

Written evidence submitted by Liquid Gas UK (NRG0010)

About Us

Liquid Gas UK is the trade association for the Liquefied Petroleum Gas (LPG) and renewable liquid gases (RLGs) industry in the UK, representing companies who are LPG and RLG producers, distributors, equipment and service providers, and vehicle convertors. It is dedicated to the safe and effective development of LPG and RLGs. Member companies cover 99% of the total LPG and 100% of the total RLGs distributed in the UK. Our members have a collective turnover of over £1bn and plan to invest around £600m up to 2025, with £300 million spent between 2021 and 2023.

1. What impact will the UK Government's approach to net zero have on Scotland's oil and gas industry?

- What state of readiness is the oil and gas sector in for the net zero transition?

The Climate Change Act commits the UK government to bring all greenhouse gas emissions to net zero by 2050, compared with the previous target of at least 80% reduction from 1990 levels. Currently, heating our homes accounts for 18% of all UK greenhouse gas emissions, so decarbonisation of this sector will play a central role in meeting these targets.

The majority of homes in the UK are expected to install heat pumps. However, the Department for Energy Security and Net Zero (DESNZ) estimates that around 20% of homes (for a range of reasons) are not suitable for this technology and will need an alternative decarbonisation option. Analysis undertaken by Liquid Gas UK, in our *Journey to 2050* report on the industry's journey to net zero, puts this figure even higher, at 36%.¹

BioLPG is chemically identical to fossil-derived LPG and can provide a versatile, 'drop-in' renewable solution which can provide up to 90% carbon emissions reduction compared to conventional LPG, and 92% compared to oil. Already available on the market today, bioLPG can be used in an identical manner to conventional LPG and provides a seamless 'drop-in' fuel utilising the existing supply chains. Consumers are able to use this fuel in their existing heating appliances, stored in existing bulk tanks and cylinders without any modifications, and transported using today's infrastructure and skilled workforce, with little or no additional cost to the consumer.

The Liquid Gas industry is also investing heavily to evaluate the use of renewable dimethyl ether (rDME) as a future low carbon fuel.

Almost all of the DME produced today is manufactured from fossil fuels. However renewable dimethyl ether (rDME,) which is chemically identical to fossil derived DME, can be produced from a number of zero / low carbon feedstocks including biomethane, biomethanol, municipal waste, renewable power, and captured CO₂, with potential emissions reduction of up to 85%.

¹ 'Liquid Gas UK: The Industry's Journey to 2050', Gemserv and Liquid Gas UK, (2024)

rDME has physical properties similar to butane and propane, making it a possible replacement for LPG into the existing infrastructure as a drop-in blend with bio propane & bio butane. Higher concentrations of rDME in LPG and 100% rDME can be used with relatively small changes to existing infrastructure.

Work carried out by LGUK has shown that rDME / propane blends can be utilised for heating and cooking in homes and commercial businesses, with the possibility to supply pure rDME in industrial and commercial sectors.

A report prepared by the bioenergy consultancy NNFCC determined that there is a bankable case for there to be a 100% indigenous supply of bioLPG and rDME by 2040 with industry investment of between £1 to 2 billion, with our members already having invested £600 million.²

Oil refineries already have the capabilities to recover and purify the bio propane to meet the required LPG specification. BioLPG is manufactured as a co product where bio feedstocks are being used in the refining process. Apart from the cost of feedstock pre-treatment the co-processing of bio-oils with petroleum intermediates in oil refineries for the production of renewable diesel, requires almost no additional capital cost. Therefore, oil refineries can process very high quantities of bio-oils with minimal capital expenditures.

There is also significant potential for rapid scale-up of indigenous bioLPG production as a co-product of Sustainable Aviation Fuel (SAF). Modelling undertaken by Gemserv discovered that, with the appropriate policy support , ‘if all biopropane produced from SAF is incentivised to be put on the market, 20%-55% of biopropane demand in the UK can be met by biopropane produced from SAF.’³

Even though there are opportunities for producing certain bioLPG quantities with minimal capital costs through the co-processing model, achieving a 100% transition to bioLPG in the UK would require significant investments in gasification based biorefineries. Based on data publicly available from gasification project developers, building an industrially sized gasification and catalytic synthesis facility, is expected to require around £100 to £200 million.

Our industry will open multiple new plants over the coming decades which will boost jobs across the UK with international and domestic capital.

² ‘A Business Case for an Indigenous bioLPG Supply Chain in the UK’, NNFCC, (2020)

³ ‘LGUK’s response to the Biomass Strategy’, Gemserv, (2024)

- Is the scaling up of the clean energy sector keeping pace with the decline of jobs and investment in the oil and gas sector, or does the UK Government need to do more to close this gap?

The LPG industry employs approximately 4,000 workers across the UK, and the industry has invested £600 million in infrastructure and £260 million specifically into the development of Renewable Liquid Gases over the past five years, ensuring the sector is ready for the transition. However, a supportive policy framework for renewable liquid gases as low carbon heating options for homes and businesses would allow the industry to grow this market. With this support it is expected to return £1.3 billion in GVA by 2050 while supporting the growth of over 8,000 green jobs.⁴

With a new US Administration incoming which will be far more geared towards traditional oil and gas production, the Scottish and UK governments have an opportunity to show their support for Renewable Liquid Gases as an opportunity for investment.

⁴ 'Liquid Gas UK: The Industry's Journey to 2050', Gemserv and Liquid Gas UK, (2024)

2. What UK Government interventions will be necessary to maximise the ability of oil and gas workers to find jobs in clean energy?

Liquid Gas UK would recommend that UK Government takes a technology neutral approach, which does not preclude or prevent any technologies from being installed which are able to demonstrate a viable decarbonisation pathway. This means moving away from a full electrification approach and recognising bioLPG and rDME as fuels to decarbonise homes and businesses. The UK government has set out a clear preference for heat pumps for all future homes, with the 2035 ban on new boilers still in place.

RLGs such as bioLPG and rDME are the best route to decarbonisation for the 20% of homes off the gas grid that are unsuitable for electrification (including heat pumps), as identified by DESNZ, as well as businesses. Archetype analysis demonstrates that for these hard to heat and hard to treat households, RLGs have the lowest levelised cost, making them the most affordable low-carbon heating option over the system's lifetime.

BioLPG has up to 90% fewer carbon emissions than LPG and 92% fewer than heating oil. As explained earlier it is also a 'drop-in' fuel, meaning it can be used in existing infrastructure, from storage tanks to boilers.

As a drop-in fuel, this also means our existing workforce is currently trained and ready to work on renewable liquid gas boilers. As a result, current jobs already in the LPG sector have the potential to become secure jobs in clean energy.

The full recognition of LPG as a transitional fuel away from oil and coal for off gas grid properties would allow both the UK-based refineries and LPG distribution industry to have a secure future with the possibility to grow in future years. Most importantly, the LPG industry has a clear pathway to 100% low carbon fuels, so a transition to LPG is also consistent with net zero targets. LPG emits 33% less CO₂ than coal, and around 15-20% less CO₂ than oil, with low levels of NO_x, SO_x and Particulate Matter, also enabling immediate air quality improvements.

Additionally, the recognition of bioLPG and other renewable liquid gases as low carbon heating options for homes and businesses would allow the industry to grow to fill this market. By focusing on heat pumps for all properties, whether suitable to be installed or not, this holds back the growth potential of the LPG and renewable liquid gas industry to fill the market that the heat pump market cannot, namely, hard-to-treat and hard-to-heat off-gas grid properties and businesses.

Off-gas grid homes and businesses should be allowed to use, and continue to use, renewable liquid gases as low carbon heating solutions. This would give rural communities choice for their route to decarbonisation, avoid an undue upfront cost burden and provide a safeguard against stresses placed on extension to the electricity grid.

Available on the market today, bioLPG is an affordable, convenient, and non-intrusive 'drop-in' solution to decarbonisation for a variety of rural off-grid homes and businesses. Made from a diverse mix of biological feedstocks and processes, bioLPG is a 'drop-in' fuel,

meaning LPG infrastructure is ready for the future - this means no retrofit costs and low consumer disruption. It is able to provide immediate and expedient heat or hot water.

Allowing off-gas grid properties to use renewable liquid gases would also boost security for homes and businesses. BioLPG and renewable liquid gases can also be used in hybrid heat pump technologies, offering greater security than sole heat pump solutions alone. According to our own research, if they have to have a heat pump, 72% of rural households would want a back-up boiler.⁵ LPG and bioLPG is the perfect partner for hybrid heat pumps in rural areas and it would be short-sighted by Government to not consider a place for them in the future regulatory framework. Hybrid heat pump solutions using bioLPG have also been identified by the Committee on Climate Change (CCC) as a key technology for decarbonising heat in off-grid buildings:

“Hybrid heat pumps can be installed alongside existing heating systems, with these secondary fuels later transitioning to low carbon sources. For hybrid heat pumps on the gas grid, peaking gas use can be transitioned to hydrogen, whilst off the gas grid, biofuels can be used (assumed to be bioLPG for the purposes of our modelling).”⁶

The introduction of an exemption to allow the use of bioLPG in hybrid heat pumps would allow off-gas grid properties to benefit from a mixed technology approach, while significant emission reductions would be realised through the decarbonisation of on-gas grid buildings. Energy consultancy Ecuity (now Gemserv) has found that a mixed technology approach will enable the UK to achieve its net zero target. It was found to be the most cost-effective approach, and ultimately saved £7bn in levelised cost analysis across the whole of UK.⁷

Liquid Gas UK believes that new regulations should be phased in for off-gas grid areas on the same timescale as on-gas grid properties, giving consumers until 2035 rather than 2026. A phased introduction will give greater opportunity for the challenges facing these areas – around cost, practicality, consumer choice, and supply chain and network readiness – to be fully addressed.

Such an introduction would also provide opportunities for reskilling existing oil and gas workers, specifically at the Grangemouth Refinery. Prioritising a mixed technology approach would provide an opportunity for workers affected by the recent closure to reskill when the refinery becomes an import terminal only, as well as a significant opportunity to repurpose assets in the refinery to produce bioLPG.

⁵ ‘Off-gas grid survey review’, Liquid Gas UK (2021)

⁶ ‘Net Zero Technical Report’, Committee on Climate Change (2019)

⁷ ‘A Practical Approach: Analysis of Off-Grid Heat Decarbonisation Pathways’, Ecuity Consulting & Liquid Gas UK, (2019)

3. Are Scotland's energy industry and associated supply chains well-placed to transition to clean energy generation, or is more support needed?

More support is needed for Scotland's energy industry to transition to clean energy generation. Only a supportive policy framework for renewable liquid gases as low carbon heating options would allow the industry to grow and provide the sector the assurance it needs to invest.

Scotland produces more LPG than it consumes and there is sufficient conventional propane to meet additional internal demand if needed for the replacement of coal and oil. The existing supply chains are well established and would be suitable for bio propane (and other 'drop-on' blends) of Renewable Liquid Gases that will be supplied in the future. The future manufacturing routes of bioLPG (and other RLGs) in Scotland are unclear and it is likely that supply will be dependent on fuel imports. The future closure of the Grangemouth Refinery has increased concerns in this area. Liquid Gas UK has an evidenced pathway to net zero for our sector by 2040, with the use of renewable liquid gases made from sustainable waste carbon feedstocks. We do not support a definition of 'polluting heating systems' that includes fuel types that can deliver net zero emissions, including bioLPG and rDME.

BioLPG, is a versatile, 'drop-in' renewable solution which can provide up to 90% carbon emissions reduction compared to conventional LPG. Already available on the market today, bioLPG is chemically identical to LPG and can be used as it is, just like conventional LPG. This means it can be seamlessly 'dropped-in' to existing supply chains and can be used by consumers in their existing heating appliances, stored in existing bulk tanks and cylinders without any modifications, and transported using today's infrastructure and skilled workforce, with little or no additional cost to the consumer.

Switching to LPG systems today also locks in a seamless pathway to renewable energy use, as bioLPG can directly replace conventional LPG going forward in a hassle-free way. LPG and bioLPG can also be used in hybrid systems, alongside heat pump technology.

4. What actions should the UK and Scottish Governments take to ensure the necessary generation and transmission infrastructure to support the development of Scotland's renewables sector?

The transition to a carbon neutral economy will not be easy and will be expensive in terms of initial capital outlay and / or the type of fuel being used. The UK and Scottish governments should continue to support all of the available technologies that provide a technically robust, reliable, cost-effective long-term solution to consumers which will enable them to choose the best solution for their specific needs.

Heat pumps will cause a significant rise in demand for electricity consumption on the local network, especially when coupled with demand for electricity to power electric vehicles – it is important that this additional demand does not cause power outages. As well as underground lines costing between 3 – 5 times more per km than overhead lines, upgrading the network and the actual technology in the home would cause significant disruption to the rural population. It is in these rural located homes and businesses, where boilers using RLGs and hybrid solutions should be used to ensure new homes are low-carbon.

5. How can GB Energy, and other ways of backing industry (including funding), most effectively support employment, economic growth and the development of clean energy supply chains in Scotland?

To maintain energy security and balance with our net-zero commitments, the UK should look at creating a domestic biofuels industry that can support a diverse portion of the economy. The UK is already committed to increasing the production and use of Sustainable Aviation Fuel (SAF). A biofuel derivative from this process is bioLPG, which is chemically indistinct from conventional LPG and yet has carbon savings of up to 90% compared to conventional LPG. Off-gas grid energy security can be supported, therefore, through the decarbonisation of aviation.

Additionally, renewable liquid gases, made from a diverse and variable wealth of sources, including animal waste, sewage sludge, municipal waste, energy crops and forest residues, can be produced in the UK in the future without reliance on imports, delivering higher energy security than fossil fuel equivalents. Modelling prepared by Fraser-Nash and NNFCC to support the pathway to 100% renewable liquid gases by 2040 detailed how the strategic exploitation of rDME and rDME blends in commercial and household settings respectively would avoid shortfalls in domestic supply of renewable energy options. The report calls for greater policy clarity on the status of bio-energy technologies. This would allow for incentivisation of their use and greater production of renewable liquid gases as a by-product. Liquid Gas UK's 2040 Pathway demonstrates the commitment from the LPG industry to deliver renewable liquid gases now and in the future - scaling up investment by a further £160 million investment across the UK, scaling up commercial production in the UK and scaling up innovative solutions for homes and businesses.

Scotland has been identified as the most attractive location for the development of wood-based biorefineries in the UK. Building three standard-sized plants in strategic locations, utilizing currently available woody biomass after competing uses (mostly forestry residues), and diversifying certain sawmill residues volumes from existing uses could feasibly produce around 180,000 tonnes of BioLPG.⁸

⁸ 'A business case for an indigenous BioLPG supply chain in the UK', NFFCC (2020)

6. How should GB Energy work with the Scottish Government and other Scottish bodies to identify appropriate funding and other mechanisms?

No answer.

7. What does a just transition look like for workers and communities across Scotland's highland and island communities, and what role might community energy and community benefits play in this?

In the Scottish Government publication (Agriculture and Rural Economies Directorate) 'Rural Scotland Key Facts 2021' Rural Scotland accounts for 98% of the land mass of Scotland and 17% of the population. These rural and island communities face specific challenges in their path to net zero. Their homes are often older and less well insulated – making them harder to decarbonise with clean electricity. These communities are remote and electricity grids aren't as developed, there is a lack of transport infrastructure and services are often limited and often rely on energy solutions that are off-grid.

By DSENZ's own admission, heat pumps are not a viable solution for decarbonising at least 20% of these off-gas grid homes. In addition around 227,000 oil heated homes were built pre-1945 and are large and detached. Archetype analysis by Ecuity found that, for these properties, the lowest levelised cost renewable heat option would be a bioLPG boiler. To achieve equivalent carbon savings with any other technology, the upfront costs are at least six times greater. For the same property archetype, the installation and requisite retrofit of an air source heat pump would be £29,690.

Currently, facing the technical challenges and costs of installing heat pumps, there is a significant barrier for these properties achieving net zero. For these properties, there is a clear case for a mixed technology approach, with consumers being allowed the flexibility to install a low carbon system that meets their individual situation. In recent months the Scottish Government has started to take note of some of these issues. For example, in September, Scottish Ministers issued a temporary direction to allow wood burning stoves and other bioenergy heating systems to be installed in new homes following concerns raised by those living in rural and island communities. This move that has since been made permanent.

Scottish Government must go further and ensure existing homes and businesses can use bioenergy heating systems in their pursuit of net zero through the Heat in Buildings Bill.

Allowing off-gas grid properties to use renewable liquid gases would also boost security for homes and businesses. BioLPG and renewable liquid gases can also be used in hybrid heat pump technologies, offering greater security than sole heat pump solutions alone. If they have to have a heat pump, 72% of rural households would want a back-up boiler. LPG and bioLPG are the perfect partners for hybrid heat pumps in rural areas and it would be short-sighted by

Government to not consider a place for them in the future regulatory framework. Hybrid heat pump solutions using bioLPG have also been identified by the Committee on Climate Change (CCC) as a key technology for decarbonising heat in off-grid buildings:

“Hybrid heat pumps can be installed alongside existing heating systems, with these secondary fuels later transitioning to low carbon sources. For hybrid heat pumps on the gas grid, peaking gas use can be transitioned to hydrogen, whilst off the gas grid, biofuels can be used (assumed to be bioLPG for the purposes of our modelling).”⁹

Taking a mixed technology approach for off-gas grid homes, allowing the use of renewable liquid gases and hybrid heat pumps would help to ensure reliable and secure heating for rural and island properties. The consequences of electricity outages – such as those caused by storms Malik and Corrie in January 2022 – will be particularly acute for off-gas grid consumers if they have no recourse to a bioenergy alternative.

Heat pumps will also cause a significant rise in demand for electricity, particularly when coupled with demand from electric vehicles. Without very high and significant improvements the local electricity networks across the Highlands and Islands are unlikely to have the capacity to meet demand. Consequently, many could be left without heat and power – especially at peak times as highlighted by events this Christmas, where hundreds of homes in Orkney and Eday were left without power due to storms affecting the electricity grid. Putting greater electricity demand on these vulnerable networks, will increase the impact of these incidents when the next storm hits.

⁹ ‘Net Zero Technical Report’, Committee on Climate Change (2019)

8. Can the UK learn lessons from international examples about how to effectively manage Scotland's energy sector transition?

No answer.

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