

LCH 20

Ymateb gan : Calor  
Evidence from : Calor

**Calor, the UK's leading supplier of LPG fuels is fully supportive of a cost-effective and ambitious approach to low-carbon housing. Calor is pleased to have the chance to submit evidence to the Climate Change, Environment and Rural Affairs Committee's consultation into Low Carbon Housing – The Challenge.**

- **What role can housing can play in Wales' low carbon transition, including the potential positive impacts on greenhouse gas emissions?**

Improving the standards of new homes is vitally important and will help reduce the carbon impact of modern life. However, there are practicalities which must be considered in order to find a solution, which is cost effective, pragmatic and results in homes which are comfortable (not too cold or hot) and affordable. Calor recommends:

- That the Welsh Assembly continues to encourage innovation in low carbon fuels and technologies such as the projects at the University of South Wales and by Wales and West Utilities.
  - Looking at rural housing separately to urban, as one solution will not fit all homes.
  - Ensuring current Building Regulations are properly enforced. This would then create a good basis from which to add new, efficient technologies and low carbon energy sources, chosen to be suitable for different kinds of housing. The end result is a low-carbon future, reached quickly and cost-effectively.
  - Revising the format of Energy Performance Certificates, so that they clearly reflect the energy efficiency of a home, not the cost to heat it.
- **The development and availability of technology needed for highly energy efficient housing;**

It is important that no single approach is favoured to deliver highly energy efficient homes. For example, using biomethane in a modern, efficient combined cycle gas turbine to generate electricity is not a solution. These turbines are at best 55% efficient. Then there are transmission losses as the electricity is taken from a central generation facility to the end of the network to heat a rural home. However, if a low carbon gas were used in a condensing boiler in someone's home, the efficiency could be as much as 85%. This is a much more cost effective and low carbon solution to heating homes. **Calor would therefore recommend maintaining the current standard of Welsh Building Regulations and then focus on helping energy suppliers to supply low carbon fuels to rural customers.**

Calor is working to bring bioLPG to the market, which is a low carbon and chemically identical fuel. It would allow our customers to continue heating their homes and cooking their food as before. Our first delivery of bioLPG will take place in December 2017; this shipment is created as a by-product of biodiesel but there are many different ways to create LPG from non-fossil fuel sources and Calor is actively investing UK-based production routes. For example, making bioLPG from household, black bin bag waste, which then provides a sustainable route away from landfill for this waste stream.

Another potential route being investigated at the University of South Wales is creating bioLPG from anaerobic digestion. This would be a sustainable and low carbon solution to providing a gas to rural homes. **Calor would like to see the Welsh Assembly support the research and development into new generation biofuels, through projects such as this at the University of South Wales.**

For new homes in rural locations, the Freedom Project, run by Wales and West Utilities is a great example of looking at practical ways to deal with problems of meeting heat demand whilst maximising the use of renewable energy generation. This is project is looking at how energy storage, demand side response and green gases can be deployed to heat homes in the future in the most efficient and low carbon manner. Calor is working with the team to look at solutions specifically for off gas grid homes.

### Technology and biogas can deliver

Calor has worked with environmental economists Ecuity to model some scenarios to demonstrate the potential of using bioLPG combined with new technologies to achieve low or zero carbon emissions in off-gas grid areas. The different scenarios looked at simply replacing existing boilers with new, high efficiency boilers, or using newer technologies like smart controls, heat pumps, micro-CHP and hybrid systems. The following graphs illustrate the potential from changing systems and moving to bioLPG from other, traditional fossil fuels.

Figure 1 shows the impact on emission reductions in the off-gas grid area if a switch to LPG fuel is made (away from oil) and in addition, highly efficient boilers with controls are installed.

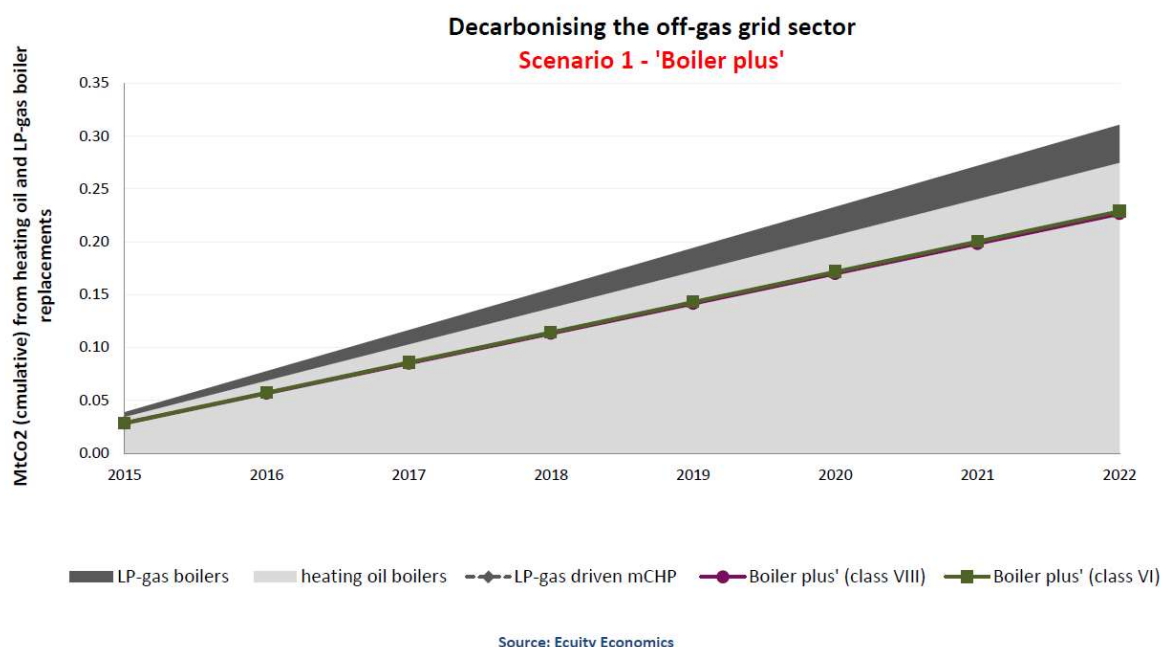


Figure 1: Carbon emissions reductions from boiler plus

Figure 2 shows the impact on carbon emissions if different technologies are installed, for example a hybrid heating system as currently being trialled by Wales and West on the Freedom Project.

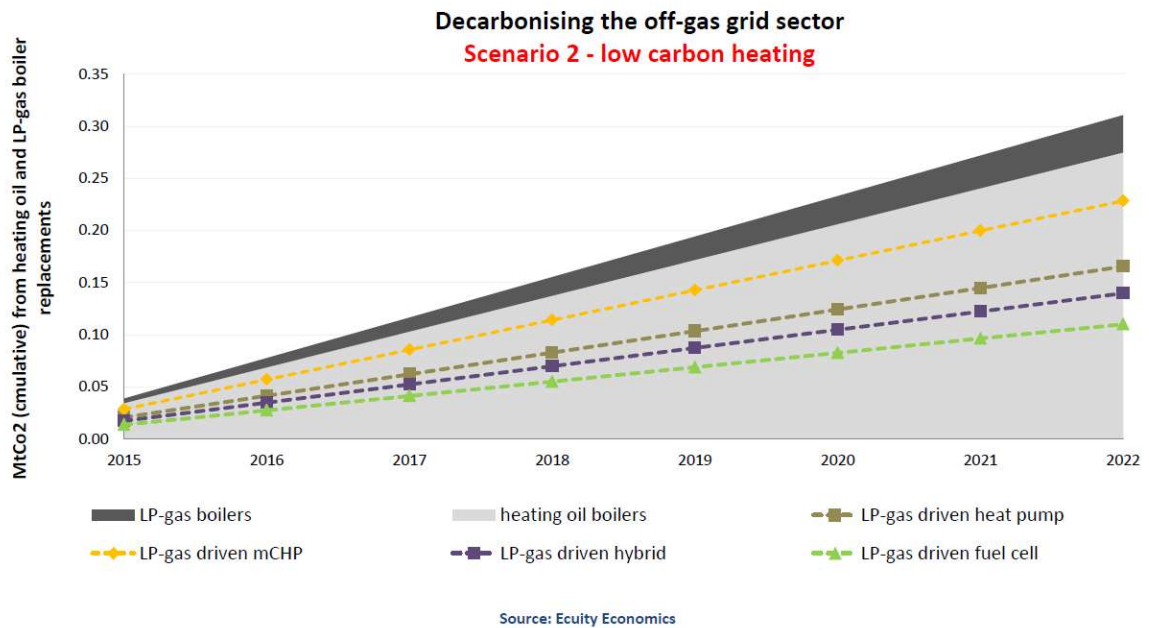


Figure 2: Carbon emissions reductions – low carbon heating

Finally, Figure 3 shows what an impact using biopropane (the same as bioLPG, just a different name) can make. This clearly outlines the future for LPG or rather bioLPG is off gas grid areas in delivering zero or low carbon heating to rural homes.

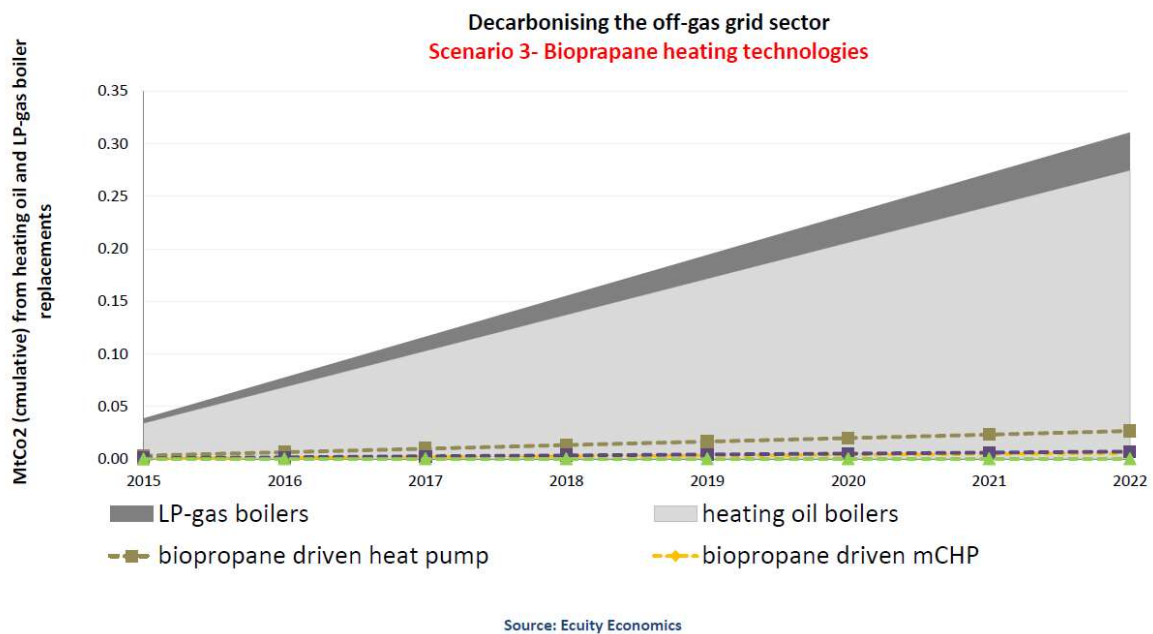


Figure 3: Carbon emissions reductions – biopropane (bioLPG) heating

- **What changes are needed to ensure that existing housing stock is as energy efficient as it can be?**

Calor commends the Welsh Assembly for pushing housing developers already via the Welsh Building Regulations. However, we advise caution before setting even higher standards. Current standards are already 23% higher for some homes than the level the Department for Communities and Local Government deemed to be ‘cost optimal’ in their report in 2013<sup>1</sup>.

**Table 7.1c:** Comparison Table, Wales

<i>Reference building</i>	<i>Cost Optimal Level (kWh/m<sup>2</sup>/yr)</i>	<i>Current Requirements(kWh/m<sup>2</sup>/yr)</i>	<i>Gap (%)</i>
Semi-Detached	141	107	+ 23%
Mid-Floor Flat	116	92	

- **Whether it is possible and feasible to deliver low carbon, energy positive, affordable housing at scale in Wales and, if so, how this can be achieved;**

It is better to drive down energy demand as much as possible but without increasing the cost of the development too much. One way to do this would be to ensure that current Building Regulations are properly enforced and to ensure that the latest Building Regulations apply to any project being built now, regardless of when the project officially ‘started’. There is a risk that if the costs to develop homes in Wales increases disproportionately, then housing developers will choose not to build in Wales, instead focussing on developments in elsewhere. If they do develop in Wales, the houses will be more expensive than in other parts of the UK, as the developers will pass on the costs to customers, thus unfairly passing the burden onto the Welsh customers.

- **What are the barriers to delivering transformative change in house building in Wales?**

The SOLCER scheme in Wales is delivering some really interesting results for newly built homes, however the technologies employed are not possible for every home, in every location. For example, the roof orientation is vital to ensure the optimum use of glazed solar photovoltaic panels, fully integrated into the design of the building, which allow the roof space below to be naturally lit. Additionally, the house’s energy systems, which combine solar generation and battery storage to power the building’s services, are only effective if the house has been built to very high thermal standards, which run the risk of overheating, if designed incorrectly.

**For rural homes, not on the mains gas grid, reaching zero carbon will require a different approach to urban homes.** Building off the gas grid means that solutions such a district heat network, are not feasible, as this is only effective when there is a high density of housing.

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<sup>1</sup> Cost optimal calculations: UK report to European Commission, DCLG, May 2013. Achieving energy efficiency in a cost optimal manner is a requirement within the European Performance of Building Directive and is detailed therein.

Rural homes tend to not only be off the gas grid but also a long way from other homes and at the end of the electricity distribution network as well.

Renewable electricity, delivered by the electricity network, is able to bring a rural home to zero carbon, if there is an appropriate electric heating solution installed. For older homes, electric heating is very difficult to retrofit. Another important factor is that the electricity network is not designed to deliver the requisite quantity of power required to heat rural homes. This part of the network is at the periphery of the current grid, usually exposed and lacking recent investment. The electricity distribution network will require huge funds to bring it up to the necessary standard and capacity to supply all rural homes with sufficient power to meet peak heat demand.

Additionally, increased electric demand for heating homes will require a large construction programme to build more electricity generation capacity. Heat demand is much greater and much more variable than electricity demand, so a large amount of standby generation would be required for the times of peak demand. This is especially so for the days when it's very cold, cloudy and still – as it often is in winter – and there is no renewable electricity being generated by PV or wind installations. On these days, electric generation capacity is required that can easily be ramped up and down, which means gas or even diesel, not nuclear.

- **What changes are needed to Building Regulations in Wales to accelerate progress towards 'near zero' energy standards and beyond?**

Building Regulations to date have pushed housing developers to improve their standards greatly, so that modern homes have a much lower energy demand, particularly when it comes to heating. Energy demand in UK homes now is only increasing for electrical appliances; lighting and heating demand is reducing.

However, we advise caution before setting even higher standards as this could have a negative impact on rural affordable housing provision as the cost of housebuilding increases. In terms of zero-energy, this target requires proper definition as current standards are already 23% higher for some homes than the level the Department for Communities and Local Government deemed to be 'cost optimal' in their report in 2013<sup>2</sup>.

In a recent interview, Chris Tinker, an executive board director at Crest Nicholson - one of the largest housebuilding companies in the UK - said that new builds are already very high up on the efficiency curve.

*"I think you need to look at what your payback is for every pound you invest", Tinker said. "New homes are a long way up the curve already and as a country we would arguably get a higher degree of payback from investing in existing housing stock."*

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<sup>2</sup> Cost optimal calculations: UK report to European Commission, DCLG, May 2013. Achieving energy efficiency in a cost optimal manner is a requirement within the European Performance of Building Directive and is detailed therein.

Calor questions the necessity to revise the carbon emission targets for new builds due to the fact that standards already exceed the 'cost-optimal' curve and there is no definition of 'zero-energy' from the European Commission. In light of the UK's decision to leave the EU, the UK and the devolved administrations have an opportunity to design a new energy efficiency policy for new buildings, including reviewing the Energy Performance Certificate regime.

The current format and methodology of EPCs causes problems for homes off-grid. Currently the main measure, on which government policy is based for schemes such as feed-in tariffs and gives a rating of A to G, is based on the cost to heat any given home. It is not based on the energy required to heat a home or the associated carbon impact. In off gas grid areas, where heating oil is common, homeowners choosing oil to heat their homes have recently benefitted from an improved EPC rating as oil prices have fallen. Nothing else has been done to the building fabric, simply the cost to heat has fallen so the EPC rating has improved. **Calor asks that this approach is reviewed and corrected to reflect the environmental impact of a dwelling, not the cost to heat the dwelling.**