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.

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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?

As both the IPCC and IPBES make clear, the climate and biodiversity crises are indivisible and we will not stay within 1.5ºC of warming without addressing the biodiversity crisis. Therefore the implications of the 2019 IPBES report detailing the biodiversity crisis and its implications should be very much considered as integral to the CCC's work and not considered in isolation.

On the climate science specifically, there is considerable new evidence available detailing the much greater sensitivity of the climate to anthropogenic warming than was previously understood which the Committee should consider in terms of the ambition of its proposals. This should be combined with new evidence e.g. around the likelihood that we are approaching tipping points. We note with interest the recent analysis from Lancaster University relating to the mitigation deterrent effect of including greenhouse gas removals within net zero targets – we urge the CCC to consider this carefully and thus the implications for any recommendations around Greenhouse Gas Removal technologies such as BECCS or DACCS.

The nature of this evidence means that it is more important than ever that the CCC is recommending emissions reductions options and policies that actually drive emissions reductions - avoiding practices like bioenergy - and that deliver genuine climate benefits. In this context, we strongly urge the Committee to consider further the science around removals which has led the RSPB to conclude that bioenergy and BECCS pose significant climate risks and should be avoided as far as possible, investing instead in immediate removals mechanisms with considerable co-benefits such as habitat conservation and restoration. There is a strong scientific consensus that bioenergy, due to a failure to account for carbon debt, and policy failings leads to emissions rather than removals within the relevant mitigation period. This evidence is synthesised by the European Academy of Sciences paper but is ignored in CCC reports.

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?

These are highly relevant as they underline the extent to which we have very little time or emissions budgets remaining and therefore high UK ambition is essential to play our fair share in keeping on track for global temperature goals.

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?

As the world decarbonises its energy systems, we need to redouble our efforts to reduce the share of emissions from land-use, land-use change and agriculture. It is critical that globally, we stop our natural carbon stores and sinks from becoming sources as we have seen happening with the forest fires in the Amazon and Australia. The UK is home to a significant such natural carbon sinks, such as peatlands, woodlands, and coastal wetlands - there need to be better managed and protected if they are to realize their mitigation potential.

Furthermore, through the import into the UK of key products such as forest-risk commodities, as well as through the UK's significant Overseas Development Assistance (ODA) budget, the government also should take urgent action to reduce its overseas and imported emissions. In terms of the UK's ODA spending, it is essential that the UK stops funding fossil fuel development, and that spending on large-scale commercial agriculture is scrutinized to ensure that future spending has positive impacts on people, nature and climate.

The UK Government has also set up the Global Resource Initiative (GRI) to address the UK's global footprint, with a focus on forest risk commodities. The UK's import forest-risk commodities (such as soy, palm oil, cocoa, timber, beef and leather, pulp and paper, and rubber) is a driver of emissions due to the conversion of carbon-rich natural ecosystems, and due also to other activities implicit in global agricultural supply chains. The GRI will submit recommendations the government on priority action areas towards achieving sustainable land-use systems. Adopting legislative measures to reduce the UK's deforestation footprint, working with other consuming country- and producing country governments (with particular attention to support for these countries in meet enabling conditions) towards the transition to sustainable commodity supply chains are some of the key areas for action alongside setting the sixth carbon budget that would lead to real impact towards reducing the UK's emissions. These efforts will only succeed, however, if they are closely aligned with and reflected by trade policy and financial flows.

Finally, a Just Ecological Transition will require an uplift in public and private finance, with Nature Based Solutions (NBS) providing significant "win-win" scenarios for people, climate, and nature, if done right. Therefore, the UK government's credibility as a leader on climate and environmental issues will be strengthened if the UK commits to increasing the scale of ODA funding for NBS.

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?

The UK hosting COP26, ahead of which countries will be revising their NDCs. Parties' current commitments are woefully inadequate in tackling the climate emergency, putting the world on track to 3-4^{o}C or higher so the UK as COP President needs to lead by example in setting ambition levels commensurate with the crisis. Demonstrating leadership and commitment to action comes at a critical time both for the climate and as an important demonstration of ambition and intent in the UK's post-Brexit engagement in global environmental agreements and multilateral fora.

2020 is also a critical year for biodiversity, with the Convention on Biological Diversity COP at the end of the year setting targets for global nature recovery to 2030 and beyond. The UK therefore has a crucial role to play in 2020 to demonstrate the role of nature-based solutions to tackle both the climate and biodiversity emergencies we now face. The advice of the CCC should better reflect the importance of getting to net zero in a way that also addresses broader environmental objectives.

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?

The role of the consumer, individual and household in delivering emissions reductions is potentially hugely significant and the RSPB supports the CCC recommendation to the UK government to make "*policies to improve energy efficiency for all buildings*" an urgent priority. To maximise the success and uptake of incentives, these must be accessible rather than complex. Complexity may have been a potential barrier to uptake of retrofitting incentives. Regulation alongside incentives may increase the effectiveness of such energy efficiency mechanisms.

One route to incentivise and provide greater transparency is the national roll out of smart meters, described by BEIS as "*central to the delivery of a smart energy system, delivering secure, cheap and clean energy*"[1]. Whilst a huge number of first-generation smart meters have been installed, these typically present problems to customers wishing to switch supplier and the supplier deadline for smart meter roll-out has also been pushed back from 2020 to 2024.

Further action is required by Government to regulate and incentivise energy efficiency and demand reduction measures to ensure emission reductions.

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?

One of the most significant uncertainties that policy needs to take into account is the sustainability and feasibility of any deployment of **BECCS**. Requirements for massive land use change to meet projected BECCS demand will put biodiversity and carbon-rich habitats at risk of irreversible losses, whereas the restoration and expansion of biodiverse

[1] BEIS Smart Metering Implementation Programme, September 2019 p4

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?

and carbon-rich habitats offers a low-regrets approach which will contribute to both the UK's climate change and biodiversity commitments. The failure by policy to account for actual bioenergy emissions, a policy failure so far ignored in CCC analysis, but clearly elaborated by the European Academy of Sciences among others, means that there is considerable uncertainty in the belief that BECCS will actually lead to negative emissions, given that bioenergy is so emissive.

Uncertainty around the wildlife impacts of offshore wind can lead to delays in wind deployment and damage to important species. **Cumulative impacts** predicted based on the level of **offshore wind** already approved for deployment in UK waters reveal that the long-term conservation of our internationally important seabirds is threatened[2,3,4]. This is now recognised across the sector, specifically in the Sector Deal Strategic Enabling Actions and in relation to Round 3. Urgent action is needed to remove uncertainty including:

1. **Monitoring** – identifying the most important places for sealife and areas where human activities are likely to cause less harm.
2. **Research** – understanding how development impacts on nature (e.g. how do seabirds behave in existing windfarms).
3. **Strategic planning** – ensuring sustainable development at a project (e.g. single windfarm) and ecosystem (e.g. the North Sea) level

The Woodland Trust Emergency Tree Plan[5] rightly recognises that the biodiversity and climate crises must be addressed in tandem and a careless '**dash for carbon' approach to tree planting** poses significant risks in terms of unintended negative consequences. This should be prominently and clearly reflected in Government policy to reduce uncertainty. There is also significant uncertainty in the evidence base with regards to the relative climate benefits of woodland creation on different soil types, the impact that different woodland management practices have in the sequestration potential of woodland, and the fate of harvested wood products with regards to the extent that commercial woodlands will act as a carbon sink within the necessary timescales. This has been flagged in an RSPB commissioned evidence review already shared with CCC staff.

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?

Yes, there is a scientific consensus, from Stern onwards which has underlined that it is more economic to reduce emissions faster than to delay action. Furthermore, latest science (as referenced in Q1) shows us that we now know the climate is warming much

[2] Marine Scotland – Appropriate Assessment for Neart na Gaoithe offshore wind farm: *SNH provided further responses on 5 and 8 October 13 2018, advising that in its view the Development in-combination with the existing consents for Inch Cape Offshore Wind Farm and Seagreen Alpha and Bravo Offshore Wind Farms would have an adverse effect on site integrity as follows: Forth Islands SPA – with respect to gannet, kittiwake and razorbill; Fowlsheugh SPA – with respect to kittiwake and razorbill; St Abb's Head to Fast Castle SPA – with respect to kittiwake.*

[3] Natural England's final position for Offshore Ornithology at the close of the Norfolk Vanguard Offshore Wind Farm Examination was that it is not possible to exclude an adverse effect on integrity on the Flamborough and Filey Coast SPA in-combination with other plans or projects.

[4] Natural England – Supplementary Advice for Flamborough and Filey Coast SPA: *'Natural England has advised regulators that the predicted in-combination collision mortality from consented or proposed offshore windfarms could adversely affect the integrity of the SPA'*

[5] https://www.woodlandtrust.org.uk/media/47692/emergency-tree-plan.pdf

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faster than previous models predicted and we are dangerously close to approaching tipping points. Despite this we are off track to deliver on even the 4th and 5th carbon budgets set to meet an 80% emissions reductions target. Greater ambition in the fourth and fifth carbon budgets not only helps secure a safer future but also ensure that delivery of sixth and future carbon budgets is less challenging, both technically and economically.

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?

Semi-natural habitats **store significant volumes of carbon** (e.g. peatlands, woodland) and sequester appreciable volumes of CO_2[6]. Improving management and condition will potentially double this amount and substantially improve the conservation status of important species assemblages. Improving the condition of existing habitats to improve their sequestration potential is not something that has to date been sufficiently factored into CCC land use scenarios.

In addition to biodiversity, numerous other benefits arise from **nature-based solutions** including air quality, fertile soils, flood protection, sustainable food production, adaptation, amenity value, landscape character and wellbeing. There is a large amount of evidence to support this but from RSPB's own experience, here some key examples.

Saltmarsh has very rapid rates of sequestration as well as being a habitat for internationally important wildlife species. An example is the Wallasea Island Wild Coast Project – the largest coastal saltmarsh restoration project. This project is helping to redress the widespread historic loss of coastal habitats, in doing so it is helping deliver benefits local communities in the Crouch and Roach Estuary through reduction in flood risk and providing a new area of wildlife rich accessible coastal land.

A second example is from Northern Ireland where only a small proportion of **blanket bog** (14%) is considered intact. The CCC identified *'emissions from degraded peatland in the UK emissions inventory could add around 9% to Northern Ireland's total emissions'.* Restoring peatlands, such as the successful restoration undertaken by the RSPB and partners on the Garron Plateau, offers multiple benefits including carbon storage, water quality and creating improved habitat for declining species. In this context, restoration of 50% of upland peat by 2050, is not ambitious enough, all upland peat should be restored as a priority.

In relation to agriculture, land use decisions can support conservation and action on climate change without compromising food security, maintaining food production on the best suited land [7]. In addition, there are a number of co-benefits associated with reducing

[6] Equivalent to around 50% of all UK LULUCF negative emissions from 20% of the land area Field et al In review

[7] Field, R. H., Buchanan, G. M., Hughes, A., Smith, P. & Bradbury, R. B. In Review. The value of habitats of biodiversity conservation importance in climate change mitigation in the UK. Biological Conservation.
Finch, T., Day, B., Gillings, S., Massimino, D., Redhead, J., Field, R., Balmford, A., Green, R., & Peach, W. J. In review. Evaluating spatially explicit sharing-sparing scenarios for multiple environmental outcomes. Global Change Biology
Finch, T., Gillings, S., Green, R. E., Massimino, D., Peach, W. J. & Balmford, A. 2019. Bird conservation and the land sharing-sparing continuum in farmland-dominated landscapes of lowland England. Conservation Biology, 33: 1045-1055.

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climate impacts through reduced consumption of meat and dairy products if these are achieved through reduced livestock numbers in the UK. These include reduced environmental impacts such as reduced soil compaction and opportunities to better align stocking densities with best practice biodiversity management. Shifting to a more plant-based diet also offers opportunities for health improvements. Unhealthy diets are one of the leading risk factors for cancer. Reducing meat consumption to recommended healthy levels and increasing the amount of fruit and vegetables instead can help reduce unnecessary deaths and deliver significant economic benefits to governments by reducing health service costs and days lost through sickness.

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?

Urgent policy action is needed to ensure policies are fit for the purpose of reaching net zero. This includes:

- Urgent investment in **nature-based solutions** to the climate crisis including low hanging fruit such as peatland restoration[8] and saltmarsh creation through coastal realignment.
- Urgent changes are required to the planning and policy frameworks within which **offshore wind** is deployed to ensure net zero is reached in a way that does not exacerbate the ecological emergency.
- Reinstatement of CfD support for onshore renewables (onshore wind and solar) in harmony with nature.
- **UK energy policy is outdated**, not reflecting the urgent need to decarbonise and also in terms of energy technologies and initiatives. For example, the Clean Growth Strategy focuses on a combination of offshore wind, nuclear and CCS. The Overarching National Policy Statement for Energy (EN-1) (July 2011) sets out the Government's position on energy. However, it is now nearly nine years old, and some key assumptions in relation to the development of energy demand and supply are dated. The statement is also based on the 80% reduction target set in the Climate Change Act 2008 and does not reflect the 2019 change to 100%.

Lamb, A., Finch, T., Pearce-Higgins, J. W., Ausden, M., Balmford, A., Feniuk, C., Hirons, G., Massimino, D., Green, R. E. & Villard, M.-A. 2019. The consequences of land sparing for birds in the United Kingdom. Journal of Applied Ecology, 56: 1870-1881.
Lamb, A., Green, R., Bateman, I., Broadmeadow, M., Bruce, T., Burney, J., Carey, P., Chadwick, D., Crane, E., Field, R., Goulding, K., Griffiths, H., Hastings, A., Kasoar, T., Kindred, D., Phalan, B., Pickett, J., Smith, P., Wall, E., zu Ermgassen, E. K. H. J. & Balmford, A. 2016. The potential for land sparing to offset greenhouse gas emissions from agriculture. Nature Climate Change, 6: 488-492.
Gilroy, J. J., Woodcock, P., Edwards, F. A., Wheeler, C., Baptiste, B. L., Uribe, C. A. M., Haugaasen, T. & Edwards, D. P. 2014a. Cheap carbon and biodiversity co-benefits from forest regeneration in a hotspot of endemism. Nature Climate Change, 4: 503-507.
Gilroy, J. J., Woodcock, P., Edwards, F. A., Wheeler, C., Medina Uribe, C. A., Haugaasen, T. & Edwards, D. P. 2014b. Optimizing carbon storage and biodiversity protection in tropical agricultural landscapes. Global Change Biology, 20: 2162-72.
Williams, D. R., Alvarado, F., Green, R. E., Manica, A., Phalan, B. & Balmford, A. 2017. Land-use strategies to balance livestock production, biodiversity conservation and carbon storage in Yucatan, Mexico. Global Change Biology, 23: 5260-5272.
Williams, D. R., Phalan, B., Feniuk, C., Green, R. E. & Balmford, A. 2018. Carbon Storage and Land-Use Strategies in Agricultural Landscapes across Three Continents. Current Biology, 28: 2500-2505 e4.

[8] Field et al In review

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- **Ramping up the energy efficiency** of new housing to achieve net zero and ensure all new builds have rooftop solar and ground/air source heat pumps where appropriate.

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?

The RSPB recommends that the CCC look across the piste at the targets/ambitions of all UK local areas and cities to assess the differential between local ambition and current national policies and targets. It would be helpful to understand how many local targets are underpinned by roadmaps for action and hence where additional support may be needed to deliver action on the ground for example, barriers to progress by local authorities who have declared a climate emergency but may not have the resources to implement the necessary measures, perhaps due to budget cuts.

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: None

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?

Addressing climate change in the land sector, particularly in upland areas, will require significant change in the way we use our land, and in farming practice, public understanding and behaviour. Ensuring that these changes are achieved as part of a just transition that has positive social impacts will be challenging but there are real and rewarding opportunities to be realised through managing land differently. Farmers and land managers are a critical part of the transition. A different pattern of land management could benefit rural communities by creating new economic opportunities as well as the broader societal benefits set out above, for example nature-based tourism enterprises and increased visitor numbers. Engagement and debate within rural communities will be crucial in co-creating and delivering land use patterns which ensure we stay within safe climate limits. Government must act to set the direction and pace of change required to reduce land-based emissions and invest to help communities and businesses transition. This provides real opportunity to engage nature friendly farmers, enhance public understanding of the need for change and to strengthen the bond between those who manage land and those who rely on the variety of public goods the land will provide in the future.

In addition, the benefits that arise from nature-based solutions to climate change can help with a just transition as they do not differentiate between income groups. These include good air quality, fertile soils, flood protection, sustainable food production, adaptation to a

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warming world, amenity value, landscape character and assisting with mental and physical health.

C. 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?

The RSPB welcomes **clearly differentiated emissions pathways** and targets at a country level in addition to overarching UK budgets. Country specific comments:

Scotland has a **greater potential** within its borders to contribute to climate change mitigation via **nature-based solutions** – particularly through protection, restoration and expansion of carbon rich peatland, but also woodland and marine habitats (e.g. kelp and seagrass habitats). Recognition of the scale of potential of these solutions should be prioritised to help maximise the contribution these habitats can make to emission reductions.

CfDs currently provide support for onshore wind located on remote islands, particularly in Scotland – Orkney, Western Isles and Shetland. However, these islands support some of the best wildlife and habitats in the UK and as such the current CfD favours projects that are likely to be sited in high environmentally sensitive sites. If continued, this current approach will increase the **pressures on these ecologically important regions** whilst excluding the opportunity for mainland onshore wind to be deployed in lower ecologically sensitive locations and at the scale required to decarbonise the UK.

Wales – see Q14

The CCC has not set out a pathway to Net Zero for **Northern Ireland** and there is considerable disparity in emission reduction progress with the rest of the UK. Since the introduction of the UK Climate Change Act (2008), greenhouse gas emissions have fallen by 9% in Northern Ireland (2008-2016), compared to 27% for the whole of the UK. This is a critical moment for the CCC to influence the direction of travel in Northern Ireland. A robust net zero pathway should include:

- Interim targets leading to net zero by 2045.
- Sector specific emission reduction targets
- A commitment to nature-based climate solutions including an action plan and provisions for a nature-based climate fund.
- Protection and restoration of carbon and nature rich land and at sea.

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?

Unlike other parts of the UK, the LULUCF sector in Northern Ireland is a net carbon emitter rather than a carbon sink.[9] This situation must be reversed to enable woodland expansion in Northern Ireland to make a more meaningful contribution to achieving the UK's 2050 net zero target.

Northern Ireland's Strategic Energy Framework expires at the end of 2020 and there is currently no route to market for new renewable installations in NI. The electricity transmission network needs upgrading, the electricity grid in NI is not currently able to cope with 100% input from renewables (currently around 65%, 5-year upgrade plan in the offing to reach 95%[10]) and society is very car dependent due in part public transport limitations.

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?

Natural Resources **Wales'** first 'State of Natural Resources Report' (SoNaRR) in 2016 stated "*This report has shown losses of habitats and species' populations over at least the last century, indicating chronic declines in the diversity of Wales' natural resources and ecosystems. Given the fundamental importance of diversity to resilience, this is a concern and also a direct indication that ecosystems are not resilient because species are not recovering".*

The 2019 State of Nature report, which shows no let-up in biodiversity decline suggests this is likely to be the case when the next SoNaRR is published later this year. Welsh

[9] https://www.theccc.org.uk/wp-content/uploads/2019/02/Reducing-emissions-in-Northern-Ireland-CCC.pdf
Net emissions from the land use, land-use change and forestry (LULUCF) sector were 0.3 $MtCO_2e$ in 2016, with a total increase of 0.12 $MtCO_2e$ between 2008 and 2016.
[10] https://www.pv-magazine.com/2019/09/27/northern-ireland-grid-aims-to-be-ready-for-95-renewables/

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- 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?

Government needs to make sure that in responding to the climate crisis it doesn't exacerbate the nature crisis – this means for example ensuring development of renewables or tree planting are not done at the expense of biodiversity or other natural resources (in alignment with the Environment (Wales) Act).

Protecting and restoring ecosystems in Wales (including peat habitats, native woodlands, wetlands etc) needs to be part of Wales' response to the climate crisis. As well as providing nature-based solutions to decarbonisation this will help people and wildlife adapt to the changing climate (supporting wider well-being), offering additional benefits such as water and flood management.

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: None

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

ANSWER: None

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?

The UK CCC Report, *Land Use: Policies for a Net Zero UK (2020),* should be taken a step further to identify land use actions specific to the devolved context. The report recognises the need for a strategic land policy across the UK but lacks detail on specific land use

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?

interventions required in each devolved region. As such, it is likely to have less traction in Scotland, Wales and Northern Ireland than might otherwise be the case.

It should be noted that currently, Northern Ireland has no strategic land use policy. We would welcome central coordination of strategic land use approaches In Northern Ireland, as proposed by the UK CCC (2020), with tailored land use strategies being developed in the devolved contexts.

In terms of transitioning to a post-carbon economy, coordinating electricity transmission between England, Scotland, Wales, Northern Ireland and the Republic of Ireland will be important. Maintaining and repairing the Moyle interconnector, as well as installing the North Sea interconnector, is vital for maintaining electricity supply and providing energy security.

D. 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: None

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

ANSWER: None

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: None

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: None

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: None

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: None

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

ANSWER: None

Question 25 (Industry) 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: None

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?

Low carbon and energy efficient heating also offers the benefit of reducing energy bills, supporting policy aspirations to ensure a secure and affordable energy supply. With support, the timeframe for roll out could be accelerated. Investment must be put in place to:

- Ensure all homes achieve an energy efficiency rating of at least Band C by 2030
- Provide funding to install 10 million heat pumps by 2030
- Work with industry to ensure all new homes reach Passivhaus standard by 2023.

The sector was geared up for delivery of the former zero carbon homes policy, so there is scope to draw on that previous experience including the zero carbon homes hub.

A combination of accessible incentives and regulation would support accelerated decarbonising heat in buildings. Lessons should be learned from retrofitting policy which opted for complex incentives rather than regulation hindering uptake. In addition, the Government must provide clear direction and maintain momentum; the stop-start nature of policy, for example. the decision to scrap zero carbon homes in 2016 when the building industry was ready to take this step, is ultimately undermining the delivery of energy efficiency mechanisms.

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: None

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: None

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?

Whichever models and policy instruments are chosen for a future power system, with or without CfDs, they must focus support on zero-emissive renewable energy, supporting infrastructure (e.g. storage) and energy conservation and efficiency. They should not support high-carbon sources of energy, including from forest biomass.

The energy sector must first be supported to ensure the growth necessary to operate without subsidy support and in an energy efficient way. The CCC's Net Zero Report

observed[11], that excluding solar PV and onshore wind from CfDs "*limits the potential speed of decarbonisation and adds to the costs*". In order to ensure a low cost future, onshore renewables, including onshore wind and solar, must now be given a route to market and reinstated in CfD auctions with support given to projects which jointly tackle the climate and ecological emergencies (i.e. deployment in the least sensitive areas and alongside biodiversity enhancements). In order to provide this support, subsidies could be diverted from unsustainable biomass combustion facilities.

Support for onshore renewables is particularly crucial given the current challenges to offshore wind deployment. In order for this sector to expand without CfD support, the relevant policies (e.g. National Policy Statement for Energy, marine plans) must be fit for purpose otherwise outdated frameworks and poorly evidenced planning risk 2030 and 2050 GW targets and potentially irreversible wildlife losses. Urgent action is needed to address these challenges and take a strategic approach to offshore wind deployment across UK waters, particularly the North Sea. Ultimately, a carefully planned approach now will result in savings and efficiencies throughout the lifetime of offshore wind projects.

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?

At a time of **climate and ecological emergency**, the low carbon technologies we see playing a key role are renewables deployed in harmony with nature including by avoiding adverse impacts and maximising opportunities for nature recovery and resilience. In particular this includes onshore and offshore wind and solar deployed in the least ecologically sensitive areas between now and 2050. This must be alongside energy efficiency and demand reduction measures. We do not see a significant role for large-scale bioenergy for electricity production which can be highly emissive.

The RSPB does not see a role for new **nuclear** electricity generation. Whilst nuclear power potentially offers a low carbon source of generation, there are many others which offer low carbon generation at much lower cost, much more rapid deployment and avoiding substantial safety risks. In our view, investment in nuclear power is a costly distraction from the investment urgently needed in technologies which we already know can deliver a sustainable energy system.

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?

Question 32 (Aviation and Shipping): In September 2019 the Committee published advice to Government on international aviation and shipping and Net Zero. The

[11] Committee on Climate Change report May 2019 'Net Zero – the UK's Contribution to Stopping Global Warming'

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?

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?

Whilst we welcome increases in agricultural productivity arising from efficiency and precision farming, we caution against an exclusive focus on 'sustainable intensification', which can encourage an overall increase in resource use and environmental impact, where efficiency technologies enable indefinite expansion of production without regard for the total impact of the production system. This strategy may also fail to capitalise on synergistic benefits which may be gained through a more integrated approach. The RSPB strongly advocates genuine integration of nature-friendly farming systems that lock up carbon, increase overall system resilience and restore soils. These include agroecological methods and mixed farming systems including silvopasture, intercropping with legumes, and reducing the stocking density of livestock. We call on the Committee to re-examine their scenarios to better account for impacts on biodiversity in order to jointly address the nature and climate emergencies.

We strongly urge the CCC to consider further the evidence around which sustainable and healthy diets can play in realigning land uses. The RSPB considers that the 20% reduction in consumption of meat and dairy is too low based on the most recent evidence. We are also concerned that this target focuses solely on beef and lamb. Instead the target should relate to a significant reduction in the consumption of all meat and dairy to take better account of systems which rely on imported resources which have impacts overseas. The 50% stretch target referenced in the most recent CCC report would align with consumption levels aligned with recommended dietary guidelines.

Chatham House found that governments need to lead transitions to plant-based diets, and that policies which expand choice, use nudge approaches, public procurement and investment in plant-based alternatives could have significant affects at accelerating change. In addition to the environmental impacts, there are also a number of compelling health arguments supporting a shift to a more plant-based diet. Reducing meat consumption to recommended healthy levels and increasing the amount of fruit and vegetables can help reduce unnecessary deaths and deliver significant economic benefits to governments by reducing health treatment costs and productive days lost.

A 20% reduction in food waste by 2025 also falls short of what is required. Sustainable Development Goal (SDG) 12.3 sets a global target for 50% reduction of food waste by 2030 (UN, 2016), with WRAP's new Food Waste Roadmap encouraging businesses to sign up to this target. Greater government involvement could speed the uptake of this target. We therefore call on the CCC to incorporate the more ambitious target in line with the SDGs.

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?

Rewilding and natural regeneration should form a vital role in land spared, especially on agriculturally unproductive land. This can often go hand-in-hand with continued extensive livestock production, taking into account the need for a just transition discussed under Q12. There are a number of advantages of natural regeneration over tree planting for both climate and nature which should be fully accounted for (please see Q8). Land freed up in this way should specifically not be used for the purpose of growing bioenergy crops in monocultures or tree plantations.

On **peat**, the levels of peatland restoration are inadequate in the context of the climate crisis, especially as we urgently need to turn peatland from a source of emissions to a sink. To address this, all upland peat should be restored (Defra signalled in its draft peat strategy for England) not just 50%. Limiting to 50% is not justifiable, given that restoring upland peat should be considered one of the 'low hanging fruit' to be seized in the short term (e.g., ahead of 2030). We also need much more ambitious measures for restoring lowland peat including exploring different forms of agriculture such as wet agriculture/paludiculture rather than assuming that the current system continues.

On **trees**, we fully agree that new woodlands are essential in the fight against climate change. However, a focus on tree planting targets could lead to the delivery of plantation trees that have reduced climate mitigation benefits, limited co-benefits and potentially negative impacts on biodiversity (underlined in RSPB evidence review, pre-publication copy already shared with CCC). Woodland planting should be subject to rigorous environmental assessment and needs to primarily benefit wildlife and people (native trees, sensitively sited) to ensure that trees are a nature-based solution and not an intensive crop. While we welcome the proposals for more trees in the farmed landscape (agroforestry, hedgerows), the CCC proposed market mechanisms to support woodland expansion risk incentivising large scale roll out of forestry plantations focussed on a few, non-native tree species. The RSPB review, indicates trees are more valuable for climate mitigation purposes as standing woodlands than burned for bioenergy or even turned into wood products, most of which do not last longer than 0-25 years. A very small proportion of wood products ends up as construction timber.

We are concerned about proposals for large-scale expansion of **bioenergy crops** which can lead to greenhouse gas emissions through land use change, competing with food production and result in indirect land use change elsewhere.

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?

Currently the UK is considering BECCS at the Drax plant. Drax is highly emissive as bioenergy burns less efficiently than coal and huge volumes of biomass are burned to generate electricity. However, the vast proportion of these emissions are ignored from all accounting systems as the CO_2 emissions from the power station's chimneys are not counted either in the UK, as bioenergy is rated zero carbon in the energy sector, nor in the US where the trees are harvested (the vast majority of Drax supply chain comes from wood pellets from US forests) as the US is outside of the global accounting system. As such Drax currently receives hundreds of millions of pounds in subsidies for highly polluting energy supply, money that would be much better deployed for climate change mitigation purposes to energy efficiency and demand management action as well as onshore wind and solar. The direct impacts of Drax feedstocks on the ground are also highly ecologically damaging (photos are available for the CCC's information).

For BECCS to deliver emissions reductions in this context requires some **substantial systemic changes to international carbon accounting rules** for LULUCF but these are currently politically unlikely. Indeed, the UK's experience with biomass electricity to date suggests that large-scale reliance on burning biomass from forests would set back climate efforts and risk untenable ecological costs. As such, the road to net zero must not be based on the assumption that BECCS via the Drax plant will be carbon negative, it may not even be carbon neutral.

According to the Government's Clean Growth Strategy, the UK has an ambition of deployment of BECCS at scale from 2030, which is subject to cost reductions and demonstration of cost-effectiveness. To date, however, despite over £365m of government investment in Carbon Capture Usage and Storage, progress has been slow. Furthermore, given that carbon capture has never been tested on flue gases from biomass plants, and that the size of the energy penalty is not known, the technical availability of such technologies cannot be assumed.

Critically, carbon capture technology only captures the majority of smokestack CO_2 emissions; it cannot mitigate the carbon lost when a tree is cut and replaced by a seedling – or not replanted at all. In other words, it cannot make up for the resulting loss in the ability of forests to continue to absorb and store CO_2 when trees are harvested for large-scale energy production[12].

The UK Energy Research Centre have highlighted the need for further research on the environmental impacts of BECCS deployment in the UK, including from feedstock supply chains, noting that stricter assessment of biomass feedstock emissions – which we would highlight are essential to ensure carbon savings are genuine – will limit the role for BECCS in the UK.

[12] Chatham House report on BECCs "Net Zero and Beyond: What Role for Bioenergy with Carbon Capture and Storage?"

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:

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?

Brack & King (2020) highlight that biomass use for energy is not carbon neutral and considerable cost and feasibility issues for scaling up BECCS capacity, including land take, loss of biodiversity and terrestrial carbon stocks, transport and infrastructure needs, and efficiency shortfalls next to other renewable technologies. Considered together, these are not necessarily surmountable for the roll-out of BECCS at scale.

By contrast, much research and practice for habitat restoration as a nature-based carbon removal option is already well-developed and could be readily 'rolled-out' at far greater scale than at present to provide carbon dioxide removal, together with biodiversity recovery, water and air quality management and other benefits.

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:

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?

A recent report (Brack & King, 2020[13]) from Chatham House has estimated that global projections of BECCS capacity, including the production, collection and transport of biomass and carbon dioxide, could amount to up to half of current total primary energy consumption, requiring a similar scale of pipeline infrastructure to the current global natural gas network.

As Brack & King (2020) have recommended, it essential, therefore, that BECCS is evaluated on the same basis as other carbon dioxide removal options, including nature-based solutions, according to a comprehensive system of carbon accounting and assessment of other environmental impacts.

At the UK level, the UK Energy Research Centre have highlighted the development of CO_2 transport and storage infrastructure for permanent storage as a bottleneck for BECCS deployment. The full costs and impacts of developing the required infrastructure capacity should therefore be factored into any comparison with nature-based options, including

[13] Brack, D. & King, R. (2020). Net Zero and Beyond: What Role for Bioenergy with Carbon Capture and Storage? London: Chatham House, the Royal Institute of International Affairs. Available at: https://www.chathamhouse.org/publication/net-zero-and-beyond-what-role-bioenergy-carbon-capture-and-storage. Accessed 31-1-20.

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?
expected timelines to achieve removals and the wider environmental impacts (negative and positive) both approaches are likely to have, including on biodiversity.