

**Liquid Gas Ireland Submission
to DECC's Call for Expert Evidence – Climate Action Plan
2021**

18 May 2021

***this document follows the format of the Online Consultation Questionnaire**

About you

Name: Liquid Gas Ireland (LGI)

LGI is the association representing companies operating in the LPG and BioLPG industry in Ireland. Members include LPG and BioLPG producers, distributors, equipment manufacturers, and service providers. Our mission is to ensure that policy makers continue to recognise LPG and BioLPG as the clean, versatile, and alternative lower carbon energy of choice for off-grid energy users in the residential, commercial, industrial, agriculture, leisure, and transport sectors in Ireland. Liquid Gas Ireland is committed to working with consumers, stakeholders, and policymakers to support Ireland's goal to tackle air quality, drive decarbonisation and achieve net zero emissions by 2050.

As part of Liquid Gas Ireland's response to the Department of Environment, Climate and Communication's Call for Expert Evidence - Climate Action Plan 2021, we wish to respond to the consultation questions posed under the following sections:

1. Carbon Pricing and Cross-Cutting Issues
2. Enterprise
3. Built Environment
4. Just Transition

Email: info@lgi.ie

Carbon Pricing and Cross-Cutting Issues

- **What further opportunities exist within our taxation system, beyond measures already implemented and planned, to promote emissions reductions, either on an economy-wide basis, or in specific sectors?**

Carbon tax and BioLPG

BioLPG is certified as renewable by the EU and Irish Government and is exempt from carbon tax, meaning it is a great investment for the future. Accepting BioLPG as part of the solution to reducing emissions and embracing it as part of the renewable mix in Government policy will drive the transition to BioLPG without requiring changes to the taxation system.

The legislation underpinning the Carbon Tax system has shown itself to be flexible in terms of helping to promote lower carbon intensive fuels in the solid fuel market and should remain.

Economic recovery of rural households and businesses

Affordability of cleaner, lower carbon energy solutions will be key for the economic recovery of rural households and businesses. LPG/BioLPG boilers are the most cost-effective low carbon option for many households, especially older properties that are less energy efficient.

For an average household, the upfront cost of an electric heat pump unit is €15,000 versus €4,000 for a new LPG or BioLPG boiler. Implementing the necessary energy efficiency upgrades to accommodate heat pump technology in an average older rural home and carrying out a whole house retrofit would add an additional €35,000- €60,000 to the upfront cost, depending on size.

LPG boilers offer a long-term, cost effective pathway to decarbonisation through the gradual introduction of BioLPG into the mix meaning that over time, carbon emissions will increasingly reduce. LPG and BioLPG can also be used seamlessly in cutting edge heating systems, such as gas driven heat pumps and hybrid heat pumps.

Ireland can achieve its retrofitting target but only if it embraces all low-carbon technologies in the transition. By including and supporting BioLPG in this exercise, the target can be met whilst reducing the unsustainable financial burden on rural customers.

- **What supporting policies might be required to offset the impact of any taxation changes on low-income households or those most at risk from fuel poverty?**

Just Transition:

At the heart of this question is the need for an equitable Just Transition process. As is already committed to in the Programme for Government (PfG, 2020), it is crucial that the Government ensure that the increases in the carbon tax are progressive and investment is made to prevent fuel poverty to ensure a just transition. The PfG further commits to working to achieve a consensus on a just transition to a sustainable future for all communities. Central to this are the 500,000 families who are being forced to move away from their existing heating source.

The Government's current Climate Action Plan envisions most of Ireland's households undergoing retrofitting to install electric heat pumps. However, this approach does not consider the unique needs and economic and infrastructural challenges of rural Ireland. As referenced above, 500,000 Irish properties have no connection to the natural gas distribution network; two-thirds currently rely on oil boilers for heating and fuel. Connecting remote, less energy-efficient properties to the natural gas grid or installing new heat pump technology will prove prohibitively expensive.

This will therefore require a 'mixed technology' approach to decarbonisation, which includes lower-carbon fuels such as LPG and BioLPG. LGI estimates that if these 500,000 homes switched from using oil-fired central heating to BioLPG by 2040, it would save about 1.9 million tonnes of CO₂ emissions per year.

To facilitate this switch, Renewable Energy Ireland (REI) recently launched its 40by30 report (2021). The document outlines REI's roadmap to an Ireland where 40 per cent of its heat can come from renewables by 2030 and outlines the role that renewable gas (BioLPG) can play. It also identifies several policy interventions that we invite the Department to consider in the context of potential supporting policy measures as part of this consultation. These include:

1. Widen the supports for renewable heat in the Home Energy Grants and in the Support Scheme for Renewable Heat (SSRH) and incentivise large heat users to adopt renewable heat solutions.
2. Update the building regulations and BER assessment methodology to accurately reflect the decarbonisation benefits of renewable heat.
3. Make it simpler and easier for consumers/businesses to apply for the financial incentives for renewable heat technologies.
4. Implement Article 23 of the Renewable Energy Directive (REDII) under the EU Clean Energy Package with a mandatory high ambition of at least 3% per annum.

Furthermore, we are concerned about proposals in the draft Energy Efficiency Obligation Scheme (EEOS), which we believe will increase costs for rural consumers by removing our ability to deliver energy upgrades. That, coupled with the nature of the rural building stock, means that we anticipate it being cost prohibitive for energy efficiency upgrades to be carried out in non-urban areas. Ultimately, it is a concern that rural consumers will be asked to pay for a scheme, which will potentially not benefit their off-grid homes, local amenities, and businesses.

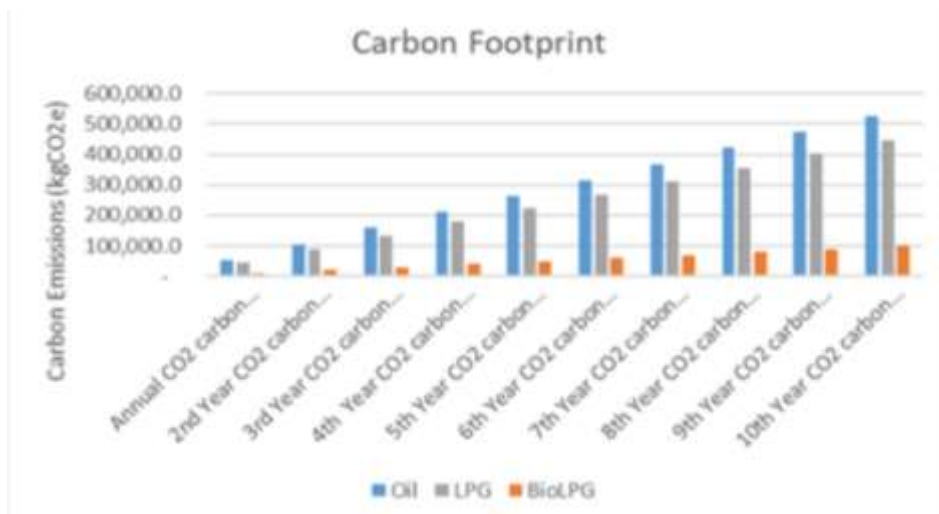
Our sector will effectively be forced to promote expensive 'deep retrofit' solutions to older rural homes, which will result in a disconnect between us and our consumer base on vital role that lower carbon gas and renewable gas can play in heating and fuelling homes and businesses

Enterprise

- **What measures can be taken to accelerate the uptake of carbon-neutral low temperature heating?**

LPG is a clean-burning, smoke-free fuel that cuts emissions from domestic, commercial, industrial, and transport sectors by up to 33% compared to heating oil and solid fuels. BioLPG is a chemically indistinct but renewable version of LPG, made from sustainably sourced renewable vegetable oils, wastes, and residues, and delivers up to 90% certified carbon emission savings compared to conventional LPG.

As BioLPG can be used in existing LPG infrastructure, it increases the speed at which renewable fuels can be used in businesses all over Ireland without the need for capital investment. As part of this switch however, we call on the Government to consider introducing incentives for consumer switching and to include BioLPG in the SSRH renewable heat scheme (40by30, 2021). Due to the large volume of businesses and homes who have no connection to the natural gas network, there is huge potential to accelerate the transition to carbon neutral low temperature heating. In a study recently conducted by Rinnai UK (2021) in association with the UK gas appliances industry, they were able to demonstrate the carbon reduction achievable from an energy transition from OIL to BioLPG using LPG as an interim step (see Graph 1).



Graph 1: Comparison of Oil, LPG, and Bio LPG for a Rural Hotel (Rinnai UK, 2020)

For businesses and homes in rural off-grid areas, this switch is easy and affordable to make, and the environmental benefits are immediate. Therefore, a 'mixed technology approach' to decarbonisation will accelerate the uptake of carbon-neutral low temperature heating.

As a sector, we support the principle of energy efficiency first, having delivered energy saving measures for our rural consumers. As an industry we support the deployment of highly efficient gas boilers and hybrid heating systems. We are keen to continue to support our rural business customers further along on their energy efficiency and decarbonisation journey.

- **What measures can be taken to tackle high temperature heating in industry?**

The LPG sector can help to transition tens of thousands of businesses away from oil boilers to LPG by 2030. As an industry, we aim to further transition to 100% BioLPG by 2040 for all businesses (LGI Vision for 2040, 2020)

A key measure is to ensure that a mixed technology approach is part of the Climate Action Plan 2021. Such a mixed technology approach will significantly benefit businesses in rural off grid areas. This switch is easy and affordable to make, and the environmental benefits are immediate. Failure to have a mixed technology solution will be damaging to businesses in Ireland.

- **What other opportunities exist to support the decarbonisation of the enterprise sector?**

In parallel with the commitment to help transition 500,000 homes with oil boilers to LPG by 2030, the LPG sector can play a very significant role in helping to reduce the dependence on oil heating for major industrial and commercial facilities. In the last decade, the LPG sector has helped transition very significant oil dependent businesses to low carbon energy efficient LPG solutions. Transitioning to BioLPG for such commercial and industrial facilities requires no further capital investment for individual businesses. As an industry, we aim to transition to 100% BioLPG by 2040 and in doing so, can act as a huge support for the Irish enterprise sector, while simultaneously helping to reduce greenhouse gas emissions and dramatically improve air quality all over Ireland.

- **What measures should be taken to address the risks that climate change poses for enterprise?**

Cost and Competitiveness for business are key issues in Ireland. The foreign direct investment sector (FDI) and the indigenous export sector are highly sensitive to additional cost competitiveness challenges. According to SEAI (2019) figures, energy costs in Ireland are already significantly above the EU average for businesses in Ireland since 2011 and in the second half of 2019 natural gas prices for businesses were 5% above the EU and 1% below the Euro Area average. While further grid enhancements are likely to facilitate increased renewable energy on the electricity grid, the cost will be borne by business and by families. Central to the Programme for Government is the commitment to an equitable just transition. This is especially relevant for business including those who have had significant capital expenditure over last decade in their transition away from oil. A mixed technology approach is a key measure to help reduce the risk that climate change poses for enterprise.

Built Environment

- Can Ireland exceed the target of retrofitting 500,000 homes by 2030? If so, how?

LGI, whilst generally supportive of the process of retrofitting homes, would like to stress that some properties are markedly more difficult to treat, being unsuitable for a deep fabric insulation retrofit. As seen in the table below, deep retrofitting these properties is prohibitively expensive.

Hard to treat retrofit		Typical retrofit	
External Wall Insulation (€)	12,600	Cavity wall insulation (€)	1,000
Attic Insulation (€)	1,500	Attic Insulation (€)	1,000
Improved Glazing (€)	12,000	Improved Glazing (€)	8,000
Heat Pump (€)	8,500	Heat Pump (€)	8,500
Heating Controls (€)	1,000	Heating Controls (€)	1,000
Ancillary Costs (€)	2,070	Ancillary Costs (€)	1,500
Sum(€)	37,670	Sum (€)	21,000

Hard-to-Treat Retrofit	Estimate (€)	Typical Retrofit	Estimate (€)
External Wall Insulation	12,600	Cavity Wall Insulation	1,000
Attic Insulation	1,500	Attic Insulation	1,500
Improved Glazing	12,000	Improved Glazing	8,000
Air Source Heat Pump	8,500	Air Source Heat Pump	8,500
Heating Controls	1,000	Heating Controls	1,000
Ancillary Costs	2,070	Ancillary Costs	1,500
Summation	37,670	Summation	21,500

Table 2.1: Excess costs of ‘hard-to-treat’ properties. (ECA, 2020).

A clear difference in costs appears here – with hard-to-treat property retrofits costing around €17,000 more (approximately 80%). Given that approximately 25% of houses in rural areas would come under the hard-to-treat criterion (CSO, 2020), the CAP must facilitate a financially feasible decarbonisation pathway for these households. Furthermore, there are several residential buildings in Ireland for which heat pump installations are physically impractical.

LPG has been a key part of Ireland’s energy mix for almost a century. Going forward, we believe LPG and BioLPG can support the Irish Government’s commitment to transition to a low-carbon economy and fulfil its binding obligations under the 2015 Paris Agreement on climate change. As natural gas network penetration in Ireland is relatively low (39% of households, (Ervia, 2018)), the full potential of lower-carbon gaseous fuels like LPG needs to be further exploited. Over 40% of households in Ireland rely on oil to heat their homes. This share varies significantly by region, with roughly 26% of households located in towns using oil for central heating compared to 65% in rural areas (CSO, 2016; SEAI, 2019).

While LPG already offers significant reductions in carbon and air pollutant emissions, BioLPG should be recognised as a fuel for now and for the future, providing up to 90% certified carbon emission savings compared to conventional LPG. Already available on the market today (LGI, 2020), BioLPG allows off-grid homes and businesses to significantly reduce their carbon footprint without expensive retrofitting or changes to heating systems. BioLPG is certified as renewable by the EU and Irish Government and is exempt from carbon tax, meaning it is a

great investment for the future. As BioLPG is a ‘drop-in’ fuel, LPG infrastructure is already prepared for the future, so no new equipment is required.

- **Should Government consider bringing forward a phase out of the installation of fossil fuel boilers?**

LGI believes that a blanket ban of fossil fuel boilers fails to recognise the possible carbon savings available, particularly in the usage of BioLPG and hybrid heating systems (HHS). As seen in figure 3.1 sizeable emission reductions can be achieved purely via the installation of more efficient condensing LPG boilers (a 32% annual savings versus the fossil fuel baseline):

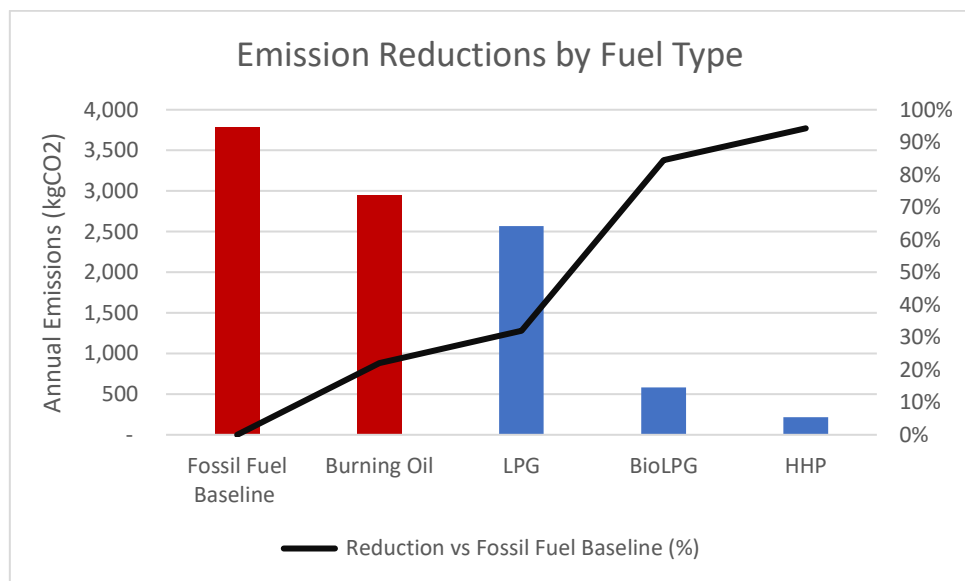


Figure 3.1: Emission Reductions by Fuel Type (references here).

One of the primary concerns regarding the usage and future installation of boilers is their ability to facilitate future consumption of fossil fuels. However, this view fails to recognise the potential for carbon reductions. BioLPG (described in the prior answer to question 2), offers an approximately 80% reduction in annual emissions. Partnering a BioLPG solution with a heat pump, creating an HHS, raises those savings even further, to nearly 95%.

- **What trade-offs between decarbonisation and air quality may need to be further considered in policy design?**

LGI is aware of the importance of the effect of using different heating fuels on air quality, since poor air quality is reported as a cause of illness and premature death; in Ireland in 2017, the EEA estimated 1,300 premature deaths were caused by the air pollutant PM_{2.5} (Environmental Protection Agency, 2019). This can create trade-offs in decarbonisation solutions, since fuels associated with lower carbon emissions can cause higher air pollution levels, as noted later in this section.

The impact of fuel use on air quality is indicated by figure 8.1. Air pollution is significantly increased during the afternoon and evening hours, when heating is in use, indicating the relationship between air quality and fuel use (Environmental Protection Agency, 2019).

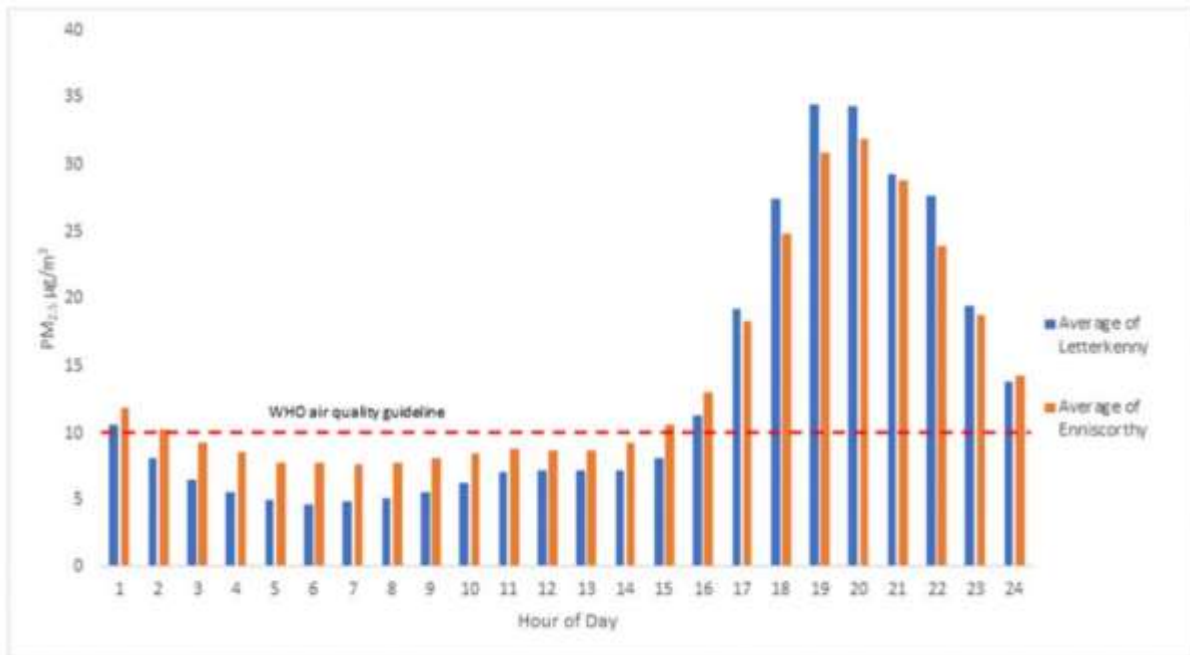


Figure 8.1: Average concentrations of PM_{2.5} by time of day at Letterkenny and Enniscorthy monitoring stations during 2019 (Environmental Protection Agency, 2019)

The EPA has considered the effect of different heating fuels and heating systems on air quality, indicating that solid fuels such as peat, coal and biomass can negatively impact air quality and health - as shown in figure 8.2 (Environmental Protection Agency, 2019).



Figure 8.2: air quality and health impact of ways to heat homes, (Environmental Protection Agency, 2019)

To compare emission levels from different fuels, considering its type and usage, data from the European Environment Agency for the PM_{2.5} emissions factors [EEA, 2019] has been utilised to

produce the following graphs. They indicate the possible range of emissions factors for each of the fuels depending on the appliance it is used in.

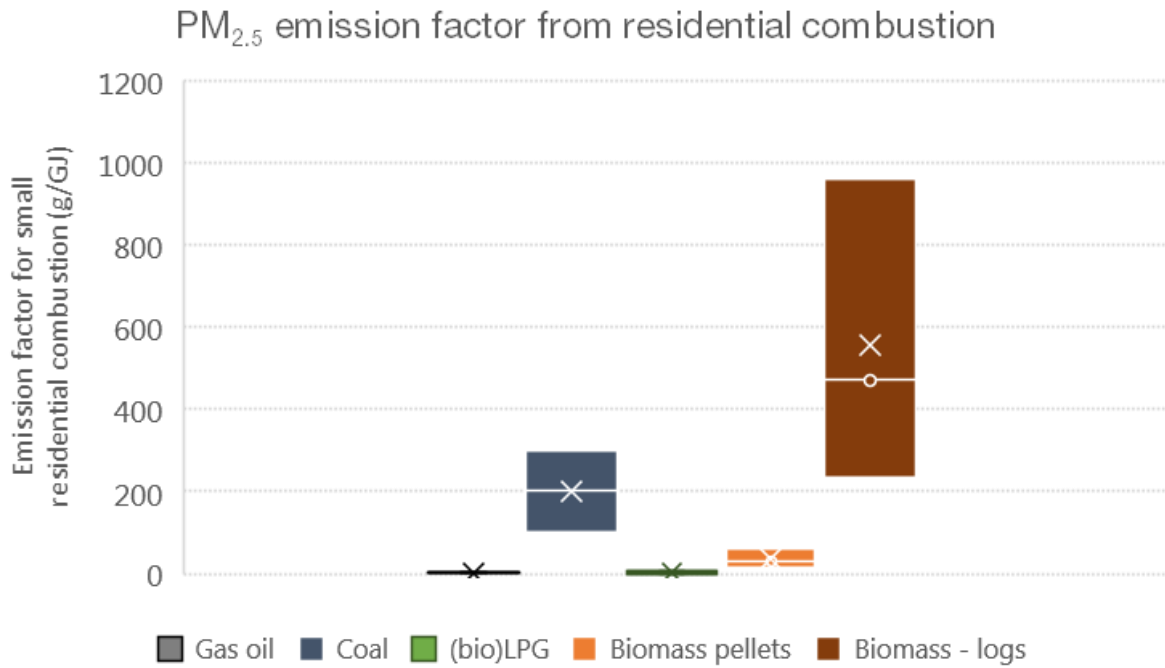


Figure 8.3 – PM_{2.5} emissions factors for five fuel types

Figure 8.3 indicates that particular care needs to be taken in considering different types and uses of biomass for decarbonisation, due to possible higher PM_{2.5} emissions factors.

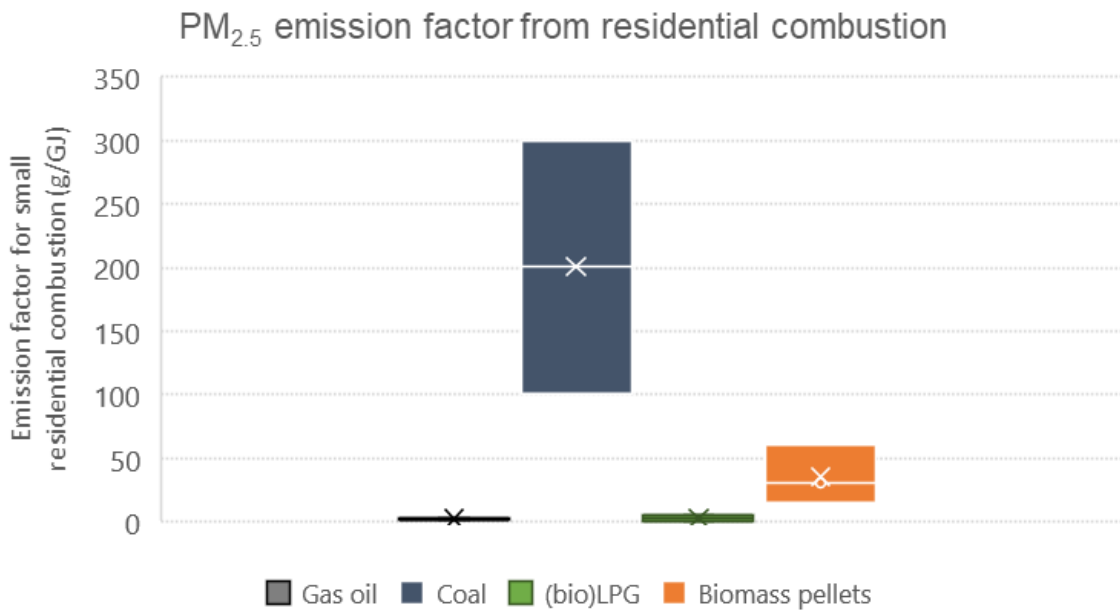


Figure 8.4: PM_{2.5} emissions factors for the lower four fuel types

In figure 8.4 the relative emissions factors between these four fuels can be more easily compared. The low level of air pollutants from BioLPG combusted in boilers suggests this could provide an alternative off-grid heating solution with lower PM_{2.5} emissions than other options under consideration.

Considering this information, LGI recommends that the target should be to transition households away from smoky solid fuels, such as peat and coal, but that effects on air quality need to be considered to ensure low carbon solutions meet air pollution targets.

- **Are there specific household behaviour changes that should be considered? Should such changes be mandated by way of regulatory changes?**

Household behaviour change will be a key consideration for the Irish government as it looks to steer the economy from being fossil-fuel dependent, to a net zero target. Whilst some decarbonisation routes can be promoted without consumer disruption and behaviour change (such as the decarbonisation of power production), others will require changes active participation from consumers – such as decisions regarding home heating.

Indeed, the SEAI has a behavioural economics unit which has published reports (SEAI, 2020) highlighting the bounded rationality of consumers, and many behavioural barriers which may slow the heat decarbonisation journey. For instance, the efficient operation of electric heat pumps requires a change to the heat use profile, moving away from instantaneous high temperature heat produced by traditional boilers to low-temperature heating with a longer ramp-up period between turning the system on and reaching comfortable temperatures in the property. Alongside the use of new and complex heating controls, these household behaviour changes should be considered by the Irish government.

The academic literature highlights that consumers can be categorised based on their willingness to change behaviour and take-up new technologies. Whilst some consumers can be *innovators* and comfortable changing their behaviour, it is well known that technology *laggards* are likely to prefer the status quo and will be resistant to change. Research suggests that ~40% of the population could be categorised as falling into the *late majority* or *laggard* category (Li & Strachan, 2019).

We think that the Irish government should pursue a mixed technology approach which supports new heating solutions such as heat pumps, but also renewable gas solutions such as bioLPG boilers which benefit from being a drop-in to existing heating systems and can be operated in familiar ways for consumers. Some consumers will gravitate towards new technologies based on their preferences and building types, whilst others will find the convenience of using drop-in BioLPG in their existing heating system to be more appealing. A basket of solutions will be needed to deliver heat decarbonisation in the next 30 years – which is equivalent to 2 heating system replacement cycles.

Just Transition

- **Which regions, sectors, or industries do you believe will be most adversely affected by climate policy in Ireland and over what timeframe?**

Climate change policy must be equitable for all families and all businesses. The current proposals are destined to adversely impact the 500,000 homes that rely on oil for central heating, and the tens of thousands of businesses who equally have no access to the natural gas grid.

In addition to this, proposals in relation to the EEOS scheme mean that the LPG sector will effectively be forced to promote expensive ‘deep retrofit’ solutions to older rural homes.

As BioLPG becomes increasingly available to the market in Ireland, LGI wants to work in partnership with the Government to drive consumer behaviour in rural areas towards cleaner, more efficient, lower carbon solutions.

- **What types of supporting interventions should be considered by the Government to address the specific areas identified?**

Over 40% of homes in Ireland rely on oil-heating. A significant burden is placed on oil consumers, who are required to pay for the removal of their existing oil boiler and tank – which given prices in adjacent markets is likely to cost more than €1,000 (NNFCC, 2019).

To secure a Just Transition, the Irish Government should support the transition away from oil heating – via a boiler / oil tank scrappage scheme. This one-off incentive should be established to support the transition away from high-carbon fossil fuel infrastructure to low-emission ready heating systems – such as hybrid heat pumps and BioLPG boilers.

In addition to this, grants for renewable heating technologies should be expanded to other technology options for homeowners, particularly BioLPG boilers which offer capital-constrained consumers a lower upfront cost option. This position has received industry consensus, as published by Renewable Energy Ireland (2021) (coded RES-H7).

The Government should extend the energy efficiency measure eligibility to include hybrid heat pumps, hybrid solar thermal heating systems and LPG/BioLPG boilers. This would provide consumers with an additional heat decarbonisation option which may suit their preferences, circumstance and/or property type, allowing the LPG industry to better contribute to delivering the objectives of the scheme.

Affordability of cleaner, lower carbon energy solutions will be key for the economic recovery of rural households and businesses. LPG/BioLPG boilers are the most cost-effective low carbon option for many households over the lifetime of the heating system, especially older properties that are less energy efficient.

For an average household, the upfront cost of an electric heat pump unit is €15,000 versus €4,000 for a new LPG or BioLPG boiler. Implementing the necessary energy efficiency upgrades to accommodate heat pump technology in an average older rural home would add an additional €35,000- €60,000 to the upfront cost, depending on size.

We also call on the Government to increase the free allowance for suppliers of rural fuels and to reverse the proposal to remove our sector's ability to meet our obligation via the installation of (bio)LPG boilers and heating systems, as part of the revised EEOS scheme.

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. The industry also came together to develop policy proposals for the recognition of the value of biogas, and specifically support for production of BioLPG from indigenous feedstocks (RES-Gas 3 policy code in the Renewable Energy Ireland report, 2021). We call on the government to develop a [[policy framework for supporting the production of biogas – which will play a strategic role in the decarbonisation of heat.

LPG and BioLPG can also be used seamlessly in cutting edge heating systems, such as gas driven heat pumps and hybrid heat pumps.

It is the industry's ambition to offer 100% renewable energy solutions by 2040.

- **How should the State finance just transition initiatives and investments?**

As is already committed to in the Programme for Government, it is crucial that the Government ensure that the increases in the carbon tax are progressive and investment is made to prevent fuel poverty and ensure a just transition.

The Just Transition initiatives and investments can therefore be funded by the revenue generated by the increased carbon tax, as estimates by the Department of Finance suggest that the combined proceeds of the 2020 (€6) and 2021(€7.50) increases in the carbon tax are estimated at €238m in 2021.

- **What other issues should be considered by the Government to inform just transition policy in the 2021 Climate Action Plan?**

The current Climate Action Plan 2019 among many things, signals the intention to ban the installation of oil boilers from 2022 and the installation of gas boilers from 2025. The Nearly Zero Energy Building (NZEB) performance standards requirements were introduced in 2019 and apply to all new buildings occupied after 31st December 2020, facilitating the banning of oil boilers. A commitment has also been made to install 400,000 heat pumps in existing buildings by 2030.

While heat pumps do have the potential to abate emissions, they are highly dependent on the type of technology, location, and electricity mix. The uptake of heat pumps in Ireland has been relatively low thus far, which demonstrates that some of the existing targets within the current Climate Action Plan do not reflect the lived reality.

While the Government does recognise that the most cost-effective abatement measure for the built environment is to retrofit existing dwellings that use oil boilers to a B2 equivalent BER, connecting remote, less energy-efficient properties to the natural gas grid or installing new heat pump technology will prove prohibitively expensive and not financially viable for many rural households and businesses.

To reduce financial burden on rural households and businesses, a 'mixed technology' approach to decarbonisation is required, to include lower-carbon fuels such as LPG and BioLPG. This would lead to a fairer, 'just', transition for rural Ireland while significantly reducing CO2 emissions. It would also accelerate the uptake of carbon-neutral low temperature heating and significantly benefit businesses in rural off grid areas.

- **What additional supports could be considered for regions that are most at risk from the physical impacts of climate change?**

As a sector, we recognise that heat is fundamental to our well-being, warming our homes and offices, and is an essential ingredient in many industrial processes. But it is also a big part of Ireland's Climate Action challenge.

The existing, 'one size fits all', approach to decarbonisation currently presents a huge challenge for those living in rural areas of Ireland. Under this approach, the government has set out key targets to:

1. Install 400,000 heat pumps in existing buildings before 2030
2. Require 500,000 homes to upgrade to a building energy rating of B2

As over 80 per cent of all Irish homes are powered by either oil or gas boilers, the requirement on these homes to install and/or upgrade their households would be too costly. While heat pumps do have the potential to abate emissions, they are highly dependent on the type of technology, location, and electricity mix. The uptake of heat pumps in Ireland has been relatively low thus far, which demonstrates that some of the existing targets within the current Climate Action Plan do not reflect the lived reality.

As an alternative solution, and in line with the Programme for Government's target of 7% annual reductions in CO₂ emissions over the next decade, we advocate that renewable heating can support Ireland in delivering its 7% CO₂ abatement per year target. As outlined in Renewable Energy Ireland's 40by30 report, this reduction can be achieved with renewable heat technologies readily available in Ireland and already widely deployed in EU countries.

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