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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Response: Equinor UK, February 2020

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?

Equinor believes that some of the most important uncertainties for the UK in reaching Net Zero relate to the decarbonisation of the heating, transport and industry sectors.

These include consumer receptiveness to changes in transport and the home (e.g. acceptance of different heating systems). Coherent and integrated strategies are required that lead to emissions reductions at least cost while not hampering economic growth.

Market-based measures have proved successful in the power sector, and we agree with the CCC's assessment that offshore wind will play a major role in reaching net-zero. To realise the potential, it is important that market design is stimulating investments, that emerging technologies that can meaningfully contribute – such as floating wind – are promoted, that offshore and onshore grid is developed in an efficient and coordinated manner and that consenting risk is reduced.

The decarbonisation of the heat sector will be of utmost importance for the UK to reach its Net Zero target, given heating characterises a major component of the UK's overall energy system. Thus action on heat needs to gather pace: technical and commercial challenges exist, though these are not insurmountable with the right regulatory and policy framework.

Such a long-term policy framework needs to set out the investment landscape and actively engage with local and regional stakeholders. Given the size of the decarbonisation challenge that remains, agile and innovate solutions need to be explored. We believe in the longer-term, hydrogen could have a central role in the heating sector, given its potential to leverage existing infrastructure, while providing optionality on both sourcing and use. The recently published H21 North of England concept shows what is possible.

Consumer engagement and understanding must also be bolstered. Supply chains and markets for low carbon heat in the UK are underdeveloped. It is therefore vital that the policy and regulatory framework encourages hydrogen technologies. Ultimately, a clear roadmap on heat decarbonisation and hydrogen is necessary to enable firms to make appropriate investment decisions. Additionally, the UK government should incentivise the creation of carbon capture, utilisation and storage clusters to decarbonise industry directly and indirectly (through fuel switching to hydrogen).

Solutions need to be developed during the 2020s so they can be scaled up rapidly in the 2030s. This may be fostered if silos between government departments are broken down, so that energy, transport, planning, housing and environmental policy is better co-ordinated.

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?

We believe there is merit in the CCC revisiting these targets if doing so makes it more cost efficient for the UK to reach Net Zero.

A. 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?

Equinor believes that carbon pricing ought to be promoted at a high level to foster efficiency improvements and omit the most GHG-intensive forms of energy. Putting a price on carbon is a fair, clear and efficient way to incentivise both producers and customers to find innovative and cost-efficient means of reducing emissions. Carbon markets are able to provide good governance and strong accounting frameworks that allow for technology transfers to be a win-win for both participants in a transaction.

As mentioned in the Net Zero Advice, the UK has contributed widely to support global carbon pricing mechanisms. It is important that post-Brexit the UK considers carefully its relationship with the EU ETS system. A standalone UK ETS, without sufficient alignment, is likely to suffer from reduced liquidity and increased volatility and to also diverge from the Internal Energy Market.

UK policy must be clear to enable further significant investments into renewables and other decarbonisation technologies. It also needs to create the right incentives for people to be happy to switch from gas to low carbon heat at lowest cost as ultimate public acceptance will depend on the impact on energy bills. Effective public communication, also regarding air quality implications, needs to be fostered.

Power market design must take into account a power market that would be dominated by intermittent low-carbon generation with low or no short-run marginal costs. This means that while subsidies will no longer be required, Government intervention in the form of revenue support mechanisms such as CfDs, floor prices and/or Capacity Mechanisms would be important to ensure sufficient deployment to reach targets and sufficient firm capacity. Flexibility in the form of e.g. demand side management and storage will also be important.

The net zero target will require a wider and more ambitious targets than in the current policy. For example, plans for wider roll-out of CCS and hydrogen should be more aggressive and seek at least four clusters with early market development and demonstrators by 2025-2027.

Hydrogen and CCS projects are large-scale and complex projects. Strong policy measures are needed in the entire value chain (from producers to users) to be successful. The current funding scheme might not be sufficient to make the projects that are under development in these respective clusters materialise.

See below on oil and gas production electrification.

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?

We see low carbon opportunities for UK offshore oil and gas. Success depends on the collaboration of many stakeholders.

Several of Norway's offshore oil and gas fields - including Johan Sverdrup, Martin Linge, Troll A - are now provided with power from shore, significantly reducing emissions from offshore operations, and enabling Equinor to reduce its CO2 emissions in absolute terms.

In the future, a new electricity transmission link between mainland Scotland and the Shetland Isles could offer the potential to power new and existing UK oil and gas developments in the area.

Benefits would include: carbon reduction for newest fields and potential to reduce CO2 emissions from existing infrastructure; a new power supply for Shetland; the ability to export electricity generation from potential future renewable developments, such as offshore wind.

Currently there is no regulatory framework for power from shore to UKCS infrastructure. The responsibility for regulation sits across three separate authorities – OFGEM, Crown Estate and OPRED – which may hinder the pace and development of such a framework.

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?

Security of supply must remain a priority, especially as the energy system transforms itself to become Net Zero. Policy design must be aimed at Net Zero while supporting or enhancing security of supply, aiming for a secure, clean and affordable energy system at all time, especially as new intermittent generation come on the system. Market-based measures should be the priority, exemplified by the UK's large and liquid market in natural gas in enabling the UK to move away from coal securely and cost-efficiently.

Implications for the job market and competitiveness must be considered while aiming to be at the forefront of the energy transition. Failure to decarbonise now will increase long-term costs in the future.

Seed funding to kickstart and de-risk various decarbonisation projects will be necessary for firms to act faster, and will also grow UK expertise in these areas. Policy makers will have to analyse the possibility of a Regulated Asset Base (RAB) model for various projects. De-risking large low carbon infrastructure projects, such as new CCUS projects via RAB arrangements, would have the potential to lower the cost of capital and therefore the overall costs of these projects. The government should also use cost abatement curves to help with its target and identify cost-effective, low-carbon investments.

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

In order to support meaningful global agreement on strengthened actions to reduce emissions during the UK's hosting of the COP at the end of 2020, there is wide agreement that the UK should show leadership by putting policies in place to support decarbonisation in its hard-to-decarbonise sectors.

These actions should include mechanisms to support the development of hydrogen, biomethane and CCS. The decarbonisation of the heat sector will be of the utmost importance for the UK in order to reach its Net Zero target, yet there is currently a significant level of uncertainty due to a lack of policy direction on the long-term changes needed. This must be rectified so action on heat can gather pace. The policy and regulatory framework need to enable business cases for decarbonisation technologies including hydrogen. Policies should be clear to allow firms to plan investment decisions accordingly.

Multiple CCUS clusters are needed in the UK to enable the decarbonisation of manufacturing in and around the UK's main industrial sectors, either directly or indirectly (through fuel switching to hydrogen). CCUS should grow to become a sector in itself over the long term.

UK government should also consider widening the scope of carbon markets, to include other sectors and increase the share of renewable energy, incentivise CCS and allow for clear, complementary and non-contradictory measures, such as targeted energy efficiency and emission performance standards.

Putting a price on carbon will reduce emissions at a larger scale, and at lower cost than alternative policy measures. It is a technology-neutral and fuel-neutral policy measure which leaves flexibility on how to reduce emissions. Further, a price on emissions is the most efficient and effective way to stimulate investment in technology and to cut the emissions that cause global warming.

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?

The UK CfD system has successfully delivered a substantial cost reduction for renewable projects, in particular offshore wind. As the power market changes from a power market dominated by coal and natural gas to a market dominated by intermittent low carbon generation with low or no short run marginal cost, there is a risk of substantial price cannibalisation and volatility. Hence, future market design needs to take this into account. This means that mechanisms such as CfDs, floor prices and/or Capacity Mechanisms are expected to still be needed to ensure necessary deployment of these technologies. As long as these mechanisms are designed in a competitive and efficient way, this will minimise costs to consumers. The UK government must also develop business models that can quickly roll-out low carbon dispatchable power based on hydrogen and CCS.

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?

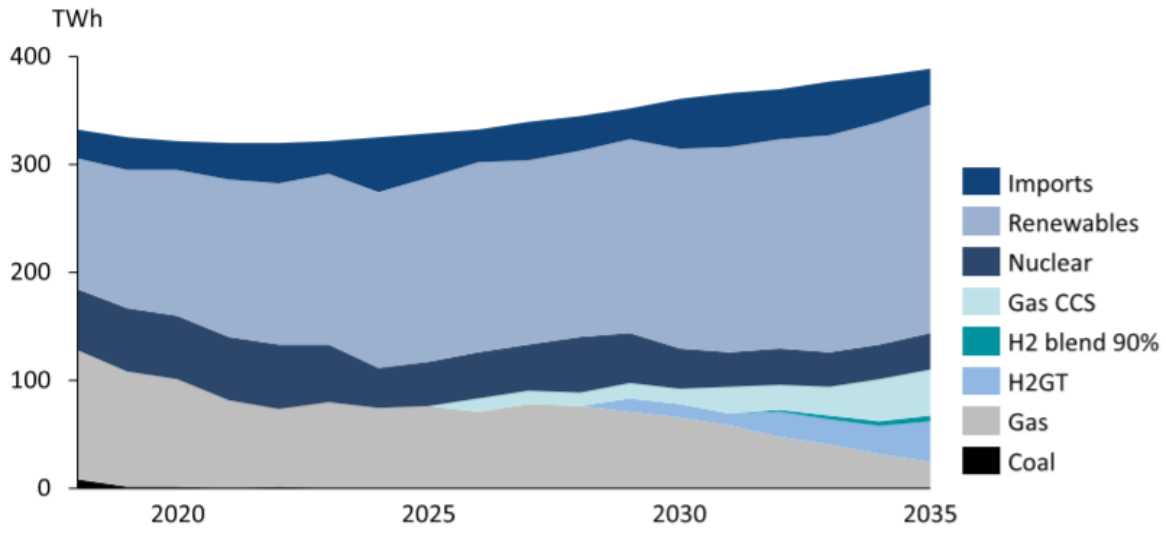
We agree with the CCC's assessment of the great potential of offshore wind. As outlined earlier, there must be a predictable policy framework to enable the investment required to achieve further low carbon generation.

It is also fair to assume that renewable gas (biomethane), hydrogen and abated gas will represent a large share of the UK's energy network. Synthetic fuel production will also be at higher levels. There needs to be flexibility in gas generation and fast-acting backup power to help manage the intermittency issue. Multiple CCUS clusters will be necessary - CCUS should develop into a sector in itself. Equinor believes that these technologies will play a pivotal role in the generation mix in years to come and underpin the UK's ambitions on climate change while ensuring that it has a sustainable and secure energy future.

Note: In the Net Zero Technical report the 2050 power mix comprises roughly 75% of non-dispatchable power (renewable and nuclear) and 25% of dispatchable (Gas CCS).

This implies the load factor of future low carbon dispatchable power will be 25% with multiple starts/stops and days of no operations. From our internal work, and partly documented through the Hy-impact series report "Hydrogen to Power Generation" link, use of hydrogen in gas power stations provides the most competitive solution in delivering flexible power with a 95% capture rate.

In the same report two 2035 scenarios were described: 1) based on 100% hydrogen in power and 2) a hybrid between hydrogen and post combustion.



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Since the UK has access to offshore CO2 storage, hydrogen storage via caverns and a very developed gas infrastructure (which is mostly hydrogen ready) it is Equinor's view that hydrogen from natural gas with CCS will be the most cost-efficient way to meet Net Zero and deliver to sectors that require seasonal and weekly flexibility, i.e. dispatchable power and heat. This is documented in the H21 North of England report and the Hy-Impact Series.

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?

Answered elsewhere.