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.

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?

In order to reach the net zero target by 2050, the Government will need to deliver complete decarbonisation of energy use in buildings. Addressing the decarbonisation of 4million homes off the gas grid will be critical in achieving net zero. This will undoubtedly cause consumer disruption and is a challenge that must be considered in any policy decisions that are made.

The off-grid housing stock is mostly made up of new build apartments and traditional rural properties making them hard-to-treat as they are older, less efficient and have a higher heat demand. As a result, it is important that a mix of technologies are considered in lowering emissions in the off-grid sector to ensure that the consumer can make the right heating decisions for their property. Simply "picking winners" can create excessive costs and place unnecessary burden on the consumer, placing more people at risk of fuel poverty.

As found in BEIS' Cost of Energy independent review, "the cost of energy is significantly higher than it needs to be to meet the government's objectives and, in particular, to be consistent with the Climate Change Act (CCA) and to ensure security of supply."[6] The Climate Change Committee have already estimated the costs of decarbonisation for electricity to be around 20% of typical electricity bills with legacy costs amounting to well over £100 billion by 2030.

There are a mix of technologies in addition to the electricity grid that are decarbonising rapidly and will help the Government to reach a future homes standard by 2025 with economic feasibility, such as the transition from LPG to bioLPG. BioLPG is 100% renewable and requires no changes in infrastructure as it is chemically identical to LPG and can be used as a "drop-in" fuel. A study conducted by Ecuity into Off-Grid Heat Decarbonisation Pathways found that a mixed technology approach to decarbonising heating systems in the 1.5million off-grid rural homes in the UK would save over £7billion compared to a pathway that only supports electric heating. This is a saving of approximately £4,700 per homeowner.[7]

If the Government chooses a winner today, it could prevent other low carbon technologies that are set to decarbonise over the next five years from having an influential role to play in the decarbonisation of off-grid housing and increase in energy efficiencies. Instead of picking winners, the Government should focus on a framework for allowing the market to innovate which will bring new technologies and products to the consumer while keeping the cost of energy down.

[6] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/654902/Cost_of_Energy_Review.pdf

[7] https://www.liquidgasuk.org/uploads/DOC5DA5B347CF3A7.pdf

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?

Uncertainties that must be considered within policy for the off-grid sector include security of supply, cost, fuel poverty and consumer disruption.

Security of supply needs to be considered in any policy decisions to prevent instabilities in the electricity grid from causing mass consumer disruption. The power outage in August 2019 affected over 1 million customers across Britain causing disruption for people and businesses and had a knock-on effect for transport several days later. A mixed technology approach to decarbonising off-grid homes would prevent over-reliance on the electricity grid and reduce further incidents from happening in the future. LPG is readily available in the UK today. Furthermore, Flogas Britain has been granted planning permission to store 34,564 tonnes of LPG at the Avonmouth Storage Terminal which will provide commercial and residential customers in the South East and across the UK will have greater security of supply.

In the off-grid sector, LPG is the lowest carbon conventional energy source available to homes and businesses in the UK today. Off-grid houses are hard-to-treat as they are older, less efficient and have a higher heat demand. Adopting an electric heating approach to heating these off-grid buildings will leave consumers with lower grade heat and make it much more costly to heat their homes, increasing the risk of these consumers falling into fuel poverty. A study conducted by Ecuity, into Off-Grid Heat Decarbonisation Pathways found that a mixed technology approach to decarbonising heating systems in the 1.5million off-grid rural homes in the UK would save over £7billion compared to a pathway that only supports electric heating. This is a saving of approximately £4,700 per homeowner.[8]

The effects of consumer disruption must also be considered in deciding any policy for off-grid homes and businesses. LPG has a plausible and cost-effective route to decarbonising the off-grid sector in line with the Government's net zero targets. LPG and bioLPG, a low-emission fuel, can be seamlessly used in existing heating systems, be those gas boilers, combined heat and power (CHP) units or even in renewable hybrid heat pumps. The fuel is compatible with a range of heating technologies and systems, and the transition from LPG to bioLPG is a seamless way to reduce emissions further today or in the future due to its "drop-in" nature. This can all be delivered by a well-developed supply chain, with experienced installers, retailers and distributors providing businesses with security of supply and excellent service.

[8] https://www.liquidgasuk.org/uploads/DOC5DA5B347CF3A7.pdf

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?

If the Government is to meet its net zero objective, decarbonising heat will be one of the greatest challenges. The Government will need to maximise carbon reductions today in order to see the fourth and fifth carbon budgets met.

It is important to consider the immediate carbon savings that can be made from switching off-grid homes and businesses from heating oil to LPG for which the infrastructure is already "bio-ready." Upgrading a working heating system is not at the forefront of mind for most homeowners and therefore Flogas Britain believes suitable regulatory signals and or policy incentives from Government are likely to be necessary to mobilise the switch away from oil and coal. A Government supported oil tank scrappage scheme could be used to drive the right consumer behaviour and incentivise the homeowner to switch from heating oil to low carbon solutions such as LPG with immediate benefits and further deep de-carbonisation through a transition to biopropane.

The most consumer friendly and cost-effective solution to reduce carbon emissions immediately is to replace inefficient oil boilers with an LPG boiler system. The 1.1 million homes using oil use on average 19,337kWh per annum.[9] If all homes were to convert to LPG this would deliver an immediate CO2 saving of at least 30% per property (13% from the fuel and the rest delivered through the use of a more efficient gas boiler, particularly vs the existing oil boiler stock). Even before the application of biopropane or advanced technologies, LPG can deliver **savings of 1,901,637 tonnes of CO2 per annum**. Incentivising off-grid domestic oil consumers to switch to LPG is therefore a realistic and cost-effective solution to cutting CO2 emissions with the option of installing advanced gas-powered technologies in the future.

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?

A co-benefit of acting on climate change that should be valued alongside reducing carbon is air quality. Air pollution is a major public health risk in the UK and is a leading cause of premature deaths according to the World Health Organisation with estimates that long-term exposure can shorten lifespans equivalent to 28,000 – 36,000 deaths per year.[10] Compared with off-grid conventional fossil fuels such as oil and coal, LPG is a clean burning, smoke-free fuel which emits 84% less Nitrogen Oxide (NOx) than oil and emits almost no particulate matter (PM).[11] LPG and bioLPG therefore have negligible impact on air quality and is a low carbon alternative to oil and solid fuels.

[9] Weighted average: https://www.nnfcc.co.uk/files/mydocs/Bioenergy_heating_options_in_off-gas_grid_homes.pdf

[10]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf

[11] https://www.wlpga.org/wp-content/uploads/2019/09/The-Role-of-LPG-Bio-LPG-in-Europe-2019-Report.pdf

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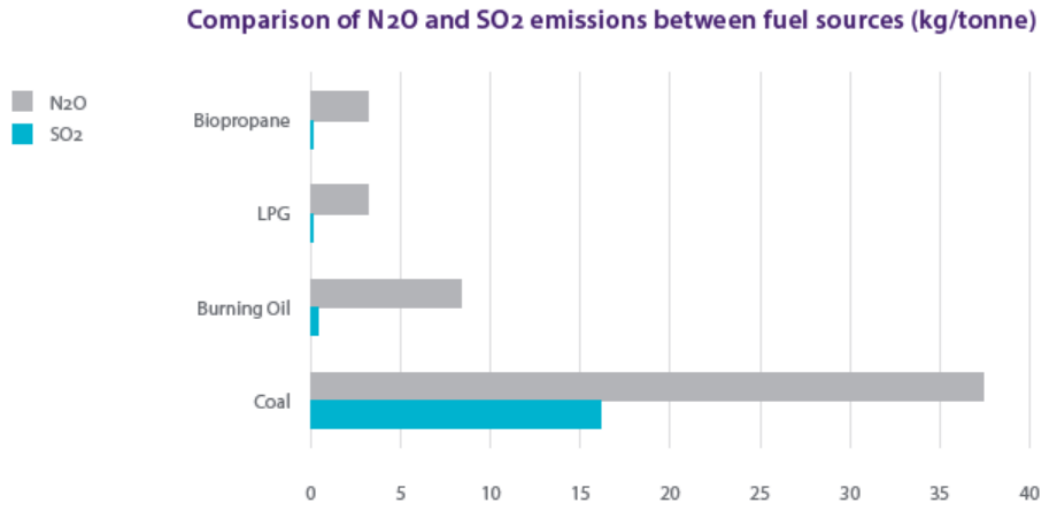
A levelised cost analysis conducted in the "The Role of LPG and BioLPG in Europe" by The WLPGA, quantifies the costs to businesses of switching to a range of heating technologies. The levelised cost of a typical rural pub in the UK using an LPG boiler is around 14% lower than an existing, oil boiler. In the longer term, switching to a bioLPG-fuelled system would generate a levelised cost of £86/MWh, this is around 30% lower compared to a biomass boiler and around 13% for a typical in-situ electric heat pump. [12]



[13]

[12] https://www.wlpga.org/wp-content/uploads/2019/09/The-Role-of-LPG-Bio-LPG-in-Europe-2019-Report.pdf

[13] https://www.ssb.no/_attachment/288060/binary/93858?_version=539789

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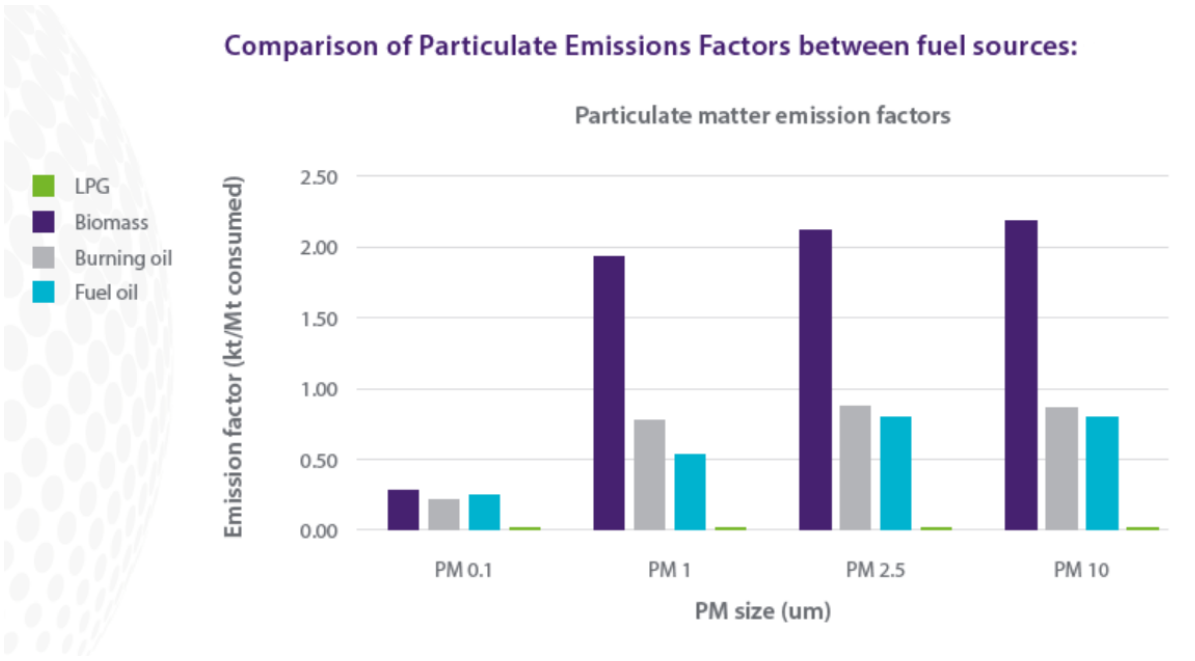

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C. Delivering carbon budgets

Question 9: Carbon targets are only credible if they are accompanied by policy action. We set out a range of delivery challenges/priorities for the 2050 net-zero target in our Net Zero advice. What else is important for the period out to 2030/2035?

The Net Zero advice includes aspirations to retrofit homes to EPC band C by 2035 off the gas grid. While we agree that energy efficiency standards should be improved wherever possible, the current EPC methodology is counter-productive towards decarbonisation targets as it measures the cost of fuel rather than energy efficiency. This actually encourages homeowners and landlords to switch to higher carbon fuels such as coal and oil while prices are low. We recommend removing fuel cost from the calculation so that energy efficiency is measured correctly. More information can be found in the following Liquid Gas UK report: https://www.liquidgasuk.org/resources/uklpg-response-to-energy-performance-certificates-in-buildings

Priorities for off the gas grid properties also includes phasing out the installation of high-carbon fossil fuel heating in homes in the 2020s. It is important to recognise that significant savings can be made immediately from switching off grid properties away from higher carbon fuels such as solid fuels and oil to LPG which has a pathway to complete decarbonisation by transitioning to bioLPG, a drop-in fuel. The most consumer friendly and cost-effective solution to reduce carbon emissions

[14] http://naei.beis.gov.uk/data/ef-all

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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?

The government's policy design for the sixth carbon must account for the best all-round fuel and technologies taking into account total long-term running costs of decarbonisation, security of supply, fuel poverty and fair bills for consumers.

As found in BEIS' Cost of Energy independent review, "the cost of energy is significantly higher than it needs to be to meet the government's objectives and, in particular, to be consistent with the Climate Change Act (CCA) and to ensure security of supply." [16]The Climate Change Committee have already estimated the costs of decarbonisation for electricity to be around 20% of typical electricity bills with legacy costs amounting to well over £100 billion by 2030. Excessive costs are placing a greater burden on households and businesses. The report shows that in electricity, the costs of decarbonisation are already estimated by the CCC to be around 20% of typical electricity bills. These legacy costs will amount to well over £100 billion by 2030. Much more decarbonisation could have been achieved for less; costs should be lower, and they should be falling further.[17]

The recent Scottish House Condition Survey published by the Scottish Government shows that 43% of electric-only homes are spending more than 10% of household income on energy costs and 106,201 of the 247,000 households using electric as the primary heating fuel are in fuel poverty. In the off-grid sector, the housing stock is older and less energy efficient making it harder to treat. Electric-only solutions in these housing types will prove very expensive and could exacerbate the fuel poverty problem that already exists.

If other fuels and technologies were offered the same subsidies they could deliver equal or better levels of decarbonisation at a lower cost. There are a mix of technologies in addition to the electricity grid that are decarbonising rapidly and will help the Government to reach a future

[15] Weighted average: https://www.nnfcc.co.uk/files/mydocs/Bioenergy_heating_options_in_off-gas_grid_homes.pdf

[16]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/654902/Cost_of_Energy_Review.pdf

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E. Sector-specific questions

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?

a) The government can begin decarbonising today in the off the gas grid housing and industrial sectors by identifying technologies with low regret. Transitioning away from high carbon conventional fossil fuels such as coal and oil to LPG can deliver savings of 1,901,637 tonnes of CO2 per annum even before the application of biopropane or advanced technologies, based on the 1.1million homes using oil and solid fuel use on average 19,337kWh per annum[18]. If all homes were to convert to LPG this would deliver an immediate CO2 saving of at least 30% per property (13% from the fuel and the rest delivered through the use of a more efficient gas boiler, particularly vs the existing oil boiler stock). An oil tank scrappage scheme would help to incentivise consumers to move away from high carbon fossil fuels which will provide large CO2 savings at a low cost.

b) The effects of consumer disruption must also be considered in driving extensive decarbonisation of off-grid homes and businesses. LPG has a plausible and cost-effective route to decarbonising the off-grid sector in line with the Government's net zero targets. LPG and bioLPG, a low-emission fuel, can be seamlessly used in existing heating systems, be those gas boilers, combined heat and power (CHP) units or even in renewable hybrid heat pumps. The fuel is compatible with a range of heating technologies and systems, and the transition from LPG to bioLPG is a seamless way to reduce emissions further today or in the future due to its "drop-in" nature. This can all be delivered by a well-developed

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supply chain, with experienced installers, retailers and distributors providing businesses with security of supply and excellent service.

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?

Off-grid homes and businesses are hard-to-treat as they are older, less efficient and have a higher heat demand. A mixed technology approach to decarbonising heating systems in the 1.5million off-grid rural homes is the most cost-effective solution with the least consumer disruption. Installation skills needed to convert oil to LPG are similar to that already used in mains gas. LPG has a network of installers and an established supply chain removing the problem of a skills gap in the transition to lower carbon fuel. Furthermore, bioLPG is a drop-in fuel which requires no additional infrastructure or supply chain. This provides a plausible, low disruption pathway to decarbonisation in the off-grid sector.

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?

In the off-grid sector, the gas distribution network does not currently exist and plans to expand the gas grid would require significant investments. Heat networks would also be problematic for this housing stock due to its sparse nature.

In contrast, the LPG distribution network is already established in the off-grid market with tanks and trucks readily available. The most cost-effective solution would be to support the infrastructure that already exists for liquid gases which can be transitioned easily into bioLPG, a renewable fuel that can help the Government to reach its decarbonisation goals.