fuel flew between London Gatwick and Orlando in 2018. Six sustainable aviation fuel production pathways have been certified, and several others are in the approval process across the EU, meaning capacity will increase over time. However, the uptake by airlines remains limited due to various factors, including the cost relative to conventional aviation fuel and low priority in most national bioenergy policies.

To increase uptake, the cost of sustainable aviation fuels to airlines needs to decrease. Allowing sustainable fuel producers to claim Renewable Transport Fuels Obligation certificates in line with road transport fuels is a good first step, priority should be given to dedicated research and development (R&D) into sustainable fuels, as well as incentives for new fuel centres to generate capacity.

Sustainable Aviation's research into this area demonstrates that with the right policy and investment framework, UK aviation can reduce its CO<sub>2</sub> emissions by up to 24% by 2050.

d)

See answer to Question 21

**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:

Work by Sustainable Aviation suggests that the successful development of a domestic sustainable aviation fuel industry could support up to 3,400 jobs: in plant construction and operation, feedstock supply and fuel distribution, and the design and development of conversion technology components and processing plants.

The successful capture of global sustainable fuel opportunities is estimated to be worth £100- 220 Million in economic value for the UK by 2030 with an increase of a further 500-1,000 jobs.

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

ANSWER:

Policy priority and incentives (outlined in 22c) would support aviation decarbonisation. Prioritisation for aviation fuels over other road fuels, where these users have other pathways to decarbonise more quickly, cheaply and easily, should be considered.

**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:

No answer

**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?

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No answer

**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:

No answer

**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:

See answer to Question 3

**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:

No answer

**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:

No answer

**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:

No answer

**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:

The UK Aviation industry is committed to achieving net zero carbon by 2050. Through Sustainable Aviation, the industry has published its Decarbonisation Roadmap. This sets out how aviation emissions could reach net zero, and some of the measures required to achieve this.

Policy asks include:

- By 2022, work through ICAO to set a clear, long term CO2 target for aviation compatible with the IPCC 1.5 degree report and 2015 Paris Climate Summit ambition
- Develop a framework that will support delivery of the 2050 long-term CO2 target

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- Progress UNFCCC negotiations on Article 6 enabling development of global carbon markets
- Continue to support aerospace research and development through the Aerospace Growth Partnership
- Reform the Renewable Transport Fuel Obligation to incorporate Recycled Carbon Fuels, remove barriers to production, and apply a 1.2x multiplier for SAF developmental fuels.
- Maintain a vital leadership role on airspace modernisation, the most significant upgrading of route networks in UK airspace since the 1950s.

Plus, the following specific actions on carbon removals:

- Raise ambition on carbon capture, utilization and storage (CCUS) deployment and commit to supporting at least two clusters that are operational by 2025.
- Work with the aviation industry to ensure UK carbon removal solutions are eligible for investment through CORSIA.

Full details are available at [www.sustainableaviation.co.uk](http://www.sustainableaviation.co.uk)

**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:

No answer

**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:

No answer

**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:

No answer

**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:

No answer

**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:

No answer

**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:

No answer