**Northern Ireland Energy Strategy**
**Call for Evidence**

**Liquid Gas UK submission**
**March 2020**

## About Us

Liquid Gas UK is the trade association for the Liquefied Petroleum Gas (LPG) and biopropane (bioLPG) industry in the UK, representing companies who are LPG producers, distributors, equipment and service providers, and vehicle convertors. It is dedicated to the safe and effective development of LPG and takes a leading role in consultation and negotiation with legislators and policy makers. Member companies cover 99% of the total LPG distributed in the UK.

Liquid Gas UK also takes a leading role in encouraging competition and setting best practise in supporting customers in the UK. Liquid Gas UK has a supplier switching service for LPG customers who use bulk or cylinders, as well as a customer charter to protect the most vulnerable.

We welcome the opportunity to respond to the consultation, in which we outline the hugely significant role LPG and bioLPG can play in the current, and future, decarbonisation of off gas grid buildings.

## An introduction to LPG and bioLPG

LPG is the lowest carbon conventional energy source available to off-grid homes and businesses in Northern Ireland, 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[1], **LPG is a transitional solution in its own right.** It also emits virtually no NOx, SOx 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% emissions reduction** compared to fossil based LPG.[2] 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.

LPG boilers offer a long-term, cost effective pathway to decarbonisation through the gradual introduction of bioLPG into the mix; this means over time carbon emissions will increasingly reduce. **It is the industry's ambition to offer 100% renewable energy solutions by 2040**.[3] As

[1] UKLPG, Response to A Future Framework for Heat in Buildings (June 2018)
[2] WLPGA, 'BioLPG: The Renewable Future' (2018), Page 52
[3] Liquid Gas UK, 2040 Vision (July 2019)

bioLPG becomes increasingly available to the UK market, Liquid Gas UK wants to work in partnership with Northern Ireland Government to drive consumer behaviour in rural areas towards greener solutions.

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. The Committee on Climate change modelled off-grid hybrids using bioLPG in their leading Net Zero report[4].

Electrification of heating systems should not solely be seen as the solution to decarbonisation and low carbon heat in Northern Ireland, 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 while of UK. We believe a mixed technology approach in Northern Ireland will best encourage consumers with different circumstances, earning capacities and building types to make environmentally sustainable choices.

## LPG use in Northern Ireland

In Northern Ireland, 5,000 households use LPG[5]. This compares to around 520,000 households estimated to use heating oil, or nearly two-thirds of Northern Irish homes[6]. The total number of mains gas customers is approximately 253,000[7]. Other forms of heating will include electricity, as well as coal and wood.

LPG is used by householders for water, cooking, space and process heating (heating oil cannot be used for cooking). LPG is also used by businesses. The non-domestic volume is most commonly found in restaurants, pubs, food stalls, warehouses and farms; with hospitality and storage accounting for over three quarters[8].

Encouraging and facilitating the conversion from heating oil to LPG is a cost-effective way to immediately reduce carbon emissions and improve air quality, as well as locking in a seamless transition to bioLPG.

[4] Committee on Climate Change, Net Zero – Technical Report (2019)
[5] The Energy Strategy Call for Evidence, Northern Ireland Department for the Economy (December 2019)
[6] The Energy Strategy Call for Evidence, Northern Ireland Department for the Economy (December 2019)
[7] The Utility Regulator's Retail Market Monitoring Quarterly Transparency Report
[8] World LPG Association, 'The role of LPG and bioLPG in Europe (2019)

**Q3: To what extent should Northern Ireland implement the key energy-related recommendations from the CCC 'Reducing Emissions in Northern Ireland' report**

Liquid Gas UK supports two of the four recommendations for energy priorities to 2030. We agree with the CCC that policy makers should focus on support to incentivise consumers to install low-carbon heating in homes off the gas grid and that policy makers should focus on options to incentivise energy efficiency improvements in homes. However, in both cases, a multi technology approach is needed so consumers can pick an environmentally friendly heating system which works for them, for example an LPG/bioLPG boiler, LPG Hybrid Heat Pump or a standard heat pump.

Liquid Gas UK believe financial incentives are a useful tool in encouraging households to take responsibility for their fuel use. One method to encourage off-grid homeowners to switch to lower carbon solutions, especially high carbon heating oil users, is an oil tank scrappage scheme for consumers moving to LPG or hybrid heat pump systems.

Oil infrastructure is owned by the homeowner, therefore the cost of removing a tank and the value of the remaining fuel causes customer reluctance to move on to lower carbon solutions. LPG tanks on the other hand are owned and maintained by the LPG supplier.

As such, Government should incentivise off-grid homeowners to switch from heating oil to low carbon solutions, such as LPG or hybrids, with a Government-supported oil tank scrappage scheme. The success of the diesel car scrappage scheme illustrates that consumers will proactively choose low carbon solutions if there is an incentive to make that positive choice.

Another incentive is for LPG Hybrid Heat Pumps and standalone bioLPG boilers should be covered in future subsidy schemes (such as the RHI) for both domestic and non-domestic buildings. In addition, the production of bioLPG, alongside biomethane, should also be covered to help encourage an indigenous production market in Northern Ireland.

**Q4: Do you agree with the 30-year timeframe? If not, please state your preferred approach and reasons.**

Yes, we agree with the proposed time frame of 30 years as this will provide the certainty needed to drive private sector investment, establish indigenous production and allow industry to work with Government to realise its low carbon goals.

The LPG industry has already signalled its ambition to transition to bioLPG by 2040, following the launch of the '2040 Vision' in July 2019. A long-term policy vision which encourages investment in localised UK production of bioLPG would be wholly supported by the industry. There is a growing market for bioLPG which will continue to scale up in the 2020s, 30s and 40s. This is an exciting opportunity for Northern Ireland to lead the way, by encouraging investment in bioenergy processing facilities or developing feedstock's and processes through R&D funding.

Analysis undertaken by NNFCC[9] demonstrates that a deployment pathway for a full switch from fossil LPG to bioLPG in the UK by 2040 is a feasible solution to support the Government in its ambition to move towards a low carbon economy. NNFCC found that there is significant potential for rapid scale-up of indigenous bioLPG production in the UK, such as new HVO plants, co-processing at existing refineries, establishing gasification and fischer tropsch synthesis facilities.[10]
These new production facilities could sit at the heart of a circular economy in Northern Ireland, utilising a sustainable local feedstock, creating jobs for the local area, contributing to economic growth and ultimately creating the energy to be used in rural homes, businesses and industries.

Examples of feedstock's which will be available to support UK production of bioLPG include used cooking oil, animal fat, vegetable oil, waste, plant dry matter, sugar and starch. Northern Ireland Government should work with industry to look at what feedstock's are most available and appropriate in different parts of the country and if they can facilitate the development of production facilities which can in turn supply local / regional bioLPG demand. BioLPG production also could be established near high use demand in off-grid heat, such as clusters of distilleries or other industrial and commercial consumers.

Presently, the UK is a net exporter of propane[11]. By understanding the important contribution bioLPG will have in decarbonising off-grid heat in the UK and beyond, the UK can take the opportunity to position the country to become a net exporter of bioLPG. The wide range of feedstock's and processing methods for bioLPG make it an ideal candidate for export, especially as the demand for biofuels grows in other European countries and beyond.

## Q5: What are the unique characteristics of Northern Ireland that need to be considered in a net zero carbon energy transition?

One of Northern Ireland's unique characteristics is its housing stock which is often hard-to-heat and difficult-to-treat. These older rural off-grid properties are typically less energy-efficient, which makes installing energy efficiency measures the building-retrofit for electrical heating technologies more challenging and expensive. In addition, some of these properties have a heritage value and character which may require bespoke low emission solutions.[12]

LPG with the transition to BioLPG however is available to support the decarbonisation of these trickier properties. LPG and bioLPG provide immediate and expedient heating and hot water, the high grade heat needed during a cold weather spell, and due to bioLPG being drop-in, it can be used in existing infrastructure. This takes away the need for costly retrofit and also makes the cost of technology affordable, as LPG boilers are already readily available at a reasonable cost.

[9] NNFCC, Biopropane: Feedstocks, Feasibility & our Future Pathway (2019)
[10] NNFCC, Biopropane: Feedstocks, Feasibility & our Future Pathway (2019)
[11] UKLPG Submission to REA Bioenergy Strategy Call for Evidence (February 2019)
[12] Ecuity / Liquid Gas UK, A Practical Approach: Analysis of Off-Grid Heat Decarbonisation Pathways (2019)

Ecuity found that a mixed technology approach, as well as one that relies solely on fitting heat pumps, could both help the UK realise its net zero target; but that a mixed technology approach could do so for over £7 billion less. It is therefore unrealistic to expect that a silver bullet approach of electrifying heat is the best solution to decarbonise heat in off gas grid homes.[13]

For example, a case study in the recent study by Ecuity showed that a typical pre-1918 detached family home would face levelised costs of 40% higher, equating to £22,6000, if forced to switch to a heat pump rather than to switching onto LPG/bioLPG. This is unaffordable and unattainable for most ordinary people in Northern Ireland, and with this in mind, its vital to have a consumer led, market approach to off-grid heat decarbonisation, which provides a mix of heating solutions.[14]

The upfront cost and ongoing running costs of a 'one size fits all' electrified heating solutions is significant. This is especially important to recognise when at least 16% of householders in off-grid areas are in fuel poverty[15] and generally use cheaper, high-carbon heating oil to keep warm in winter months. Having a mixed technology approach helps homes to choose an affordable heating solution that works for their home and needs, rather than imposing a 'one size fits all' heating system on them.

In addition to the upfront or levelised costs for the home or business, a mixed approach alleviates pressure on the electrical grid and supply chain. While the supply chain for gas boilers is mature, the accelerated uptake of heat pumps is constrained by its supply chain and network engineering challenges.

A vastly increased number of trained heat pump installers would be needed, as according to MCS there are only 1,800 certified heat pump installers[16] installing circa 20,000 heat pumps a year. Upskilling the existing workforce or training new engineers takes time, education policy is never changed or implemented swiftly, it would be unrealistic to assume that these numbers could be sharply increased (and geographically spread) in time to deliver necessary skills for upgrading off-grid rural new builds or existing homes.

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 underground lines costing between 3 – 5 times more per km than overhead lines[17], 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, where boilers using bioLPG and hybrid solutions should be used to ensure new homes are low-carbon.

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[13] Ecuity / Liquid Gas UK, A Practical Approach: Analysis of Off-Grid Heat Decarbonisation Pathways (2019)
[14] Ecuity / Liquid Gas UK, A Practical Approach: Analysis of Off-Grid Heat Decarbonisation Pathways (2019)
[15] Annual Fuel Poverty Statistics Report, 2019 (2017 data) - BEIS
[16] Installer Statistics Report (31 Dec 2018) – The Microgeneration Certification Scheme
[17] Research by Vivid Economics et.al shows that the unit cost of network reinforcement for high voltage lines is ~£38,000/km for overhead lines but ~£118,000/km for underground lines. This cost differential increases to ~5 times when looking at reinforcement to extra high voltage network lines (£91,000/km and £453,000/km respectively).

The lack of skills available and the cost of the technology should not be underestimated and the knock on effect it could have to delivering affordable new homes, especially considering the National Audit Office recently reported that none of UK Government's planned affordable 'starter homes' were built.[18] By taking a mixed technology approach in rural off-grid areas, with a mix of LPG/bioLPG and heat pumps, it allows progress to be made faster by utilising existing expertise and supply chains, while others are developed and strengthened.[19]

Rural communities in Northern Ireland, whether householders or businesses, can't be left behind, or given a 'one size fits all approach'. Having a long-term policy framework, that supports a consumer led market approach to off-grid heat decarbonisation, will enable a mix of environmentally progressive and innovative solutions for homes and businesses. This will ensure that individuals are able to make low carbon, sustainable choices that work for them, irrespective of their socio-economic status.

**Q6: Is your organisation undertaking or planning to undertake projects to support the energy transition? If so, please provide further details.?**

There is significant investment by our members in projects to support the transition to bioLPG and other renewable solutions, including R&D and investment in production. This will be scaled up even further however, once Northern Ireland Government recognises the role of LPG and bioLPG in its energy strategy and heat policy frameworks.

One example of a live project is between SHV, SkyNRG and KLM to capture bioLPG as a co-product of sustainable aviation fuel development, due to go live in 2022. Another successfully completed and ongoing project is the importing of bioLPG into the UK from Neste's Rotterdam Bio refinery.

Further, our members also have the capital and other funding available to kick start live projects such as gasification units to take advantage of local feedstock's across the UK, but we need to see positive signals in both Northern Ireland and UK Government Policy to speed up investment.

Liquid Gas UK are also carrying out a project, which is at the start of its journey, on a business case for each of the Devolved Administrations on what a transition to bioLPG could look like. For Northern Ireland, this project will explore local feedstock's, the production methods which could be invested in, the cost of this transition and how industry can work with government. We would welcome the opportunity to work with the Northern Ireland Government on this to ensure it provides you with the information you need.

[18] National Audit Office, Investigation into Starter Homes (5th November 2019) < https://www.nao.org.uk/wp-content/uploads/2019/11/Investigation-into-starter-homes-Summary.pdf>
[19] Ecuity / Liquid Gas UK, A Practical Approach: Analysis of Off-Grid Heat Decarbonisation Pathways (2019)

**Q7. How should we ensure that energy remains affordable for domestic consumers? What approach should be taken to eradicate fuel poverty?**

A mixed technology, market-led approach which allows consumers the freedom to choose the right decarbonisation pathway for their home or business is key, as this will drive down costs through competition and also will not force an unsuitable technology onto a building which is not suitable. A mixed technology approach is estimated to have the potential to save the UK £7 billion when compared to complete electrification[20].

It is also important to not look at capital or running costs alone, but also take into account the costs of retrofitting off-grid rural homes or businesses which will be necessary for electrified heating solutions. As off-grid buildings are often older homes, their method of construction and lack of insulation can make retrofitting electrified technology very expensive without real heating benefits. The challenge presented by older, poorly insulated buildings, means multiple solutions are required to ensure all these property types can transition to using more renewable and carbon friendly heating options that provide reliable heating.

**Q8. What steps could be taken to improve the relative cost competitiveness of larger non-domestic consumers?**

To ensure the new policies do not unintentionally restrict options, the Northern Ireland Government should ensure a market-led approach provides consumers with a choice of energy sources and fuels. The Call for Evidence cites the issue of high electricity costs borne by the largest energy users and the importance of cost competitiveness, particularly for non-domestic consumers. To ensure competition and drive down costs, it is important to diversify and facilitate the use of LPG and bioLPG through a market-based, technology-neutral approach. LPG and bioLPG can be used in many of Northern Irelands key economic drivers and industries including farming and agriculture, hospitality, manufacturing, food processing, leisure and distilleries.

In a 2019 report, the World LPG Association highlights the potential of an (off-grid) UK distillery in to switch to LPG to provide energy for steam, which drives the distillation process. It notes that witching to LPG can result in running cost and carbon emission savings. If a distillery was to replace its existing oil boilers with a modern condensing LPG boiler, annual running costs would fall by 2.5% per annum, rising to 3% after accounting for servicing and maintenance costs. That annual saving would enable the distillery to payback the capital cost of the new LPG boiler in under five years[21].

Encouraging switching to LPG from oil (and coal) for process heating provides clear and immediate emissions savings (up to 20% and 33% $CO^2$ savings respectively); and with the LPG industry having committed to increasing bioLPG supply, it provides for the infrastructure to unlock emissions savings of up to 80% compared to oil[22], in-line with the UK's net zero ambitions.

[20] Liquid Gas UK / Ecuity, A Practical Approach: Analysis of Off-Grid Heat Decarbonisation Pathways (2019)
[21] WLPGA, The role of LPG and bioLPG in Europe (2019)
[22] This varies depending on the production process and feedstock

**Q10. What types of advice and information are required by all consumers and what are the best mechanisms for facilitating this?**

It is important consumers are empowered to make informed decisions about how they can heat their homes and the Northern Ireland Government must work with industry to address the knowledge gap that exists about decarbonisation options, such as LPG, bioLPG and Hybrid Heat Pumps.

Liquid Gas UK believes it is incumbent on Government to ensure domestic and non-domestic consumers have access to a non-biased information resource on all energy options, including LPG and bioLPG.

**Q13. What evidence can you provide that identifies the challenges and opportunities for NI energy consumers in decarbonising energy?**

One of Northern Ireland's unique characteristics is its housing stock which is often hard-to-heat and difficult-to-treat this presents challenges in making them more energy efficient and decarbonising heat through electrification. LPG with the transition to BioLPG however is available to support the decarbonisation of these trickier properties.

As off-grid buildings are often older homes, their method of construction and lack of insulation can make retrofitting electrified technology very expensive without real heating benefits. The challenge presented by older, poorly insulated buildings, means multiple solutions are required to ensure all these property types can transition to using more renewable and carbon friendly heating options that provide reliable heating.

Ecuity, found that there were three core reasons as to why taking a mixed technology approach to decarbonisation was more advantageous[23]:

**a) Cost**

The mixed technology approach saved over £7bn in levelised cost analysis, UK wide, compared to a full electrification approach, as technologies were installed where it most cost-effective to do so. For example, a heat pump in well-insulated, newer build properties and LPG/bioLPG in older, harder-to-treat properties. There are also savings from having to upgrade the distribution network, the integration of flexibility resources and the building of additional renewable power generation to meet peak heat demands.

**b) Alleviates pressure on the grid & supply chain**

A mixed technology approach alleviates pressure on the electrical grid and supply chain, as discussed in Question 2, the accelerated uptake of heat pumps is constrained by network engineering

[23] Liquid Gas UK / Ecuity, A Practical Approach: Analysis of Off-Grid Heat Decarbonisation Pathways (2019)

challenges and a supply chain which will need to scale up over time. A vastly increased number of trained heat pump installers would be needed in Northern Ireland and vast investment and upgrades to the electricity distribution network.

A mixed technology approach would allow carbon savings to be made faster, by utilising existing expertise and supply chains. For instance, the existing LPG supply chain and installer base are already able to facilitate easy switching from oil, offering an immediate lower carbon solution with LPG and long-term decarbonisation with bioLPG. Failure to act will mean that the heating system replacement opportunities are missed in the near and medium term.

### c) Consumer choice

Consumers have a range of preferences and live in a diverse set of properties. Policy should recognise this diversity by supporting a range of low-carbon heating options and ensure that consumers will have choice between these. This lowers the political risk associated with favouring a small number of technologies, and targets outcome (emissions reduction) rather than favouring certain means of achieving this.

Rural communities, whether householders or businesses, can't be left behind, or given a 'one size fits all approach'. Having a long-term policy framework in Northern Ireland, that supports a consumer led market approach to off-grid heat decarbonisation, will enable a mix of environmentally progressive and innovative solutions for homes and businesses. This will ensure that Northern Irish citizens are able to make low carbon, sustainable choices that work for them, irrespective of their socio-economic status.

LPG boilers offer a long-term, cost effective pathway to decarbonisation through the gradual introduction of bioLPG into the mix; this means over time carbon emissions will increasingly reduce. It is the industry's ambition to offer 100% renewable energy solutions by 2040.[24] As bioLPG becomes increasingly available to the UK market, Liquid Gas UK wants to work in partnership with Northern Ireland Government to drive consumer behaviour in rural areas towards greener solutions.

While bioLPG is already available on the marketplace today, other off-grid solutions aren't there yet. For example, bio heating oil isn't available on the market today, so without any real market data there are considerable knowledge gaps surrounding the fuel properties of blends and their suitability. OFTEC have acknowledge that existing oil infrastructure will not support bio-kerosene[25] and in addition, NNFCC explored the issues with blends of biokerosene freezing in cold weather and oxidising/going rancid in warmer weather, causing additional costs on the consumer[26]. Ecuity explored this further, discussing the needs for numerous supply chain changes, due to the varying characteristics of different blends and the fact boilers, tanks and pipework would likely need to be changed.[27]

[24] Liquid Gas UK, 2040 Vision (July 2019)
[25] OFTEC, How should the storage tank be prepared for conversion? <https://www.oftec.org.uk/consumers/faqs-on-bioliquids-for-heat>
[26] NNFCC for BEIS, Evidence Gathering for Off-Gas Grid Bioliquid Heating Option (2019)
[27] Liquid Gas UK / Ecuity, A Practical Approach: Analysis of Off-Grid Heat Decarbonisation Pathways (2019)

Due to all the reasons mentioned above, heating oil is not a long-term solution and encouraging the switch onto lower carbon solutions, such as LPG, bioLPG and hybrid heat pumps, is the best way to decarbonise off-grid buildings in Northern Ireland.

**Q14. What, if any, energy efficiency target or targets should be set for Northern Ireland?**
**Q15. How should we define, measure and monitor energy efficiency to optimise its potential in our homes, business, economy and environment?**
**Q16. What are the most important policy levers for government to ensure zero carbon in:**

**a) New domestic and commercial buildings by 2050?;**
**b) Existing domestic and commercial buildings by 2050?**

**and**
**Q17. What should the future of energy efficiency support look like and who should be the key delivery bodies?**

It is important to have a UK-wide approach to meeting energy efficiency targets to ensure a consistent approach across the four Home Nations. Focusing on the fabric should be a key priority in the short to medium term, as low carbon heat develops. Utilising transitional, well established fuels in rural areas, such as LPG, enables homes built in the early 2020s to be 'future proofed' in an affordable way.

However, any future energy efficiency support should not be based on Energy Performance Certificates (EPCs) alone. EPCs are currently more likely to encourage off-grid property owners to take up higher carbon heating solutions rather than invest in energy efficiency measures. This unintended consequence is the exact opposite of what Northern Ireland Government wants to see.

Why does this happen?

The EPC rating is positioned as a measure of energy efficiency, in reality however, the rating is actually a measure of energy cost per $m^2$. This is due to the disproportionate focus on the input fuel[28]. **This means that two identical properties, one off-grid and one on-grid, will have vastly different EPC scores just because of the cost of the fuel they use, with lower carbon fuels being penalised.**

The below table demonstrates the different EPC ratings for a typical off-grid property when changing only the fuel type and heating system.

**Case Study: Typical off-grid property**

[28] UKLPG response to Energy Performance Certificates in Buildings Call for Evidence (October 2018)

| Property features: Sandstone/Limestone as built (no insulation), pitched roof (250mm loft insulation in part), full secondary glazing, boiler and radiator – heating controls, programmer, thermostat and TRVs. Low energy lighting in all outlets. | |
|---|---|
| **Heating system** | **Current Rating** |
| Mains gas boiler | 60 (D) |
| LPG boiler | 28 (F) |
| Oil boiler | 47 (E) |
| Electric boiler | 18 (G) |
| Electric high retention storage heater | 42 (E) |

The flawed EPC methodology drives off-grid homes away from low carbon technologies and onto higher carbon, cheaper energy sources to gain a higher EPC rating, especially in England and Wales due to Minimum Energy Efficiency Standards (MEES) for the private rental sector. We are aware of EPC assessors openly encouraging sticking with or switching to higher carbon fuels, such as oil, in order to get a better EPC rating – rather than promote lower carbon solutions such as LPG/bioLPG or heat pumps. Northern Ireland should learn from the mistakes of England and Wales.

This is self-defeating and at odds with what Northern Ireland Government is hoping to achieve. Removing the input fuel cost from the EPC methodology would ensure there is no disparity between identical properties on or off the gas grid, and importantly, drive investment in actual energy efficiency and low carbon heating.

Basing energy efficiency targets on EPCs, will impact on off-grid homes in the following ways:

- **Homeowners will be mobilised towards higher carbon fuels** as they attempt to improve ratings by using the cheapest fuel available rather than improving building fabric. This 'fabric last' approach not only fails to deliver building standard improvements for residents, it also directly counters Government's wider decarbonisation objectives.
- **Homeowners and house builders will have to spend more money on off-grid homes, compared to an identical home on the gas grid**. This is unfairly and unjustly penalising rural areas, homeowners and house builders for no other reason than the fact they don't use natural gas.
- **Identical properties in terms of fabric situated on and off the gas grid will receive different EPC ratings.** Due to the way that EPCs are currently calculated, off-gas grid homeowners are disadvantaged against their grid-connected counterparts in their EPC rating. This means that off-gas grid homeowners will have to spend more money on building improvements to reach the same energy performance standard as those on the grid. For the private rented sector this could in turn cause tenants' monthly rent rates to increase.

- **"Buy to let" mortgages will be refused** simply because a property does not have access to mains gas. This will result in a reduction in the supply or rental properties in rural areas and have a significant impact on local communities.
- **Flawed and unfair off-grid EPCs will devalue off-grid properties** as potential home owners and landlords choose not to invest in rural locations due to the unfair policy penalties.

**Q18. What is the appropriate pathway and timeline for the decarbonisation of heat between now and 2030, and subsequently to 2050?**

In the immediacy, the Northern Ireland Government should concentrate on simple ways to transition homes that use heating oil to lower carbon fuels, facilitating and encouraging the use of LPG as a quick and easy solution, which is locked in to a seamless pathway to renewable bioLPG. As BioLPG is a drop in fuel, which uses the same infrastructure as existing LPG, switching to LPG now provides a clear route to decarbonisation. With the industry's commitment to bioLPG in its 2040 Vision, this provides Government and consumers with a clear timeline for decarbonisation of heat beyond 2030. As noted earlier, a market-led approach is the most cost-effective way to achieve Net Zero.

**Q20. What are the most cost-effective and sustainable steps that government might take to accelerate the reduction of the carbon intensity of heating fuels?**

As noted earlier, a market-led approach is the most cost-effective way the Northern Ireland Government can provide a pathway to decarbonisation. It is important that Government incentivises off-grid homeowners to make the switch to low carbon conventional fuels, such as LPG which has a secure, seamless transition to bioLPG.

The LPG industry has already signalled its ambition to transition to bioLPG by 2040, following the launch of the '2040 Vision' in July 2019. LPG is a key part of the energy mix today and can play an even larger role in the future. The bioLPG pathway, as part of a mixed technology approach to decarbonisation, can support Northern Ireland to achieve climate change targets in an affordable and non-intrusive way.

The LPG industry should be supported in its transition to bioLPG, as the industry can use its skills, experience and supply chains in order to decarbonise off-grid buildings with its 'drop-in' renewable fuel.

A long-term policy vision which encourages investment in localised UK production of bioLPG would be wholly supported by the industry. There is a growing market for bioLPG which will continue to scale up in the 2020s, 30s and 40s. This is an exciting opportunity for Northern Ireland to lead the

way, by encouraging investment in bioenergy processing facilities or developing feedstock's and processes through R&D funding.

Analysis undertaken by NNFCC[29] demonstrates that a deployment pathway for a full switch from fossil LPG to bioLPG in the UK by 2040 is a feasible solution to support the Government in its ambition to move towards a low carbon economy.

**Q30. What would be an appropriate pathway to decarbonised energy for transport to 2050?**

LPG can play a significant role in improving air quality and decarbonising transport. In larger towns and cities, taxi and private hire vehicle (PHV) operators should be incentivised to move to alternatives which reduce carbon emissions and minimise air pollution. This should include actively promoting LPG to taxis and PHVs, in addition to electric vehicles.

This is because LPG vehicles have far lower emissions of NOx (80% fewer) and PM (99% fewer) than diesel[30], and far lower emissions of CO2 (21-23% fewer) than petrol. On the basis of this, a number of UK city administrations (London, Birmingham, Edinburgh, Aberdeen, Dundee and Glasgow currently) are offering publicly funded rebates whereby taxi drivers are encouraged to convert their diesel taxis to run on LPG, since the costs are far lower than buying a new electric vehicle. As such, this offers drivers a choice depending on how new their current vehicle is, how long they plan on working as a taxi driver for, their driving preference, available refuelling points, available funds and earning potential.

LPG can play a key role in decarbonising transport. Presently, LPG is used by 150,000 motorists across the UK as an alternative to petrol or diesel and is available in more than 1,000 UK-wide refuelling stations. Earlier this year, car manufacturer Dacia recently introduced a new LPG range for its Duster, Sandero and Logan MCV models to the UK.

**Q33. How will transport integrate with other energy uses (e.g. homes with solar generation, battery storage, EV charging) and what can government do to optimise the opportunities represented by this integration?**

The impact of transport decarbonisation will be keenly felt across Northern Ireland, especially in rural areas. As highlighted earlier in our submission, there are significant concerns the electricity grid does not have the capacity to electrify heating notwithstanding the additional pressures that infrastructure associated with a large roll out of electric vehicles would bring to bear.

[29] NNFCC, Biopropane: Feedstocks, Feasibility & our Future Pathway (2019)
[30] Independent testing, undertaken by Millbrook, commissioned by Autogas Ltd found that repowered LPG taxis emitted 99% less particulate matter and 80% less NOx.

**Q34. To what extent can alternative low carbon transport fuels contribute to decarbonisation of the transport sector?**

With car manufacturers such as Dacia introducing new LPG ranges for some of its UK models, low carbon fuels will continue to play a key role in the transport sector in the immediate term; equally, in the future, it will continue to play a role in decarbonising fuels for hard-to-treat vehicles.

In addition, as highlighted earlier, bioLPG is a by-product of the development of aviation fuel meaning its production will naturally increase, alongside increasing demand for renewable aviation fuel.

**Q43. What specific economic opportunities will arise from the decarbonisation of energy?**

Already, there are opportunities in Northern Ireland for the indigenous production of bioLPG across the whole supply chain – from production, supply, installers and manufacturing equipment; these will continue to grow should Government send a strong message it supports a market-led approach and signals a role for LPG and bioLPG. Additionally, increased opportunities for the indigenous production of bioLPG creates opportunities for its export. Further, it creates employment opportunities across the whole supply chain, and for those who would like to become an LPG installer, it is easy to re-train through a well-established training programme.

**Q44. What skills are needed to realise the potential economic benefits of energy in the future?**

Taking a mixed technology approach to decarbonising heat alleviates pressure on the electrical grid and supply chain. While the supply chain for gas boilers is mature, the accelerated uptake of heat pumps is constrained by its supply chain and network engineering challenges.

A vastly increased number of trained heat pump installers would be needed, as according to MCS there are only 1,800 certified heat pump installers[31] installing circa 20,000 heat pumps a year. Upskilling the existing workforce or training new engineers takes time, education policy is never changed or implemented swiftly, it would be unrealistic to assume that these numbers could be sharply increased (and geographically spread) in time to deliver necessary skills for upgrading off-grid rural new builds or existing homes.

[redacted]

[31] Installer Statistics Report (31 Dec 2018) – The Microgeneration Certification Scheme