Committee on Climate Change

Independent advice to government on building a low-carbon economy and preparing for climate change

The Sixth Carbon Budget and Welsh emissions targets – Call for Evidence

Background to the UK's sixth carbon budget

The UK Government and Parliament have adopted the Committee on Climate Change's (CCC) recommendation to target net-zero emissions of greenhouse gases (GHGs) in the UK by 2050 (i.e. at least a 100% reduction in emissions from 1990).

The Climate Change Act (2008, 'the Act') requires the Committee to provide advice to the Government about the appropriate level for each carbon budget (sequential five-year caps on GHGs) on the path to the long-term target. To date, in line with advice from the Committee, five carbon budgets have been legislated covering the period out to 2032.

The Committee must provide advice on the level of the sixth carbon budget (covering the period from 2033-37) before the end of 2020. The Committee intends to publish its advice early, in September 2020. This advice will set the path to net-zero GHG emissions for the UK, as the first time a carbon budget is set in law following that commitment.

Both the 2050 target and the carbon budgets guide the setting of policies to cut emissions across the economy (for example, as set out most recently in the 2017 Clean Growth Strategy).

The Act also specifies other factors the Committee must consider in our advice on carbon budgets – the advice should be based on the path to the UK's long-term target objective, consistent with international commitments and take into account considerations such as social circumstances (including fuel poverty), competitiveness, energy security and the Government's fiscal position.

The CCC will advise based on these considerations and a thorough assessment of the relevant evidence. This Call for Evidence will contribute to that advice.

Background to the Welsh third carbon budget and interim targets

Under the Environment (Wales) Act 2016, there is a duty on Welsh Ministers to set a maximum total amount for net Welsh greenhouse gas emissions (Welsh carbon budgets). The first budgetary period is 2016-20, and the remaining budgetary periods are each succeeding period of five years, ending with 2046-50.

The Committee is due to provide advice to the Welsh Government on the level of the third Welsh carbon budget (covering 2026-30) in 2020, and to provide updated advice on the levels of the second carbon budget (2021-25) and the interim targets for 2030 and 2040. Section D of this Call for Evidence (covering questions on Scotland, Wales and Northern Ireland) includes a set of questions to inform the Committee's advice to the Welsh Government.

Question and answer form

When responding, please provide answers that are as specific and evidence-based as possible, providing data and references to the extent possible.

Please limit your answers to 400 words per question and provide supporting evidence (e.g. academic literature, market assessments, policy reports, etc.) along with your responses.

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?

There are arguments for and against revisiting and revising the budgets; and ultimately the decision to revise will be a political one.

Irrespective of the outcome, if the CCC revisit the previous budgets in setting the 6th budget, in doing so it will enshrine the credibility and feasibility of the sixth carbon budget (6CB) on the path to net zero.

The argument for revisiting them – with a view to tightening them – is that it is neither feasible nor cost effective to have such a 'step change' in the rate of change of emissions reductions when moving from 5th to 6th budgets on the path to Net Zero. Furthermore, it would show the UK's leadership in achieving the Net Zero goal in the same year as it is due to host the UN Climate Change Conference in Glasgow (COP26, November 2020).

The argument against revisiting them is that change increases uncertainty and damages investor confidence. In addition given that, in the absence of additional policies, the UK will be unable to fulfil the 4th and 5th CB, arguably there is little benefit in simply widening that gap even further.

The path should only be changed if CCC can show that a new path is more cost effective than the current one.

As an industry, we believe the real priority is implementation of the policy measures that are needed to achieve – and possibly exceed – the current legislated 4th and 5th budget.

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?

Our evidence draws on our experience in Wales, and is also applicable to Q14d).

It has been clear for some time that the market conditions for coal-fired power generation have been challenging, therefore on 1 August 2019, RWE announced that it will close the

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coal-fired Aberthaw power station by 31 March 2020.

Aberthaw directly employs around 170 people with many more supported indirectly. Following the announcement, we have been working with external Union representatives to support the directly affected employees. We have implemented a number of support initiatives to minimise the impact on affected workers, including:

- **Funding, in particular to retrain/reskill** – we have provided our own funds for this in addition to drawing on the Welsh Government ReAct scheme.
- **One-to-one support**, to help affected staff prepare for the future based on their specific circumstances. All staff have been offered one-to-one outplacement support and access to personal and financial counselling (via our outplacement supplier, Chiumento).
- **External engagement:** we have also worked with local agencies to pull together external opportunities e.g. job fairs and providing links to local recruitment agencies.

Where possible, we have tried to find alternative opportunities for employees within the RWE portfolio, and all trainees have been offered the opportunity to complete their training at one of our other locations. A small number of employees have secured offers outside of the company.

It is worth noting that, even with generous funding and the best endeavours to re-train, the reality is it will be difficult for some people working in fossil fuel industry to seamlessly transition to new roles in the 'low-carbon' economy. This is particularly the case for older workers. In other words, not all jobs / skills are transferable, to the extent the skill set is different (e.g. coal power station vs offshore wind farm).

A. 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?

See response to Q14d. Scotland and Wales have set carbon budgets on a gross (territorial) basis, but the UK target is measured on a net basis (accounting for emissions trading). Consequently, due to risk of 'leakage' it is imperative that Scotland and Wales do not set targets that are 'out of step' with the UK, i.e. significantly more ambitious. This will result in carbon and economic activity simply 'leaking' to England or rest of EU (if the UK remains linked to the EU ETS post Brexit).

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?

14b)

Welsh carbon budgets are a sub-section of the UK's carbon budgets, which are measured on a 'net' basis, allowing for trading of CO2 emissions allowances (EUAs) through the EU ETS. However, the Welsh Government has decided not to account for the effects of emissions trading and count Welsh territorial emissions on a gross basis. This approach risks economic activity, jobs and emissions simply 'leaking' from Wales to elsewhere, without any net impact on global emissions, and in some cases, increasing emissions (for example if activity re-locates to somewhere less efficient). This is not in line with the principle of the Well-Being of Future Generations Act 2015 (WoFGA). We therefore strongly urge the CCC and Welsh Government to assess the risk of carbon leakage when setting carbon budgets and developing policies to meet them.

Welsh Government are seeking to maximise benefits to Wales from renewable energy generation in line with the WoFGA by developing policy and guidance on 'local ownership'. This work is ongoing and final proposals have not yet been released. However, a report by BVGA (attached with our submission) suggests that the best way to maximise both deployment of renewables and local economic benefit, is via encouraging 'shared ownership' rather than 'local' ownership. Shared ownership is a partnership between the developer and another local party such as a community group, council or local business.

We would urge careful assessment of the trade-offs of encouraging local ownership to the extent it may reduce, delay or increase the costs of renewables deployment and

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consequently weaken Wales' ability to address climate change. We are specifically concerned about initial proposals to make local ownership a material planning consideration.

14d – see response to Q12, above.

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?

The Welsh Government (WG) have a target to meet 70% of Welsh electricity demand from renewables by 2030. Since that target was set, it has increased 2050 ambition to 95% emissions reduction (vs 80%). There is therefore scope to review the 70% renewables target to ensure it is consistent with increased ambition.

Furthermore, Wales is well interconnected with rest of UK and generates more than it consumes (in 2018 it generated an estimated 30.2TWh of electricity whilst consuming approximately 14.9TWh)[1]. We believe it is better to set Wales' renewable ambition as a share of

[1] https://gov.wales/sites/default/files/publications/2019-10/energy-generation-in-wales-2018.pdf

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total generation – not just Welsh demand – taking into account its abundant natural resource relative to other areas of the UK. In other words, Wales' renewable ambitions should not be limited to the share of Welsh demand.

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?

As noted in response to Q14 above, Welsh and Scottish carbon budgets are defined on a gross basis whilst UK is on a 'net basis'. Therefore, if decision making between UK and the devolved regions is not coordinated effectively, there is a risk of leakage of activity, jobs and emissions at the expense of no net reduction in overall emissions.

As such, devolved policy should focus on the levers that are efficient and do not overlap with UK. A good example is power - the UK already has a very effective suite of policy levers for reducing emissions from fossil generation, namely the EU ETS and the UK Carbon Price Support (CPS). Both have initiated a dramatic reduction in electricity generated from coal (including the closure of Aberthaw coal-fired power station in Wales).

B. Sector-specific questions

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?

We would urge that the Government maintains its flagship and most successful policy mechanism for low carbon generation, the Contracts for Difference (CFD). There have only been three auctions to date; but each has delivered ever decreasing clearing prices, with projects constructed both to time and budget. Given this success and a worsening 'missing money problem' as a result of even lower capture prices going forward, we call for the continuation of the regime up to the 6th Carbon Budget period.

An evolutionary rather than revolutionary approach should be taken. At a high level, we propose the following three amendments:

1. **CfD auction Allocation** – should be based on a forward view of the volumes of low carbon generation needed to meet carbon budgets. This would be a more objective process for setting allocation round parameters and provide important forward visibility to investors around future opportunities in low carbon generation.

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2. **Floating Wind CfDs –** to help enable commercial-scale floating offshore wind projects in the UK, we propose the government defines wind projects with floating foundations as a separate technology from offshore wind and allows it to compete in future 'Pot 2' allocation rounds; a floating wind minima will be required if floating wind is to directly compete against fixed-bottom offshore wind.

3. **Increased system benefit** – future auction rounds could also consider how to incentivise flexibility e.g. co-location with storage and hybrid sites. Such incentives require a stronger penalty regime to deter speculative bidding.

The potential alternative to a CFD is Regulated Asset Base financing, which the Government has consulted on specifically with respect to new nuclear. Theoretically, the RAB model provides a financially efficient route to market for projects with low risk profiles. However, particularly in the case of new nuclear (with a well-documented track record of cost over-runs and delays), the RAB model is arguably highly unsuitable. We would therefore urge the continuation of CFD for renewables accompanied by, for nuclear, a thorough 'value for money' assessment of the suitability of RAB, i.e. comparing the RAB approach against additional possible counterfactuals e.g. alternative low carbon power (including renewables), direct nuclear procurement by the state, competition between nuclear projects, demand side measures ("negawatts"), etc.

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?

30a) Since the Further Ambition scenario is illustrative and looking 30 years into the future, clearly all low-carbon technologies could in principle have a greater or lesser role.

As set out in the Vivid Economics / Imperial College report (summarised in Box 2.2 of the Technical Report) the UK has vast potential renewable resources, which we believe could play a greater role. We believe that the cost of wind will be lower than that assumed by the CCC, enabling greater deployment for the same cost assumptions. This will need the UK Government to: examine different approaches to the supporting infrastructure, such as a

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North Sea Hub; address barriers to entry to flexibility markets; and introduce a series of actions, including floating wind CfDs as outlined above, to implement the manifesto commitment to “enable new floating wind farms”.

b) (i) Our internal analysis of the CCC’s illustrative power scenario for 2050 concluded that the generation mix would need a further 60-90 GW of firm, flexible capacity to ensure security of supply. This includes technologies such as interconnection, battery storage and demand response (DSR).

However, interconnectors cannot be relied upon for prolonged periods of low renewable generation / high demand, since these periods will coincide with interconnected markets (e.g. high-pressure across NW Europe on a cold, dark winter’s night). Furthermore, battery storage and DSR are only able to address short duration imbalances (i.e. less than 4-6 hours)

Flexible technologies that cover longer periods (i.e. a week or more), such as flexible gas plant with CCS and hydrogen, are therefore crucial to maintaining security of electricity supply in support of high renewables penetrations.

b) (ii) We do not have quantitative evidence on the amount of DSR that might be realised. However, we note that it will be fundamentally driven by both the opportunity cost of provision and how flexibility is valued, underlining the importance of well-functioning flexibility markets with transparent price signals.

Today, most DSR comes from industry (e.g. manufacturing) but the expected growth of other end user technologies (such as EVs and heat pumps) will provide more opportunities to increase the volume and capacity of demand side flexibility from domestic / business customers. This in turn will depend on technology development and the willingness of consumers to provide such flexibility (whether this is through additional financial incentives or associated policy changes (e.g. increased fuel duty / phase out of gas heating).

Question 31 (Hydrogen): The Committee has recommended the Government to 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?

A balanced approach should consist of a mix of incentives, such as 1) deterring the use of fossil fuels 2) incentivising production of low carbon hydrogen, and 3) encouraging end use of low carbon hydrogen.

Firstly, to deter use of fossil fuels beyond the power sector, which is already taxed via the EU ETS and UK Carbon Price Support, we would urge rebalancing the ratio of policy costs from electricity onto gas. This in turn would encourage the blending of hydrogen into the gas network, which would have the benefit of reducing carbon from domestic heat without the need for more radical changes in heating equipment or consumer behaviour. Green hydrogen from electrolysis will complement a large scheme in allowing usage of higher concentration of hydrogen in some more downstream areas of the network, i.e. higher than the 20% hydrogen blend being trialled in the HyDeploy project..

Secondly. future mechanisms to incentivise the production of low carbon hydrogen need to recognise and address the commercial, technical and regulatory risks involved with investing in low carbon hydrogen production. The CFD mechanism has been successful in incentivising renewable power and therefore, in the long-term, could be adapted for hydrogen, possibly based on production cost (£/kg) compared to standard technology production cost. However, as there is no liquid market for H2 to act as a benchmark for the CFD, in the short term a ‘quota’ approach may be necessary.

A certification scheme that reflects the carbon footprint of the hydrogen produced would help end users better understand the green credentials of low carbon hydrogen. The use of, for example, Guarantees of Origin (GoO) for renewable electricity would enable “green” hydrogen producers to secure renewable electricity from multiple sources thus enabling baseload operation of electrolysers, rather than being forced to produce intermittently (i.e. if it were confined to a physical H2 connection vs GoO trades). The UK Government must should ensure that, if implemented in the UK, the EU’s Renewable Energy Directive II; recital 90, paves the way for increasing green hydrogen usage via GoO trading.

Finally, economically rational switching to hydrogen is unlikely and therefore first deployment should be based on creating incentives (Government action) based on timely deployment and focussed on achieving the largest emissions reductions. This is most likely to be in the transport sector and in some energy intensive industries, .

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?

Geographical factors, population density, housing, finance and planning policy both at national and local level will be the key factors determining network investment with regards to

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These will determine outcomes such as: access to geothermal heat; access to a gas network (for blended up to 100% hydrogen); access to a low carbon district heat network; and the ability to install PV.

Policy makers must be willing and able to design, implement and enforce changes to planning to ensure networks are 'fit for the future'. Ambitious building standards for both new and existing properties should support increased energy efficiency and reduce the heat demand, and therefore minimise the required network investment.
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As noted in our response to Q30 the degree to which consumers are encouraged to manage their electricity use more flexibly (for example EV charging / heat pump optimisation) will impact the level and speed of required electricity network investment. This underlines the importance of well-functioning flexibility markets with transparent price signals.

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?

Whether it is used to enable blue hydrogen production or for generating reliable flexible low carbon electricity, carbon capture and storage (CCS) will be essential for delivering the secure, low carbon energy system of the future. CCS will enable the UK to continue using natural gas, which clearly remains critical for the UK energy system.

Our analysis of the illustrative Further Ambition scenario estimates that the UK will still be using over 500TWh of natural gas (roughly 2/3rd of current demand) for either hydrogen or electricity production, all of which will need to fitted with CCS. This indicates that enough CCS infrastructure to deal with ~100mt CO_2 per year could be required by 2050 to deliver Net Zero.

Through the 2020s, sufficient CCS infrastructure will be need to be developed to ensure delivery of at least the large-scale hydrogen project mentioned in Q31. Development of CCS infrastructure will need to precede such CCS projects to ensure that infrastructure facilitates delivery of low carbon energy rather than hinders it. CCS developments in the 2020s will need to take future CCS requirements into account, i.e. up to ~100mt pa, in order to avoid any future delivery bottlenecks and ensure cost effective investments, i.e. balancing out the need to facilitate future investment vs. building white elephants.