



## Liquid Gas UK

### Scottish Parliament Net Zero, Energy and Transport Committee

### Short inquiry into energy price rises

### Response by Liquid Gas UK

#### Introduction

Liquid Gas UK is the voice of the LPG and bioLPG industry in the UK, representing 98% of LPG supplied in the Scottish market. LPG and bioLPG are primarily used by off-gas-grid households and businesses, which are mainly in rural areas.

Liquid Gas UK welcomes the Committee's decision to investigate rising energy prices, which are causing wide-ranging problems for consumers and businesses. Efforts to tackle rising energy prices through energy efficiency measures and changes to the energy system must take account of the particular circumstances of rural properties.

This response outlines in more detail the role of LPG and bioLPG in the Scottish energy market, with the hope that this information can support the Committee's wider findings and provide a fuller picture of energy usage in Scotland.

#### About LPG and bioLPG

LPG is the lowest carbon conventional energy source available to off-grid homes and businesses in the UK, which provides immediate, expedient and cost-effective heat and energy. As LPG emits more than 33% fewer carbon emissions than coal and 15-20% fewer carbon emissions than oil (UKLPG, Response to A Future Framework for Heat in Buildings, 2018), **LPG is a transitional solution in its own right**. It also emits virtually no NO<sub>x</sub>, SO<sub>x</sub> and Particulate Matter, enabling immediate air quality improvements.

BioLPG, alternatively known as biopropane, is a **versatile, 'drop-in' renewable solution which can provide [up to 90% carbon emissions reduction](#)** compared to fossil-based LPG. Already available on the market today, bioLPG is chemically indistinct from LPG and can be used as it is, just like conventional LPG. This means it can be 'dropped-in' to existing supply chains and can be used by consumers in their existing heating appliances, stored in existing bulk tanks and cylinders, and transported using today's infrastructure and skilled workforce.

#### Challenges with Rural Heat Decarbonisation

A 2021 poll of Scottish rural householders indicates that 33% of respondents are unable to afford any money on a new heating system, while 86% were concerned about the upfront cost of installing a new system. The cost of living crisis has only worsened and continues to affect rural communities acutely, meaning households and businesses will be further restricted in meeting the upfront costs associated with heat decarbonisation.

Electrification of heating systems should not solely be seen as the solution to decarbonisation and low carbon heat in Scotland, especially in rural areas. It is important that regulations and policy reflect that different solutions will be required for different types of building stock and locations across the country.

We advocate a mixed technology approach to installing heating technologies in off-grid homes and non-domestic properties. Energy consultancy Ecuity has found that this 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 the UK.

Heat pumps generally operate at greater efficiency with lower flow temperatures than the typical central heating system has been set up for. As a result, homeowners often need to consider energy efficiency improvements and emitter replacement when installing a heat pump. In fact, these measures are often recommended, or required, by some Government support schemes (e.g. dRHI) as a complement to the effective operation of heat pumps.

[Our analysis](#) indicates that for an off-gas grid household to install a heat pump, the upfront cost could be as much as £32,000. A significant portion of this cost is associated with the scale of retrofit that may be required. For example, the majority of rural detached homes have solid-walls. Solid-wall insulation for a detached house can cost anywhere between [£6,000 and £20,000 and can take weeks to install](#). Survey data indicates that around 60% of Scottish off-grid householders are also concerned about the disruptions associated with changing to a new heating system.

In addition to the often prohibitive costs of heat pumps for off-grid properties, it's important to recognise the other challenges with electric-only solutions in rural Scotland. Upgrades to the electricity network will be needed to meet the demand associated with transitioning the majority of properties to electric heating, and such upgrades are, again, often more costly in rural areas. Moreover, the availability of appropriately trained heat pump installers will be a challenge for the whole country, but will likely be an ongoing problem for rural communities which already struggle with skills and supply shortages, which is driving up prices.

### **The Road to Rural Net Zero**

For a traditional detached off-grid property in Scotland, the lowest cost, low carbon heating system is a bioLPG boiler. As bioLPG is a drop-in solution, it can be used with existing LPG infrastructure (like boilers, ovens and tanks). For people who use oil heating, switching to LPG today and bioLPG in the future offers a substantially lower upfront cost (at £2000) compared to heat pumps.

Switching to LPG systems today 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. The Committee on Climate change modelled off-grid hybrids using bioLPG in their leading [Net Zero report](#).

As rural households and businesses continue to feel the pressure of rising prices, it is crucial that consumers are offered choice when transitioning to low carbon heating systems. LPG and bioLPG offer a cost-effective route to net zero for rural communities and, as such, people should be supported to install LPG and bioLPG heating systems.

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*For more information, please contact Francesca Kirtley-Paine, Public Affairs Manager at Liquid Gas UK.*

## Appendix A: Housing Archetypes

To contextualise the real-world impact of different heating systems for consumers, Liquid Gas UK has produced a series of housing archetypes based on common Scottish property types. These archetypes are presented as case studies below, alongside data on both cost and carbon emissions for different heating options.

### Case study 1: Detached House, Pre-1918



- Floor area: 198 m<sup>2</sup>
- No major renovations (assume solid walled – uninsulated, some room-in roof loft insulation)
- Energy needed for heating: 142 kWh/m<sup>2</sup>\*year (28,116 kWh/year)
- Comparable to archetype #13 from the [Scottish Government report by Element Energy](#)
- There are over 20,228 properties off-grid that correspond to this archetype

#### Cost Breakdown:

Heating System	CapEx (£)	OpEx (£/yr) [2020]	Levelized Cost (£/MWh) [2020]	Carbon Emissions (kgCO <sub>2</sub> e/yr) [2020]
<i>Oil</i>	4,150	2,096	77	10,493
<i>Coal</i>	6,093	1,868	75	14,665
<i>LPG Boiler</i>	2,000	2,777	92	7,438
<i>BioLPG Boiler</i>	2,000	3,276	<b>108</b>	1,689
<i>ASHP</i>	18,270	3,040	139	2,433
<i>ASHP (+R) *</i>	30,990	<b>1,216</b>	158	973
<i>Hybrid</i>	14,960	2,886	131	2,284
<i>Hybrid (+R) *</i>	31,270	1,335	170	988
<i>Biomass</i>	18,100	2,325	113	<b>686</b>
<i>Direct Electric</i>	<b>1,400</b>	5,603	179	4,484

\***Archetype renovations:** loft insulation (£3,100), solid wall insulation (£11,500), UPVC double glazing (£8,300) – total capital: (£22,900). New cost of ASHP (+R) = £8,090. New cost of hybrid system (+R) = £8,370.

#### Percentage of households who can afford this capital cost

Heating System (CapEx)	Percentage of households who can afford the capital cost:
BioLPG Boiler (£2,000)	<b>67%</b>
ASHP (£18,270)	25%
ASHP + R (£30,990)	16%

Hybrid (£14,960)	31%
Biomass (£18,100)	25%

**Table 2:** Displays the approximate percentage of Scottish households that have an annual disposable income greater than the capital cost of each of the low-carbon heating systems, for the archetype 1 property.

### Consumer Journey:

Heating System	Research, Search and Contact (hours)	Pre-Installation (hours)	Installation (Days)	Post-Installation (hours)	Ongoing (hours per year)	Approximate Total Time:
<b>BioLPG:</b>	4-8	3.5-8	0.5	6-16	1-2	<b><u>2.5 – 4.5 days</u></b>
<b>Biomass:</b>	10-18	3.5-8	1	7-17	1-3.5	3.5 – 6 days
<b>ASHP:</b>	10-18	3.5-14	2-5	7-80	1-3.5	4.5 – 6 days
<b>ASHP + R:</b>	10-18	3.5-14	17.25-20.25	7-80	1-3.5	22 - 26 days
<b>Hybrid:</b>	10-18	3.5-14	2-5	7-80	1-3.5	4.5 – 6 days
<b>Hybrid + R:</b>	10-18	3.5-14	17.25-20.25	7-80	1-3.5	22 - 26 days

**Table 3:** Displays the consumer journey of each heating system for the archetype property.

**\*Archetype renovations:** Loft insulation (0.25 days), solid wall insulation (10 days) and UPVC double glazing (5 days).

### Case study 2: Semi-detached house, 1965-1980

- Floor area: 123 m<sup>2</sup>
- No major renovations (assume cavity wall with no insulation)
- Energy needed for heating: 137 kWh/m<sup>2</sup>\*year (16,851 kWh/year)
- Comparable to archetype #1 (off-grid setting) from the [Scottish Government report by Element Energy](#)



### Cost Breakdown:

Heating System	CapEx (£)	OpEx (£/yr) [2020]	Levelized Cost	Carbon Emissions

			(£/MWh) [2020]	(kgCO2e/yr) [2020]
<i>Oil</i>	3,950	1,264	84	6,324
<i>Coal</i>	5,098	1,126	82	8,839
<i>LPG Boiler</i>	1,700	1,696	96	4,483
<i>BioLPG Boiler</i>	<b><u>1,700</u></b>	2,001	<b><u>112</u></b>	1,018
<i>ASHP</i>	10,650	1,782	135	1,427
<i>ASHP (+R) *</i>	11,980	<b><u>1,216</u></b>	122	973
<i>Hybrid</i>	9,870	1,706	133	1,345
<i>Hybrid (+R) *</i>	12,440	1,249	132	952
<i>Biomass</i>	13,650	1,401	123	<b><u>414</u></b>
<i>Direct Electric</i>	<b><u>1,400</u></b>	3,377	182	2,703

\***Archetype renovations:** loft insulation (£3,100), cavity wall insulation (£905) – total capital (£4,050). New cost of ASHP (+R) = £7,930. New cost of hybrid system (+R) = £8,390.

### Percentage of households who can afford this capital cost

Heating System (CapEx)	Percentage of households who can afford the capital cost:
BioLPG Boiler (£1,700)	<b><u>72%</u></b>
ASHP (£10,650)	37%
ASHP + R (£11,980)	35%
Hybrid (£9,870)	39%
Biomass (£13,650)	32%

**Table 2:** Displays the approximate percentage of Scottish households that have an annual disposable income greater than the capital cost of each of the low-carbon heating systems, for the archetype 1 property.

### Consumer Journey:

Heating System	Research, Search and Contact (hours)	Pre-Installation (hours)	Installation (Days)	Post-Installation (hours)	Ongoing (hours per year)	Approximate Total Time:
<b>BioLPG:</b>	4-8	3.5-8	0.5	6-16	1-2	<b><u>2.5 – 4.5 days</u></b>
<b>Biomass:</b>	10-18	3.5-8	1	7-17	1-3.5	3.5 – 6 days
<b>ASHP:</b>	10-18	3.5-14	2-5	7-80	1-3.5	4.5 – 6 days

<b>ASHP + R:</b>	10-18	3.5-14	3.25-6.25	7-80	1-3.5	8 – 12 days
<b>Hybrid:</b>	10-18	3.5-14	2-5	7-80	1-3.5	4.5 – 6 days
<b>Hybrid + R:</b>	10-18	3.5-14	3.25-6.25	7-80	1-3.5	8 - 12 days

**Table 3:** Displays the consumer journey of each heating system for the archetype property.

**\*Archetype 1 renovations:** Loft insulation (0.25 days), solid wall insulation (10 days) and UPVC double glazing (5 days).

### Case study 3: Terraced house, 1964-1980

- Floor area: 85m<sup>2</sup>
- No major renovations (assume cavity wall with no insulation)
- Energy needed for heating: 96 kWh/m<sup>2</sup>\*year (8,160 kWh/year)
- Comparable to archetype #17 from the [Scottish Government report by Element Energy](#)



### Cost Breakdown:

Heating System	CapEx (£)	OpEx (£/yr) [2020]	Levelized Cost (£/MWh) [2020]	Carbon Emissions (kgCO <sub>2</sub> e/yr) [2020]
<i>Oil</i>	3,950	863	92	4,317
<i>Coal</i>	3,375	769	81	6,034
<i>LPG Boiler</i>	1,500	1,175	99	3,060
<i>BioLPG Boiler</i>	1,500	1,386	<b>116</b>	695
<i>ASHP</i>	7,930	1,195	137	957
<i>ASHP (+R) *</i>	8,275	<b>685</b>	123	548
<i>Hybrid</i>	9,050	1,150	147	904
<i>Hybrid (+R) *</i>	9,675	725	145	545
<i>Biomass</i>	9,534	956	124	<b>282</b>
<i>Direct Electric</i>	<b>1,000</b>	2,305	182	1,845

**\*Archetype renovations:** loft insulation (£1,900), cavity wall insulation (£505) – total capital (£2,405). New cost of ASHP (+R) = £5,870. New cost of hybrid system (+R) = £7,270.

### Percentage of households who can afford this capital cost

Heating System (CapEx)	Percentage of households who can afford the capital cost:
BioLPG Boiler (£1500)	<b><u>75%</u></b>
ASHP (£7,930)	43%
ASHP + R (£8,275)	42%
Hybrid (£9,050)	41%
Biomass (£9,534)	40%

**Table 2:** Displays the approximate percentage of Scottish households that have an annual disposable income greater than the capital cost of each of the low-carbon heating systems, for the archetype 1 property.

### Consumer Journey:

Heating System	Research, Search and Contact (hours)	Pre-Installation (hours)	Installation (Days)	Post-Installation (hours)	Ongoing (hours per year)	Approximate Total Time:
<b>BioLPG:</b>	4-8	3.5-8	0.5	6-16	1-2	<b><u>2.5 – 4.5 days</u></b>
<b>Biomass:</b>	10-18	3.5-8	1	7-17	1-3.5	3.5 – 6 days
<b>ASHP:</b>	10-18	3.5-14	2-5	7-80	1-3.5	4.5 – 6 days
<b>ASHP + R:</b>	10-18	3.5-14	2.5-5.5	7-80	1-3.5	5 – 6.5 days
<b>Hybrid:</b>	10-18	3.5-14	2-5	7-80	1-3.5	4.5 – 6 days
<b>Hybrid + R:</b>	10-18	3.5-14	2.5-5.5	7-80	1-3.5	5 – 6.5 days

**Table 3:** Displays the consumer journey of each heating system for the archetype property.

**\*Archetype renovations:** Loft insulation (0.25 days) and cavity wall insulation (0.25 days).