# The Fifth Carbon Budget - Call for Evidence

www.theccc.org.uk/call-for-evidence

## Question and Response 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 response to a maximum of 400 words per question.

**This response is from Calor Gas. Please contact Paul Blacklock, Head of Strategy and Corporate Affairs at pblacklo@calor.co.uk for more information.**

**Questions for consideration:**

## A. Climate Science and International Circumstances

Climate science and international circumstances are important criteria in setting carbon budgets.

- The science indicates the impacts associated with different levels of climate change and the limit on emissions globally if these risks are to be contained.
- International circumstances inform the prospects of future action to reduce emissions globally, potential requirements of the UK to contribute to those actions, and prospects for low-carbon technology development and carbon pricing.
- The EU places obligations on Member States to reduce emissions to contribute to reductions in the bloc as a whole. These imply a minimum level of effort for the UK's carbon budgets.

The Committee intends to draw primarily on the work of the IPCC, as published in the Fifth Assessment Report, in assessing the implications of climate science for the budget advice

The Committee's advice is based on a climate objective to limit central estimates of temperature rise to as close to 2°C as possible, with a very low chance of exceeding 4°C by 2100 (henceforth referred to as "the climate objective"). This is broadly similar to the UNFCCC climate objective, and that of the EU.

In order to achieve this objective, global emissions would have to peak around 2020, before decreasing to roughly half of recent levels by 2050 and falling further thereafter.

The UNFCCC is working toward a global deal consistent with such reductions. Individual parties are submitting pledges for effort beyond 2020, with the details of the agreement to be discussed in Paris late in 2015.

The EU has agreed a package that requires a reduction in emissions of at least 40% on 1990 levels by 2030, on the way to an 80-95% reduction by 2050. The UK Government supported this package, while arguing for an increase to 50% in the context of a global deal.

The US and China have jointly made pledges for the period beyond 2020. The US has pledged a reduction of 26-28% by 2025 versus 2005, requiring a doubling of the rate of carbon reduction compared to 2005-2020 and on a trajectory to economy-wide cuts of the order of 80% by 2050. China has pledged to peak $CO_2$ emissions around 2030, and to make best efforts to do so earlier.

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| **Question 1** ***The IPCC's Fifth Assessment Report will form the basis of the Committee's assessment of climate risks and global emissions pathways consistent with climate objectives. What further evidence should the Committee consider in this area?*** |
| NO RESPONSE |

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| **Question 2** ***To what extent are the UN talks in Paris likely to have implications for the Committee's advice beyond the pledges and positions announced in advance of the talks?*** |
| NO RESPONSE |

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| **Question 3** ***Based on the available evidence, does the EU 2030 package reflect the best path to its stated 2050 ambition? How might this package change, specifically its targeted emissions reduction, either before the end of Paris or after Paris?*** |
| Calor supports the British Government's position on the EU 2030 package in that it includes no targets for the deployment of renewables for individual Member States. The focus should be on carbon emission reduction at the lowest possible cost. |

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| **Question 4** ***How does the UK's legislated 2050 target affect its ability to support international efforts to reduce emissions, including its position in negotiations? Does the level of UK carbon budgets have any additional impact (over-and-above the 2050 target) for the UK in international discussions?*** |
| NO RESPONSE |

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## B. The cost-effective path to the 2050 target

The carbon budgets need to set a path that is achievable from today without being over-optimistic about what is achievable in later periods to prepare for the 2050 target.

The Committee has previously set out scenarios for 2030 that balance effort before 2030 with potential opportunities from 2030 to 2050. The scenarios aim to include ways of reducing emissions that are likely to be relatively low cost and actions that will develop options that may need to be deployed at scale by 2050.

These scenarios, reviewed in detail in the Committee's report *The Fourth Carbon Budget Review – the cost-effective path to the 2050 target*, include substantial investment in low-carbon power generation, roll-out of low-carbon heat (heat pumps and district heating), development of the markets for ultra-low emissions vehicles and a combination of energy efficiency measures and fuel switching in industrial sectors.

The scenarios also reflect detailed assessments of what is practically deliverable, and the Committee monitors progress towards them as part of its statutory duties. The *2014 Progress Report to Parliament* indicated that current policy would not be enough to meet the fourth carbon budget, but that the 'policy gap' could be closed at affordable cost.

The set of policy options required to close the gap include:

- Strengthening the EU Emissions Trading System.
- Setting a clear objective for Electricity Market Reform (EMR) beyond 2020.
- Focusing on low-cost residential energy efficiency.
- Simplifying policies targeting commercial energy efficiency.
- Tackling financial and non-financial barriers to low-carbon heat.
- Pushing for strong EU targets for new vehicle efficiency in 2030.

The Government has subsequently published various documents, including its formal response, as required under the Climate Change Act, and the National Infrastructure Plan. The Plan includes investments of around £100 billion in low-carbon power generation in the 2020s, in line with the scenarios from the EMR Delivery Plan that reach 100 $gCO_2$/kWh by 2030. It also has significant investments in offshore oil and gas and in the road network. This includes £15 billion of new spending on roads and around £50 billion on offshore oil and gas.

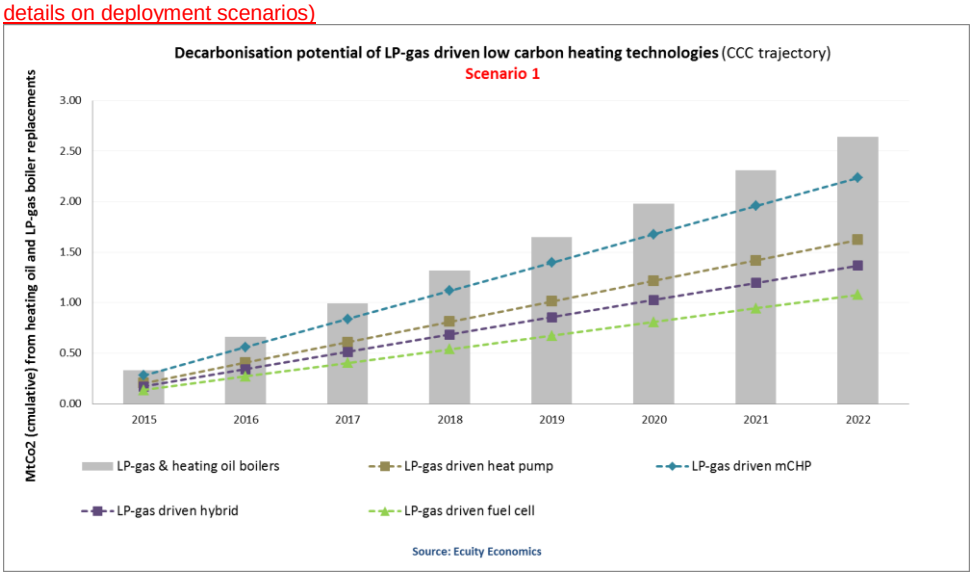
**Question 5** ***In the area(s) of your expertise, what are the opportunities and challenges in reducing emissions to 2032, and at what cost? What may be required by 2032 to prepare for the 2050 target, recognising that this may require that emissions in some areas are reduced close to zero?***

ANSWER:

- ~~Calor Gas~~ is the UK's leading supplier of LP gas~~G~~. LP gas~~G~~ has a wide variety of applications, providing a versatile fuel for heating and transport applications.
- LP gas has a lower carbon footprint than commonly used alternative fuels including heating oil and solid fuels such as coal and charcoal.
- Investment in LP-gas driven low carbon space heating and electricity generation technologies such as micro CHP, fuel cells, hybrids and LP-gas driven heat pumps is underway which will provide consumers with low carbon alternatives to the current range of LP gas and heating oil technologies. Deployed at scale, these technologies could offer consumers in off gas grid rural areas easily adoptable, low carbon solutions which utilise an existing/established fuel supply infrastructure.

- It is our view that policymakers are yet to realise the full potential of low carbon LP-gas technologies for reducing emissions in areas of the economy where transformation may be hardest to achieve. Further policy support is required to incentivise now to prepare for 2032 and for the 2050 target.

Chart 1. Decarbonisation potential of LP-gas driven low carbon heating technologies (see Appendix for details on deployment scenarios)




- Since 2010 Calor has been working with National Energy Action (NEA) to

highlight the inequality experienced by off gas grid rural communities in regard to Government fuel poverty and energy efficiency improvement programmes. Aligned with the findings of that work, Calor is proposing a more pragmatic approach to decarbonising off-grid heating markets. ÷

- We are calling for an early start to deploying the array of available high efficiency LP gGas heating systems such as condensing boilers, LP-gas driven heat pumps, micro CHP, fuel cells and hybrid heat pumps.

Specifically, we are calling for the inclusion of GAHP in the RHI and a removal of the 12,000 units review point for support of Micro-CHP within the Feed in Tariff.

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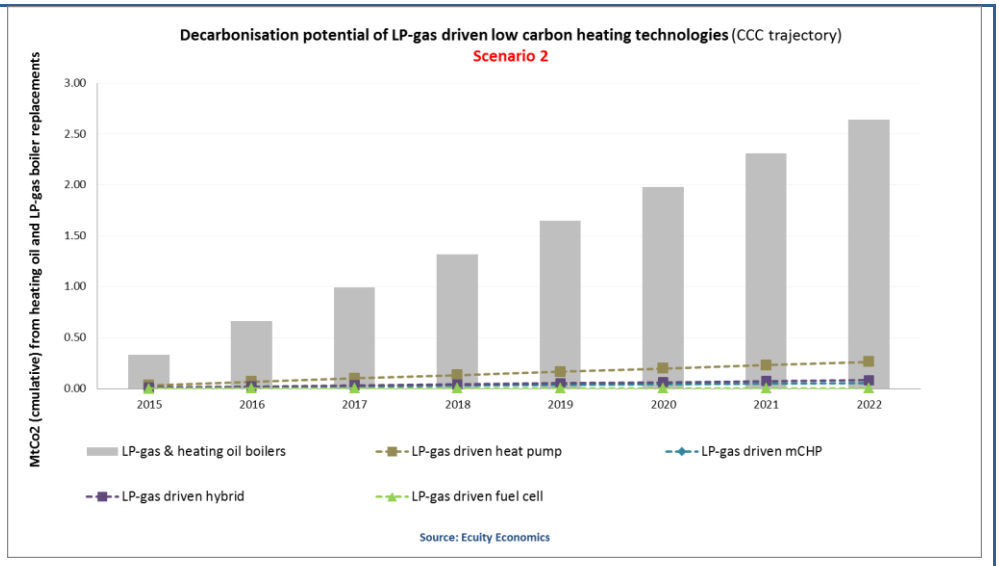
- This will bring an immediate benefit to the rural fuel poor without the need for major disruption or infrastructure investment, reducing carbon emissions and building rural community engagement in the drive for energy efficiency.

- In 2014 Calor's parent company SHV Energy announced a major deal with NESTE Oil to market and sell biopropane to be produced at Neste Oil's Rotterdam refinery. The agreement to supply some 160,000 tons of biopropane over a four-year period is the first of its kind anywhere in the world. SHV Energy plans to sell the biopropane in several European markets including the UK. Replacing existing fossil fuels with biopropane will result in significant carbon savings (carbon footprint for HVO biopropane is 10 g CO2e/MJ as per RED's Annex V, Section D, *Disaggregated default values for biofuels and bioliquids.*)

Chart 2. Decarbonisation potential of biopropane-driven low carbon heating technologies (see Appendix for details on deployment scenarios)




- There are a number of international research projects investigating other potential production routes for biopropane – including ones at Imperial College and the University of Manchester's Institute of Biotechnology. This makes biopropane a strong long-term low carbon heat (and transport) technology option for homes and businesses in off gas grid rural areas – used alongside low carbon gas technologies such as those described above.

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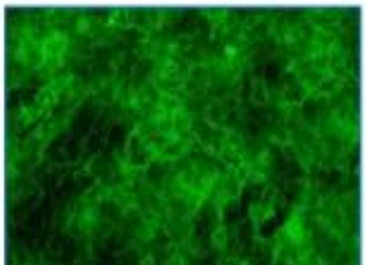
## Present

Four million homes not connected to the natural gas grid, many of them hard to treat.


## Efficient use of gas

Gas absorption heat pumps and micro CHP are the most energy efficient **high operating temperature** low carbon solutions



## Decarbonisation of gas

Renewable biopropane as a solution to deliver immediate policy gains via existing infrastructure

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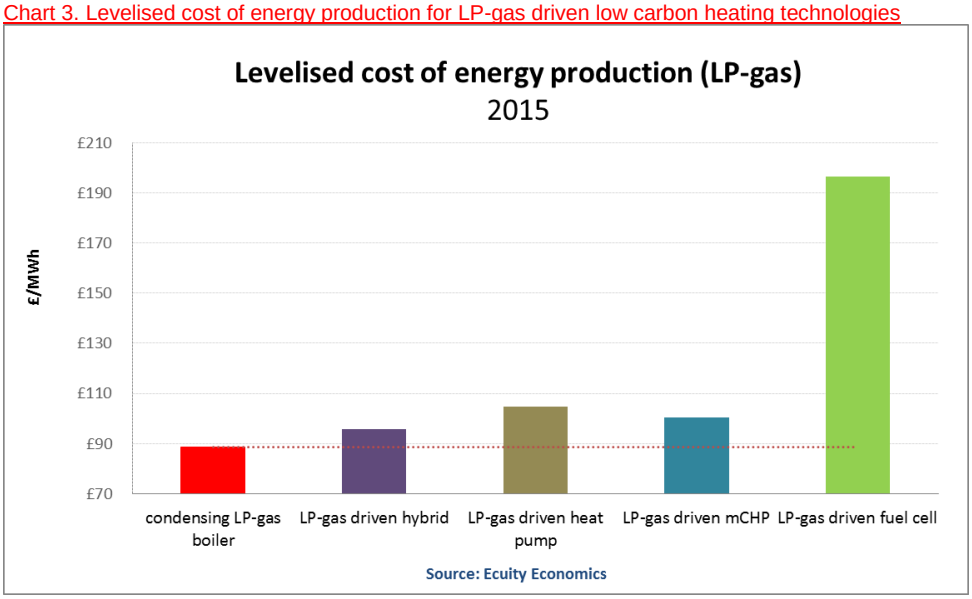
**Question 6** ***What, if any, is the role of consumer, individual or household behaviour in delivering emissions reductions between now and 2032? And, separately, after 2032?***

ANSWER:

- 40% of the UK carbon emissions come from buildings. Uptake of LP gas efficient technologies should be incentivised through a combination of policy instruments such as financial incentives and finance mechanisms;

Chart 3. Levelised cost of energy production for LP-gas driven low carbon heating technologies




- While nudging consumers will be important to start the market of LP gas efficient technologies, mass market deployment is expected to drive capital cost reductions and close the existing capital gap with traditional heating technologies. It will ultimately be consumers and business owners to decide how they heat their buildings.

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**Question 7** ***Is there evidence to suggest that actions to further reduce emissions after 2032 are likely to be more or less challenging to achieve than actions in the period up to 2032?***

ANSWER: NO RESPONSE

**Question 8** ***Are there alternatives for closing the 'policy gap' to the fourth carbon budget that could be more effective? What evidence supports that?***

ANSWER:

- A clear path could be set for future changes in building regulations Part L with respect to replacement of heating systems. At present, condensing boilers must be fitted. In future it may be possible to set a new minimum standard (for example, requiring controls, or a minimum efficiency for heating equipment or installations).
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- Provided sufficient notice is given, such a change would drive forward investment in more efficient heating systems whilst reducing costs to the economy as more cost-effective solutions would come to the fore. This is likely to be more cost effective overall as it does not involve attempting to pick winners.

**Question 9** ***Are the investments envisaged in the National Infrastructure Plan consistent with meeting legislated carbon budgets and following the cost-effective path to the 2050 target? Would they have wider implications for global emissions and the UK's position in international climate negotiations?***

ANSWER: NO RESPONSE

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## C. Budgets and action

The UK's statutory 2050 target requires actions across the economy to reduce emissions. Many of these actions will be driven by (UK and devolved) Government policy and implemented by businesses and consumers. There will be an important role for Local Authorities in successful delivery.

Although the carbon budgets do not require specific actions, they provide an important indication of the overall direction that policy will take in future. Once set, carbon budgets can only be changed if there has been a significant change in the relevant circumstances set out in the Climate Change Act.

Feedback from businesses as part of the Committee's 2013 Call for Evidence for the review of the fourth carbon budget was that stability is an important and valuable characteristic of carbon budgets.

**Question 10** ***As a business, as a Local Authority, or as a consumer, how do carbon budgets affect your planning and decision-making?***

ANSWER:

- As a business, carbon budgets impact on our planning as they provide a viewpoint regarding the future balance of fuels and services required to fuel the UK economy in the future. Provided the ambitions are realistic, this can support our planning and investment approach. The important aspect is that Government should not try and pick winners, but leave property owners to decide how to best meeting any targets or regulations.

**Question 11** ***What challenges and opportunities do carbon budgets bring, including in relation to your ability to compete internationally? What evidence do you have for this from your experience of carbon budgets to date?***

ANSWER:

- Calor Gas is part of SHV Energy which employs 13,500 people, has a turnover of over €5 billion and provides LP gas to tens of millions of customers in 27 countries. The group owns, or is a majority shareholder in,

LPG companies throughout the world; in addition to Calor Gas, well-known brand names include Primagaz in France and Liquigas in Italy.

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- A global market for LP gas fuel and services means that Calor must compete for investment and innovation funding from SHV at a global scale. Carbon budgets are therefore very important in highlighting the attractiveness or otherwise of specific markets for this investment.

**Question 12** ***What would you consider to be important characteristics of an effective carbon budget? What is the evidence for their importance?***

ANSWER:

- It is important that the Committee do not seek to over simplify, for example by proposing a one size fits all approach to replacing domestic heat space and hot water heating equipment.
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- Recognition that technology innovation can and will occur across the energy sector, not just on the electricity supply side (CCS etc)

## D. Other issues

The Climate Change Act requires that in designing the fifth carbon budget we consider impacts on competitiveness, fiscal circumstances, fuel poverty and security of energy supply, as well as differences in circumstances between UK nations. High-level conclusions on these from our advice on the fourth carbon budget were:

- **Competitiveness** risks for energy-intensive industries over the period to 2020 can be addressed under policies already announced by the Government. Incremental impacts of the fourth carbon budget are limited and manageable.

- **Fiscal impacts**. The order of magnitude of any fiscal impacts through the 2020s is likely to be small, and with adjusted VED banding and full auctioning of EU ETS allowances could be neutral or broadly positive.

- **Fuel poverty**. Energy policies are likely to have broadly neutral impacts on fuel poverty to 2020, with the impact of increases in electricity prices due to investment in low-carbon generation being offset by energy efficiency improvement delivered under the Energy Company Obligation. Incremental impacts through the 2020s are likely to be limited and manageable through a combination of further energy efficiency improvement, and possible income transfers or social tariffs.

- **Security of supply** risks due to increasing levels of intermittent power generation through the 2020s can be managed through a range of flexibility options including demand-side response, increased interconnection and flexible generation. Decarbonisation of the economy will reduce the reliance on fossil fuels through the 2020s and thus help mitigate any geopolitical risks of fuel supply interruption and price volatility.

- **Devolved administrations**. Significant abatement opportunities exist at the national level across all of the key options (i.e. renewable electricity, energy efficiency, low-carbon heat, more carbon-efficient vehicles, agriculture and land use).

**Question 13** ***What evidence should the Committee draw on in assessing the (incremental) impacts of the fifth carbon budget on competitiveness, the fiscal balance, fuel poverty and security of supply?***

ANSWER:

- Calor has serious long held concerns regarding access to, and the delivery of help and support for householders who live off the gas grid in rural areas and who want to improve the energy efficiency of their homes - in particular the Energy Company Obligation (ECO) and the recent Green Deal Home Improvement Fund (GDHIF) have been found dramatically wanting.

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- As ECO is funded via a levy on consumer electricity bills, the cost burden of ECO is being disproportionately carried by poor and vulnerable off gas grid consumers who are failing to benefit from the scheme. Action is needed now to make cost-effective modifications so that the rural off gas grid fuel poor not only contribute to the cost of delivering emissions reduction, but

actually start to see some benefits.

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- Changes have now been made to the ECO scheme to encourage measures in rural non-gas fuelled homes between 2015 and 2017; however the design of these changes means that there is still unlikely to be significant deployment in deep rural off gas grid areas and for those using some fuels.

**Question 14** ***What new evidence exists on differences in circumstances between England, Wales, Scotland and Northern Ireland that should be reflected in the Committee's advice on the fifth carbon budget?***

ANSWER: NO RESPONSE

**Question 15** ***Is there anything else not covered in your answers to previous questions that you would like to add?***

ANSWER: NO RESPONSE

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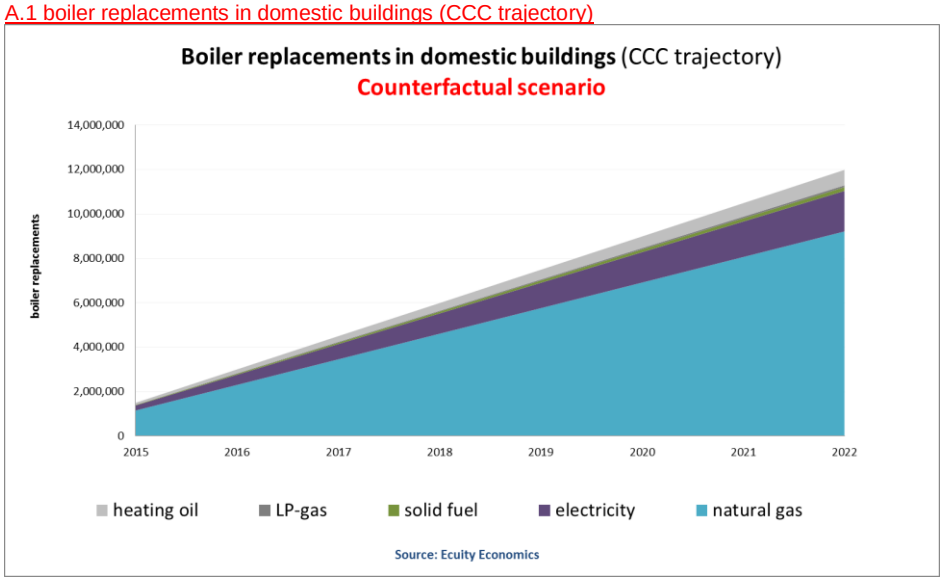
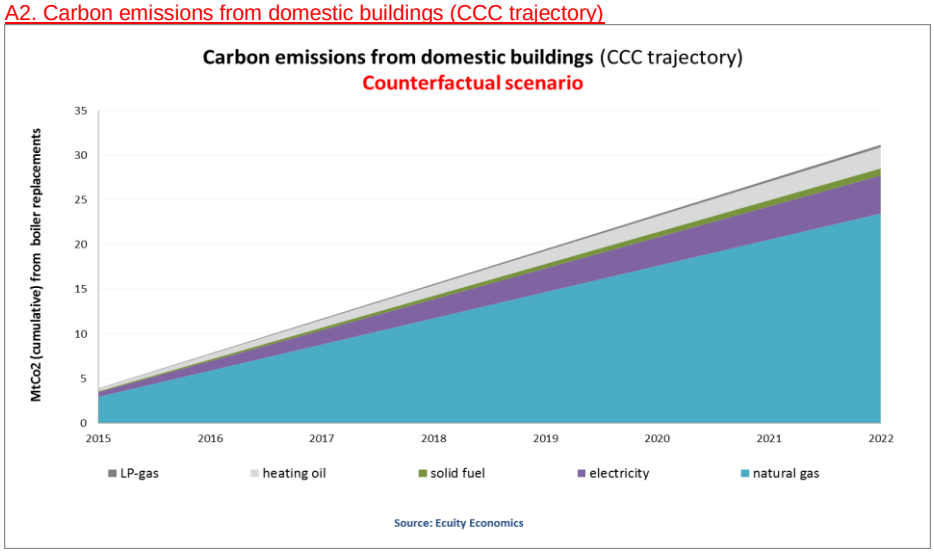
## Appendix

The economic analysis demonstrates the decarbonisation potential of low carbon heating technologies in the off-gas grid sector. According to the CCC progress report to Parliament (2014), 1.5m condensing boilers per year are expected to be installed to 2022 (A1). Assuming a fraction of this are heating oil and LP-gas boilers (see A.2 and A3 for details on scenarios) and like-for-like replacement, this analysis suggests that there are significant carbon savings from widespread deployment of low-carbon heating technologies.

A.1 boiler replacements in domestic buildings (CCC trajectory)




A2. Carbon emissions from domestic buildings (CCC trajectory)

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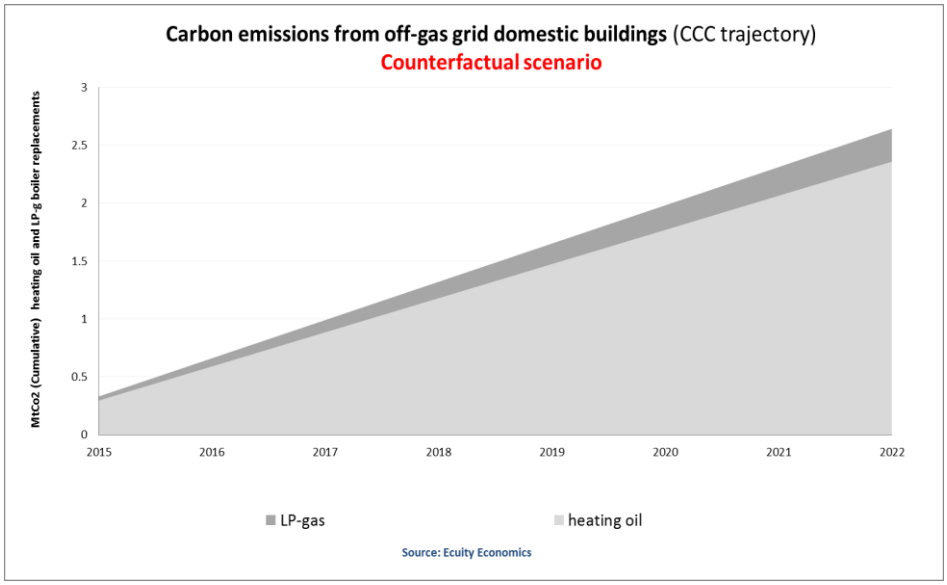
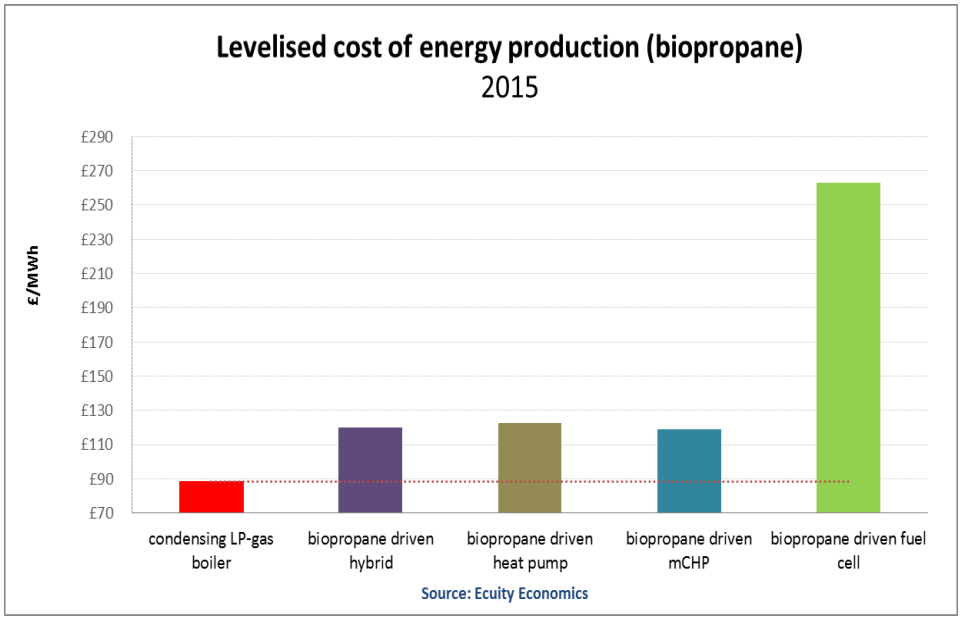
A3. Carbon emissions from off-gas grid domestic buildings




A4. Levelised cost of energy production (biopropane)

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A5. Data assumptions

| Technology | Boiler replacements/year (UK) |
|---|---|
| Heating oil boiler | 58,500 |
| LP-gas boiler | 9,000 |
| Gas boiler | 1,263,000 |
| Electric heating (including heat pumps) | 135,000 |
| Solid fuel | 16,500 |

| Fuel | kgCo2/kWh |
|---|---|
| Heating oil | 0.24 |
| LP-gas | 0.21 |
| Natural gas | 0.184 |
| Electricity | 0.46 |
| Solid fuel | 0.34 |
| Biopropane | 0.036 |

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| Technology | tCo2/year | tCo2/lifetime[3] (discounted) |
|---|---|---|
| Heating oil boiler | 3.57 | 29.7 |
| LP-gas boiler | 3.12 | 25.9 |
| LP-gas driven micro-CHP | **2.98** | **24.53** |
| LP-gas driven heat pump | **2.15** | **17.94** |
| LP-gas driven hybrid heat pump | **1.82** | **15.14** |
| LP-gas driven fuel cell | **1.43** | **11.93** |

| Technology | tCo2/year | tCo2/lifetime (discounted)[3] |
|---|---|---|
| Heating oil boiler | 3.57 | 29.7 |
| LPG boiler | 3.12 | 25.9 |
| biopropane driven micro-CHP | **0.07** | **0.60** |
| biopropane driven heat pump | **0.35** | **3.12** |
| Biopropane driven hybrid heat pump | **0.13** | **0.91** |
| Biopropane driven fuel cell | **0.001** | **0.0027** |

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