Liquid Gas Ireland

Liquid Gas Ireland submission to the Consultation on the design of the Renewable Heat Obligation

6 October 2023

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Introduction to Liquid Gas Ireland

Liquid Gas Ireland (LGI) is the association representing companies operating in the LPG and Renewable LPG industry in Ireland. Members include LPG and Renewable LPG distributors, equipment manufacturers, and service providers. Our mission is to ensure that policy makers continue to recognise LPG and Renewable LPG as the cleaner, 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.

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About LPG, BioLPG and rDME

Liquefied Petroleum Gas (LPG) is a liquified hydrocarbon gas that comes in two main forms, propane (C3H8) or butane (C4H10). As it is supplied in liquified form in a bulk tank or cylinder, it is a flexible fuel source that can reach areas not connected to the national gas grid or centralised district heating systems.

Both LPG and BioLPG offer significant emissions reductions from traditional fossil fuels. LPG combustion emits 33% less carbon dioxide than coal and 11% less than kerosene heating oil[1]. LPG also emits almost no black carbon, which scientists now believe is the second biggest contributor to climate change, and very low levels of air and particulate pollutant emissions.

BioLPG is a chemically indistinct but renewable version of LPG. It is made from a mix of sustainably sourced renewable vegetable oils, residues, and waste materials. BioLPG reduces greenhouse gas emissions by at least 50% and up to 90% against set values of fossil fuels, in accordance with the European Union Renewable Energy Directive and is certified under the International Sustainable Carbon Certification (ISCC) scheme.

Exempt from carbon tax, BioLPG is currently used in Ireland providing the same heating and fuel properties as LPG. BioLPG is what's known as a 'drop-in' fuel, meaning no new equipment is required to switch from LPG. For consumers in rural off-grid homes, this is an easier and more affordable switch to make, and the environmental benefits are immediate.

LPG and BioLPG can be used in several different sectors, such as domestic, commercial, industrial, agricultural and for transportation.

Continuing innovation in the liquid gas industry has led to the development of rDME, a low carbon, sustainable, liquid gas, which is complimenting the advances being made by BioLPG. It can be produced via gasification and catalytic synthesis, using feedstocks such as municipal solid waste, forest residues, animal waste, sewage/industrial sludge, and energy crops.

rDME can also be blended with LPG or BioLPG and used in existing infrastructure, making it a more flexible and affordable option for homeowners and businesses in off-gas grid areas. rDME is clearly a sustainable fuel for the future and significant progress is being made, with a commercial plant under development in Teesside, UK. By 2024, this plant is targeted to produce 50,000 tonnes of rDME per year. Should the necessary investment and regulatory framework be put in place, there may be opportunities for rDME production facilities in Ireland in the future.

[1] SEAI Conversion Factors

Obligation Approach, Target Level, Trajectory and Duration

1. Given our increased ambitions in climate action and emission reductions, do you think the Department should consider alternative or complimentary approaches as part of the Obligations introduction?

Yes.

LGI supports the proposal for a Renewable Heat Obligation (RHO) and welcomes the recognition of Renewable LPG as a renewable fuel. Placing a focus on the decarbonisation of Ireland's heating sector by aligning the Renewable Heat Obligation with Ireland's current climate ambitions, as laid out in the Programme for Government and the Climate Action Plan, will better help Ireland achieve its targets.

LGI argues that alongside the Obligation, the Government should actively support an environment that allows customers in rural off-grid homes and businesses a choice in reducing their carbon emissions. We have argued in our paper, *Making the 'Just Transition' more sustainable for rural Ireland*, that supporting the increased use of lower carbon LPG, Renewable LPG and in time rDME offers a very effective decarbonisation pathway for consumers who traditionally rely on high carbon fossil fuels like oil and solid fuels for energy.

The Government should support the transition away from oil heating for all consumers, especially industry in adopting a 'mixed technology' approach. The current 'one size fits all' approach, which prioritises the installation of heat pumps, is straightjacketing the options open to consumers in rural areas seeking to decarbonise. While the environmental impact of heat pumps is obvious, a sole focus on this alone is blunt an instrument. The merits of supporting the installation of a renewable ready gas boiler, in terms of cost and environmental impact are compelling as we have set out in our study.[2]

While LGI supports the principle of an RHO market mechanism to drive the delivery of renewable heat targets, it cautions on the burden of cost of the obligation on rural consumers and we advocate strongly for the necessary policy supports to ensure a Just Transition. LGI also cautions on any increase beyond the proposed target level of 10%, due to the impact on rural households, who face higher levels of energy poverty versus urban areas, as outlined further in Question 6.

We request that the Department considers several important policy interventions previously highlighted by the heating industry and set out in Renewable Energy Ireland's (REI) 40by30 report (2021) – "A 40% Renewable Heat Vision by 2030" [3].

Grants for renewable heating technologies should be expanded to other technology options such as renewable ready gas boilers, such modern boilers have efficiencies of more than 90% compared with 70%-80% with conventional designs (based on the higher heating value fuels).

[2] https://www.lgi.ie/assets/uploads/documents/resources/LGI%20Liquid%20Gas%20-%20Making%20the%20Just%20Transition%20more%20sustatinable%20for%20rural%20Ireland.pdf
[3] Renewable Energy Ireland: Renewable Heat Plan (2021)

There is potential to combine a flue gas economiser with a gas fired boiler to maximise the efficiency.

LGI advocates for an environment where all sub-sectors of the industry can contribute and help to drive the heating sector towards net-zero. With this in mind, we therefore recommend an operational tariff scheme for renewable fuels (including biomethane, Renewable LPG, and rDME), contracts for differences put in place and lastly, that the range of incentive measures seen in the Renewable Electricity Support Scheme are extended to the renewable fuels market, as discussed in question 2.

While LGI supports the Obligation, we are keen to ensure the industry plays its role in decarbonising heat. We disagree strongly with both the proposed threshold amount and the lack of a free allowance. Fundamentally, we believe that the combination of these two factors creates a dramatic cliff-edge effect, which will stunt growth and drastically reduce the natural incentives for companies to scale and grow naturally. Under the current proposal we can see that any company who grows into the obligation at a rate of 10% will face a clear cliff-edge effect in terms of costs faced once they hit the 1000GWh limit, which we will discuss further below.

LGI also argues that ISCC certified Renewable LPG produced from the HVO process, should also qualify for this Development status, as HVO renewable propane can be co-processed along with HVO in the same production facility. The Government should seek to harmonise the use of multipliers across both feedstock types and across sectors, to avoid undue competition between producers and sectors.

2. Given the Government's commitment to deliver up to 5.7TWh of Biomethane by 2030, do you think incentive measures complimentary to the Obligation should be considered to support production?

Yes

If you have responded yes, please indicate which type of support measure you feel would be appropriate for further consideration from the list provided:

Other

If other, please provide more detail in the text box provided:

Liquid Gas Ireland is fundamentally supportive of the Government's commitment to deliver 5.7TWh worth of biomethane by 2030. We believe that the approach and consideration of supporting measures, as taken towards biomethane, should be extended to other renewable liquid fuels. We are generally supportive of any mechanism which provides financial certainty to actors within larger supply chains. The primary outcome of any mechanism should primarily be to ensure support and guarantee some level of security of investment for those looking to drive investment and help the production and spread of renewable fuels, liquid or otherwise.

For all renewable fuel producers, it is likely that they will face intense competition for the feedstocks used in their production processes. This will increase cost of raw materials, and lead to a potentially higher, non-valid market price requirement for the fuels themselves. While theoretically the price signals indicated by this widespread demand should incentivise entry into the feedstock supplier market, these industries tend to inherently feature lower price elasticities of supply, due in part to the time lag and upfront costs required to enter or expand within the market.

Given the fundamental commonalities between biomethane and renewable liquid fuels, such as Renewable LPG and rDME, we propose that a series of complimentary and supportive measures are introduced, firstly to meet the indigenous production targets outlined in this and other policy documents, but also to recreate a level playing field between fuel types, to help bring balance to markets, and deliver the fairest outcomes for end-consumers. LGI is fully supportive of the biomethane target but wants an environment where all sub-sectors of the industry can contribute and help to drive the heating sector towards net-zero.

With this in mind, we therefore recommend an **operational tariff scheme** for renewable fuels (including biomethane, Renewable LPG, and rDME), whereby incentives and/or subsidies are tailored to the operational aspects of production, such as reducing taxes, or granting benefits upon production. However, we also note that the feedstock market must be stimulated, particularly if Ireland is to produce the levels of renewable fuel indigenously as discussed throughout this document. To this effect we extend our ask for there to be **contracts for differences (CFDs)** put in place (again, for biomethane, Renewable LPG, and rDME). Lastly, we recommend that the range of incentive measures seen in the Renewable Electricity Support Scheme are extended to the renewable fuels market. All renewable fuels have a role to play in decarbonisation, and we believe that a level playing field is the most important thing that policymakers must deliver for the sector.

An operational tariff scheme will help to bring producers of feedstock and suppliers of fuel into the renewable market, lowering costs and stimulating the production of these renewable fuel types in the near and short run. Production needs an immediate ramp up to stand a reasonable chance of meeting the targets for 2030 and beyond for a renewable heat obligation, and this would be an important first step. Secondly, over the longer term, as the market for renewable fuel feedstocks becomes increasingly competitive at an international level, CFDs can play an important role in helping to aid the market through periods of constrained supply – particularly under the assumption that indigenous producers will be allowed to sell their feedstock freely on the open international market.

The liquid gas sector plays a vital role in supporting Ireland's rural communities, who face vastly more difficult challenges in terms of decarbonisation (see Annex 1). Households in these areas tend to be larger, more expensive to heat, more likely to be energy poor, and face drastically more difficult renovation pathways. Neglecting this sector would contravene the principles as set out as part of a Just Transition, and we feel it is important that those individuals reliant on liquid gases are not left behind by the incentive measures designed to drive Ireland towards a Net-Zero future.

Starting rate & final 2030 target level

3. Do you think there is sufficient supply chain readiness and market maturity to support a 2% introduction from 2024?

Yes

4. Do you consider a fixed target rate across the first 3 years to be more achievable for suppliers?

Yes

5. Do you think having a fixed target rate for the first 3 years supports investment in indigenous renewable energy installations?

Yes

LGI believes a fixed target rate for the first 3 years will support investment in indigenous renewable energy installations as it will provide certainty and an achievable target while measures are put in place for the expansion of indigenous production from 2027 in line with the proposed trajectories to 2030.

6. Do you think a final 2030 target level of 10% strikes the right balance between meeting our climate objectives and potential availability of renewable fuels?

Yes

LGI is fully committed to offering energy solutions to consumers that are energy efficient, sustainable and affordable. We support the proposal for an RHO and welcome the recognition of BioLPG, or Renewable LPG, as a renewable fuel. However, we also feel strongly that the Government in its energy policy needs to incentivise the use of Renewable LPG and should actively support an environment that allows customers in rural off-grid homes and businesses a choice in reducing their carbon emissions. Supporting the increased use of lower carbon LPG, Renewable LPG and, in time, rDME, offers a very effective decarbonisation pathway for consumers who traditionally rely on rely on higher carbon fossil fuels like oil or solid fuels for energy. The Government should support the transition away from oil heating for all consumers, especially industry in adopting a 'mixed technology' approach.

LGI agrees that the final the 2030 target level of 10% strikes the right balance between meeting our climate objectives and potential availability of renewable fuels. However, we caution against any move to increase this rate due to the effect of the obligation on rural consumers, and the subsequent tendency for these rural households to experience higher levels of energy poverty (see figure 11 below). The obligation will pose an added financial pressure on rural consumers versus their urban counterparts.

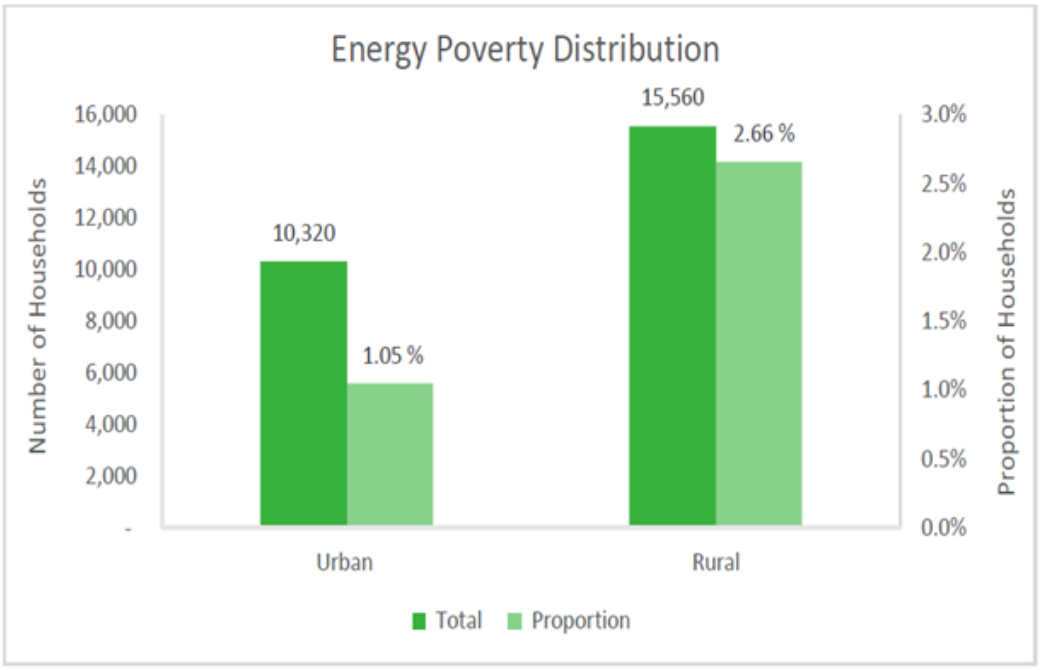


Figure 11: Energy Poverty Across Urban and Rural Areas (SEAI, 2020)

In order to alleviate this and as set out in our original submission in 2021, LGI recommends the following:

Supply Side

The brunt of incentives should focus on empowering suppliers to meet their renewable obligation targets in the longer term, without assistance. Firstly, the Government should seek to incentivise the production of Renewable LPG, expanding the terms of reference for the Climate Action Fund to consider Renewable LPG, facilitating research and development funding for the sector, providing a platform for those entities intending to support domestic production to do so. We also call on the government to update the building regulations and BER assessment methodology to accurately reflect the decarbonisation benefits of renewable heat, and 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.

Demand Side

Following on from this, the Government should seek to adopt measures which target consumers, households, and rural businesses directly. These should include direct supports for consumers to upgrade from older, inefficient systems to newer ones, such as renewable ready gas boilers. Furthermore, supporting fabric efficiency upgrades should also be a priority. Both of these should contribute to lower end-user energy consumption, and consequently reduce the financial pressures on rural business and residential consumers.

The government also must make it simpler and easier for consumers/businesses to apply for the financial incentives for renewable heat technologies and widen SEAI support for renewable heat options to include the installation of renewable ready gas boilers and incentivise large heat users to adopt renewable heat solutions. Finally, Green Procurement targets for the

public sector must be set that require a minimum annual increase in using renewable heat of 20% of demand and mandate that all new or replacement public sector heating systems must be 100% renewable.

7. Do you think a final 2030 target level of 10% could cause any undue competition with another sector?

Yes

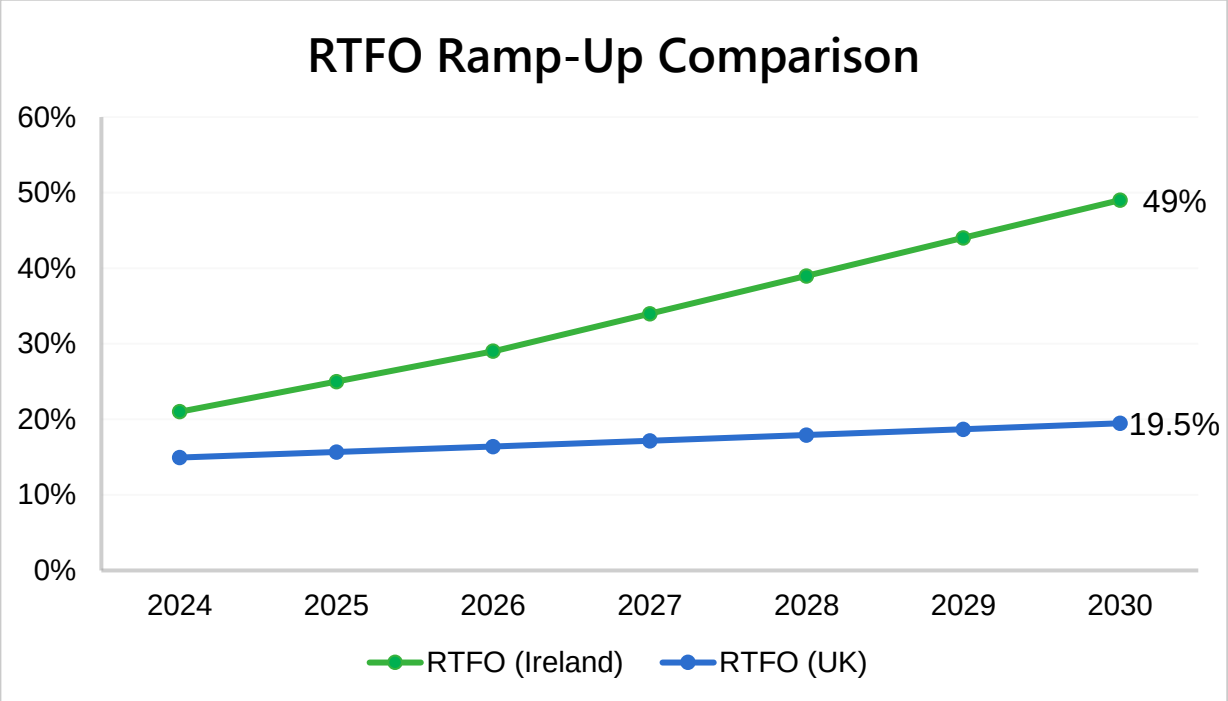
If you have responded yes, please identify which sector/sectors you feel is most at-risk of competition with the Obligation from the options provided:

Transport Sector

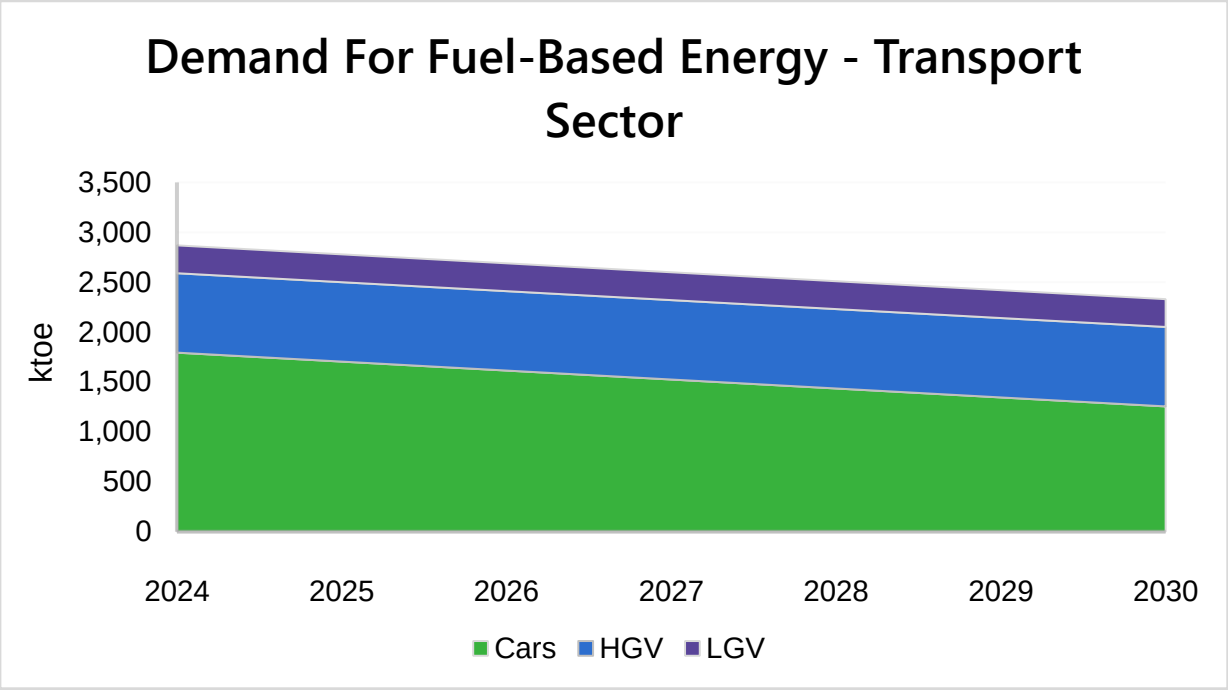
Please specify which sector/sectors you feel could be impacted in the text box provided:

LGI is supportive of a 10% obligation rate by 2030, believing that this gives the industry enough time to ramp up prooduction and supply of renewable fuels – the initial period of which will feature the most difficulty in terms of building supply capacity and delivery mechanisms. With regards to which industry would be most at risk of competition, it is important to note that all industries listed will feature competition to some regard. However, we believe that the transport sector in particular is most likely to face undue competition from any renewable heat obligation.

First, we note that Ireland's RTFO scheme is especially ambitious, aiming for a target of 49% of delivery by 2030. When compared to the UK's RTFO, this is about two-and-a-half times greater in terms of obligated percentages:

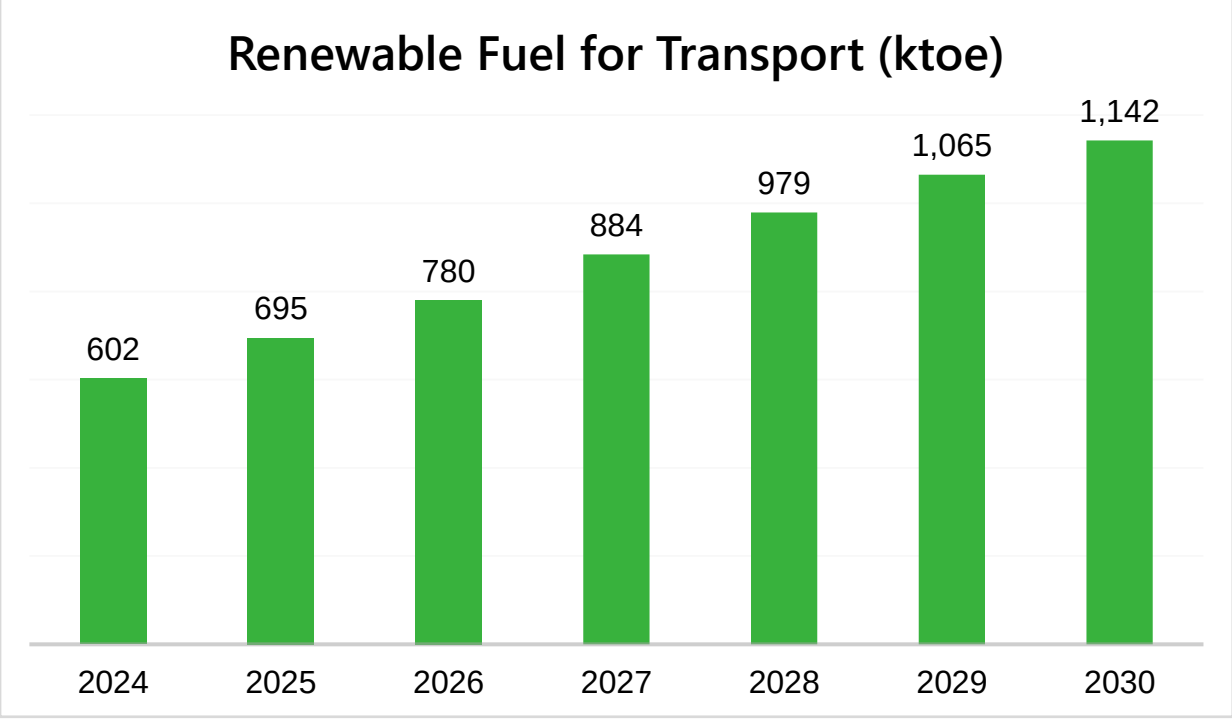


Given the obvious overlap in feedstock-usage between this and the proposed Renewable Heat Obligation, we can see a clear potential for undue competition. As per the Climate Action Plan's "Transport Vision", a 30% increase in EV usage corresponds to the following demand for relevant renewable transport fuels over time:



Demand for Fuel-Based Energy - Transport Sector. Assumed a 30% increase in EV share, as per the Climate Action Plan.

The RTFO obligation, even with these ambitious EV targets will almost double the amount of renewable fuels final energy requirements under the RTFO mechanism alone.



Fundamentally, Liquid Gas Ireland foresees a clear potential for undue competition with the transport sector, given the ambitious decarbonisation pathway it currently sits on, and the introduction of any Renewable Heat Obligation. With this in mind, we again highlight our recommendations for incentive and support schemes, which will be important not only in stimulating and driving renewable fuel supplies as part of any obligation, but will be important in shielding vulnerable consumers (those who are energy poor, or face higher fuel demands without reasonable renovation pathways) from price rises. These are, for biomethane, Renewable LPG, and rDME markets:

- Operational Tariff Measures
- Contracts for Difference
- Investment measures as seen in the RESS.

8. Do you think a final 2030 target level of 10% could cause any undue competition with existing Government policy?

Yes

If you have responded yes, please identify which existing policy you feel is most at risk of competition from the list provided:

Other

If other, please specify in the text box provided:

The final 2030 target level of 10% will cause significant competition with the renewable fuel targets of other existing policy such as the Renewable Transport Fuels Obligation, which has a target of 49% by 2030, as it will competing for the same limited supply of renewable fuels. Competition for supply will lead to higher prices for consumers, as shown in the Department's estimated maximum fuel costs projected in the scenarios examining the rising in the Obligation Rate to 2030. Rising fuel costs are associated with increased risk of fuel poverty, impacting the Government's efforts to reduce fuel poverty under the Energy Poverty Action Plan.

9. Do you feel there is a more appropriate final target level?

No

Trajectory to 2030

10. Do you think an exponential trajectory provides sufficient incentive for the investment of indigenous renewable energy installations?

Yes

11. Do you feel there is a more appropriate trajectory that should be considered?

No

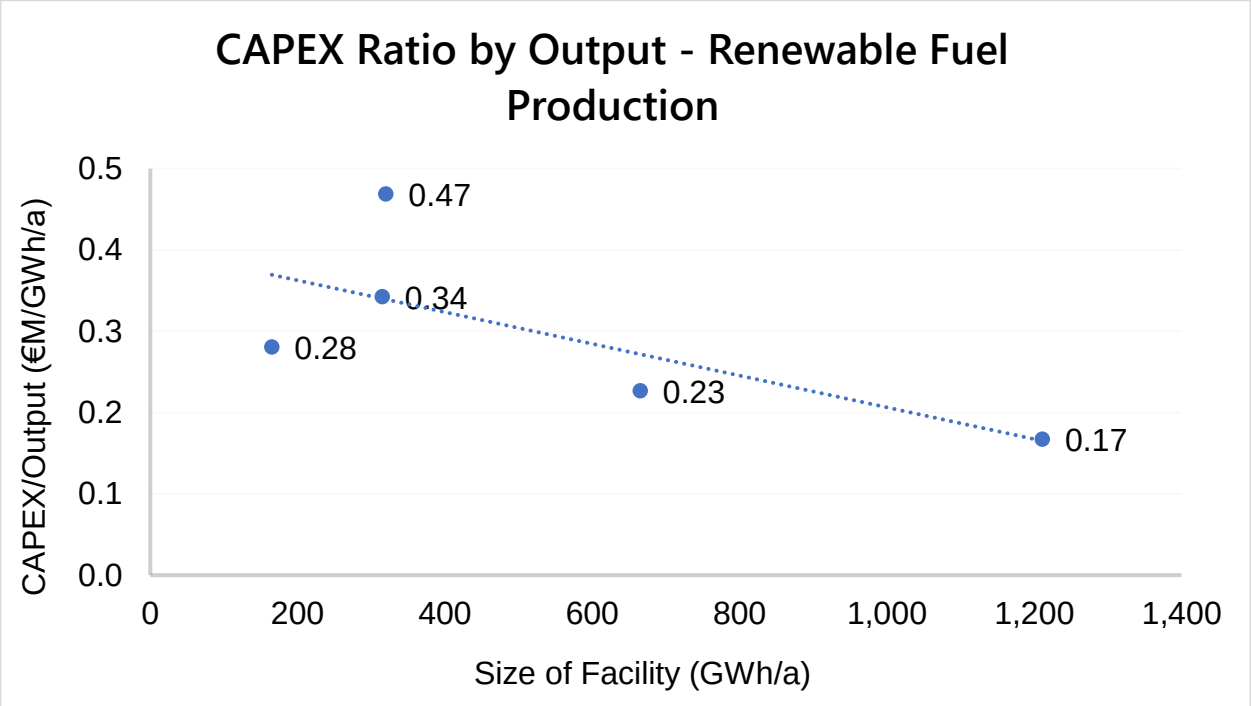
Duration post 2030

12. Do you think the proposed end date of 2040 provides a sufficient payback period to cover the investment in indigenous renewable energy installations?

No

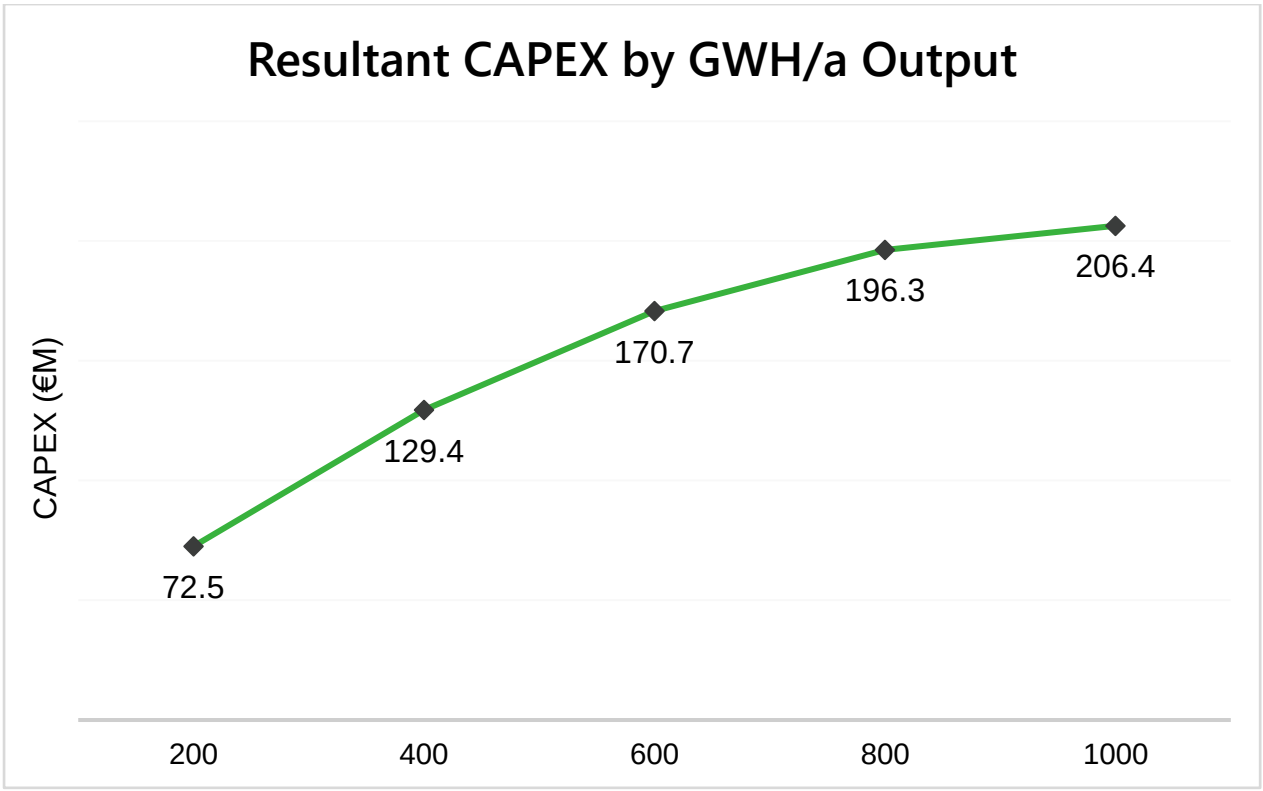
If you have responded no, please provide more detail as to why in the text box provided:

There is a layer of complexity which makes a 2040 payback date difficult to support. According to research by LGUK and NNFCC, there is a clear correlation between CAPEX costs per GWh/a, and the size of the production facility being set up:[4]

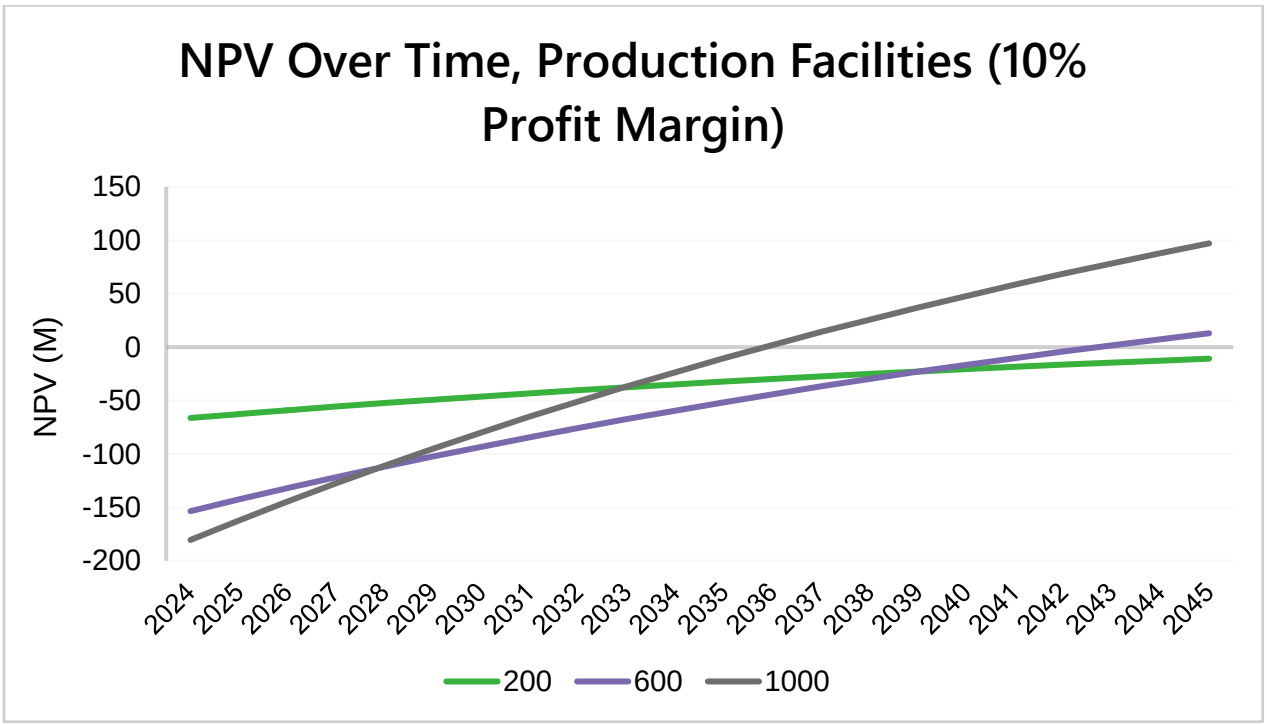


These results demonstrate that there is a clear economies of scale effect occurring with the production of renewable fuel facilities:

[4] NNFCC (2020). A business case for an indigenous Renewable LPG supply chain in the UK.



Fundamentally, this means that any payback date must consider the varying sizes of facility – considering earlier payback periods could limit the construction of renewable fuel facilities to only the largest capacities, limiting the overall production of indigenous fuel in Ireland over time. Taking a hypothetical profit margin on the renewable fuels considered (of 10% in this instance), illustrative NPV curves can be viewed over time, based on the size of the facility being created:



As demonstrated above, at a discount rate of 3.5% and assuming a 10% profit margin[5] is taken on the current price of Renewable LPG, we can see that only the largest (1,000 GWh/a) production facilities can meet a payback date of 2040. Other, even smaller factories, such as those around 200 GWh/a, may even require longer than 2045.

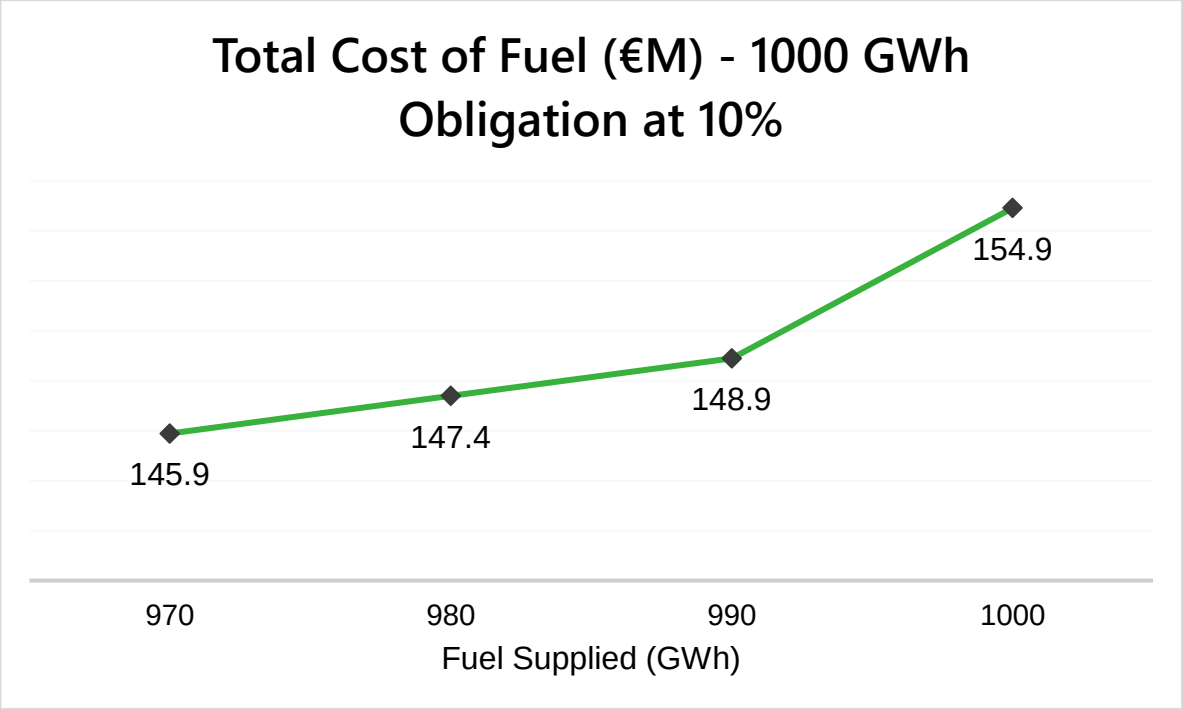
13. Do you agree with the proposed Obligation threshold of 1000GWh?

No

If you have responded no, please indicate a more appropriate threshold and rationale to support your answer in the text box provided:

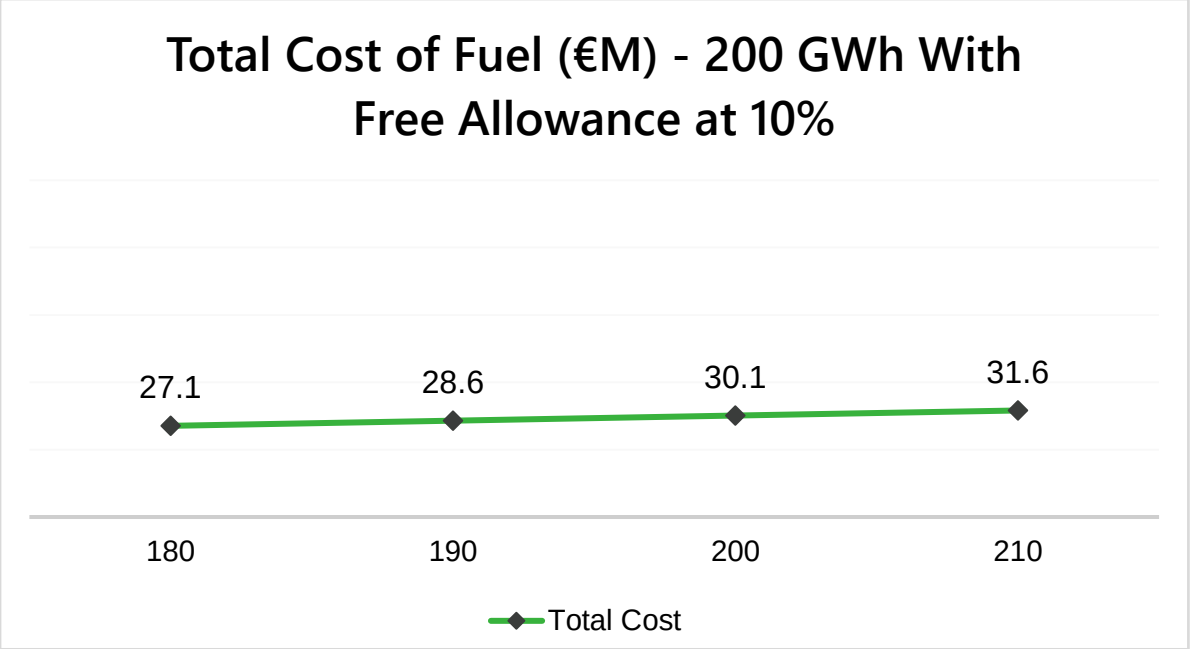
LGI disagrees strongly with both the proposed threshold amount, and the lack of a free allowance. Fundamentally, we believe that the combination of these two factors creates a dramatic cliff-edge effect, which will stunt growth and drastically reduce the natural incentives for companies to scale and grow naturally. Again, it is worth reiterating that we fundamentally agree with the obligation and are keen to ensure the industry plays its role in decarbonising heat and helping to deliver a Net-Zero future.

Under the current proposal we can see that any company who grows into the obligation at a rate of 10% will face a clear cliff-edge effect in terms of costs faced:



Under the existing proposal a cliff-edge effect of around €6M exists. If the obligation itself was altered to 200 GWh with a free allowance, this additional imposition of cost is clearly reduced:

[5] N.B. The 10% figure is hypothetical and must remain so given the competition constraints placed on the trade association and its members.



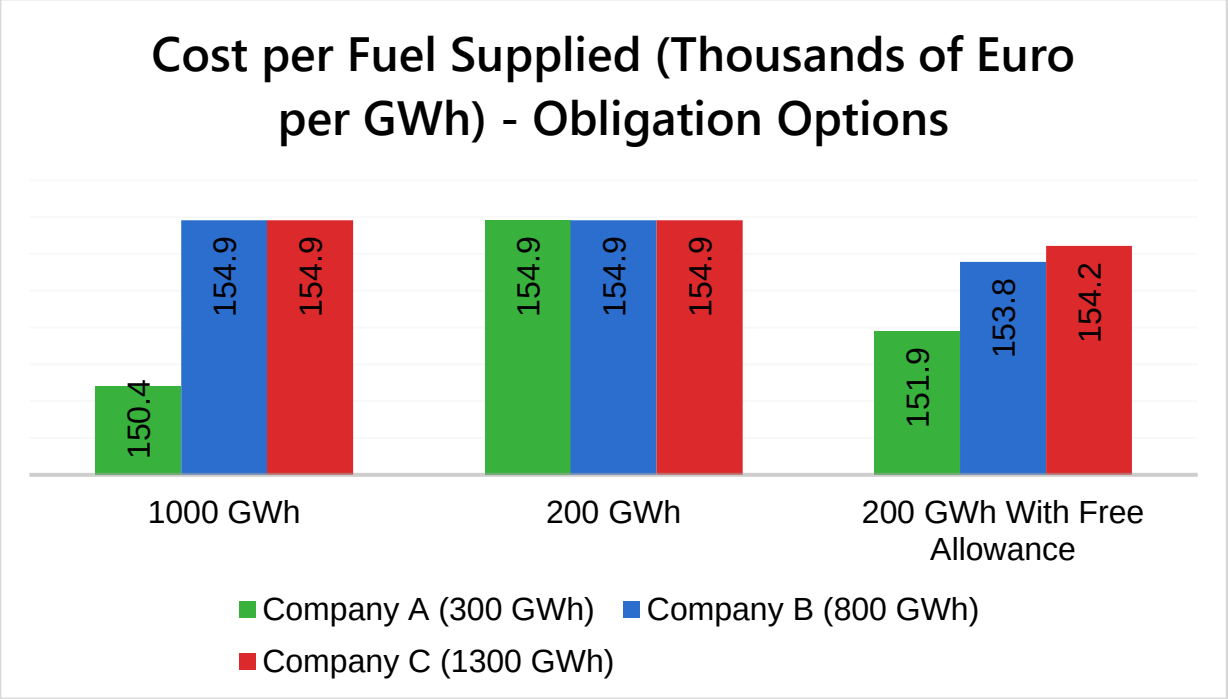
Whilst the inclusion of a free allowance does reduce the amount of fuel that each party would need to ensure is obligated, the reduction of the threshold amount would capture a greater share of the heating market, which in Ireland is primarily dominated by mid- and smaller sized suppliers. LGI notes again that its membership is keen to play a role in the transition, and the reduced threshold allows for each company to play their part in a vital transition.

14. Do you feel there could be any risk of market distortion with the proposed Obligation threshold of 1000GWh?

Yes

If you have responded yes, please provide more detail on potential market impact in the text box provided:

We believe that there is a strong chance of market distortion at an obligated rate of 1000 GWh without a free allowance. First, the cliff-edge effect creates the disincentive for growth amongst mid- and smaller sized suppliers of heating fuel, as described in the response to the prior question. Over the longer term, this reduces the ability for the industry as a whole to grow, reducing the capacity for investments in the vital research and development that will be necessary for the sector's decarbonisation journey.



There are different concepts of "fairness" and LGI believes firmly that smaller producers should face lower costs per fuel supplied in order to incentivise growth, but at such a scale as to not distort the market. Under the hypothetical obligation scenarios described above, the Consultation's proposal indicates that the largest companies (B and C), would clearly face a disproportionately disadvantageous market condition when trying to compete against smaller entities (A). Whilst a reduction of the obligation rate to 200GWh would make this perfectly level, a free allowance retains the benefit of a sloped cost curve relative to the size of the producer – but being far more proportional and relative to the size of each producer.

Eligible Fuels

15. Please select all of the proposed renewable fuels you feel are appropriately listed as eligible for certification:

- Bioliquid - HVO
- Bioliquid - LPG
- Renewable fuels of non-biological origin (RFNBOs)
- Biomethane
- Domestic use biomass and biogas

16. Are there any fuels not listed that you feel should be eligible for certification under the Obligation?

Yes

If you have responded yes, please list relevant fuels and provide rationale to support your answer in the text box provided:

Renewable Dimethyl Ether (rDME) is a sustainable and low-carbon fuel produced from renewable and recycled carbon. It can reduce greenhouse gas emissions by up to 85% compared to heating oil, and LGI strongly feel should be eligible for certification under the Obligation. The fuel emits no harmful particulates and much lower CO2, NOx and SOx than standard LPG, offering customers an immediate route to reduce their carbon intensity and lower adverse local air quality impacts, without requiring major investment in new energy systems.[6]

Most DME currently in the market is produced via catalytic synthesis of methanol and so by switching to renewable methanol as the feedstock, plants can immediately start producing rDME. There is established production technology for rDME (catalytic synthesis from renewable methanol), which means rDME can be immediately produced to support decarbonisation. Additionally, it is produced using advanced technologies such as gasification and pyrolysis, and development can support the production of other fuels across all sectors. Gasification and pyrolysis can use a wider range of feedstocks, including those immediately available, which gives opportunity for low cost and low carbon DME production.

The industry needs financial support that helps innovation and development across the advanced biofuels sector, and inclusion in the Renewable Heat Obligation would incentivise the scaling up of rDME production, support market growth and help overcome the high production costs experienced with advanced biofuel production.

17. Do you think that non-domestic biomass & biogas should be excluded as an eligible fuel for certification under the Obligation?

Yes

18. Do you think the portion of fuel attributable to heat in a Combined Heat and Power (CHP) plant should be considered as part of the Obligation?

Yes

Liquid Gas support of a level playing field for all fuel types and would recommend that the Renewable Heat Obligation is imputed fairly and applied wherever is practical to help Ireland to meet its commitments to decarbonisation of the heating sector.

Electricity is generated at power plants around the country at efficiencies of about 40%, which is reduced further by the time it reaches the end user due to transmission losses. Combined Heat and Power (CHP) enables localised electricity generation and because the excess heat is used, up to 90% efficiency[7]. Therefore, the carbon footprint for the heat and electricity used

[6] https://www.calor.co.uk/news-and-views/futuria-dme-propels-calors-2040-vision
[7] https://www.flogas.ie/business/business-heating/chp-combined-heat-and-power-systems.html

on site is greatly reduced. As well as large scale CHP being utilised for District Heating projects, medium and small installations using gas-powered engines to generate electricity on site can, for example, be used to heat water for showers and swimming pools in hotels, huge increasing energy efficiency in these buildings. When fuelled on Renewable LPG or other renewable fuels, CHP contributes to generating renewable electricity for use at the building and for feeding onto the grid under the Micro Generation Scheme, in the same way as solar panel installations.

19. Do you think renewable waste, as defined by the revised Renewable Energy Directive, should be included as an eligible fuel for certification?

Yes

The Renewable Energy Directive, including its amendments, sets ambitious targets for energy production by 2030. Given the Renewable Heat Obligation is a key step towards that target, it is important that it makes use of all potential sources of renewable energy – particularly the ones which the directive itself sets out. Of these is renewable dimethyl ether (rDME), which has the potential to deliver significant carbon savings, and to facilitate a wider fuel choice for those rural homes at threat of being left behind in the upcoming transition.

rDME, a fuel utilising waste methanol, biogas from dairy waste, and other food/agricultural wastes, has similar molecular properties to conventional LPG, and can support the decarbonisation of heat in off-grid areas. Furthermore, some forms of Renewable LPG makes use of used cooking oil as a key feedstock and energy source. The inclusion of renewable waste fuels, such as rDME, within the Renewable Heat Obligation would prove a pivotal moment, signalling inclusion in an important government policy. This in turn would help to provide confidence to key stakeholders along the supply chain and would kickstart Ireland's indigenous production of renewable fuels. Ireland will face a difficult challenge in meeting the production and sale of renewable heat and should explore all avenues to ensure these targets are met.

Multipliers

20. Do you think the Department should consider the use of multipliers?

Yes

If you have responded yes, please provide more detail to support your answer in the text box provided:

LGI would support the use of multipliers to support accelerated development of Renewable LPG and rDME, helping Ireland reach its ambitious renewable fuel targets. The use of multipliers would also bring the Renewable Heat Obligation in line with other schemes such as the Renewable Fuels for Transport Obligation. As multiple sectors will be competing for the

same fuels under Ireland's renewable energy policies, it is essential that these schemes are aligned to avoid unfairly advancing one sector over another.

Under the EU Renewable Energy Directive, there is inconsistent application of the measurement of feedstocks for different fuel types which presents a huge obstacle to the Irish biofuels market. Under a x1.5 'Development' multiplier status introduced on April 1st, 2023; FAME (Fatty Acid Methyl Ester) biodiesel qualifies where the feedstocks are tallow. Category 1 and Category 2 tallow are double counted under this system, whereas at present Category 3 tallow is only single counted. Renewable LPG produced from the HVO process, where the feedstock is certified from sustainable sources should also qualify for this 'Development' status, as HVO renewable propane can be co-processed along with HVO in the same production facility. The Government should seek to harmonise the use of multipliers across both feedstock types and across sectors to avoid undue competition between producers and sectors.

Governance Arrangements

21. Do you think that a buy-out mechanism should be used in the Obligation?

Yes

If you have responded yes, please select an appropriate buy-out price form the list provided. Costs listed are based on potential price differentials between fossil fuels and eligible renewable fuels.

<30 euro/MWh

LGI agrees that a buy-out mechanism should be present in any obligation mechanism. However, we feel that a buy-out price of 30 euro/MWh would be best for industry, as increasing it sharply increases the risk and potential costs faced by industry. For a 1000GWh supplier, a 10% undershoot, with a 30 Euro/MWh buyout price at an obligated rate of 10% equates to a total cost of 3M Euros. This is a substantial amount – increasing the buyout rate under this scenario to 50 euros/MWh raises this to 5M Euros.

22. Do you agree that the buy-out mechanism should be capped, allowing obligated parties to buy-out up to a maximum of only 30% of their total annual obligation?

Yes

Please use the text box provided if you would like to give any additional information in support of your answer:

A buy out of 30% of total annual obligation is consistent with other schemes, and it is crucial that all the renewable schemes available are aligned on their buy out mechanism, to make sure that no one sector can dominate the market. Consistency will also be key to compliance on renewable obligations, as having varying rates and processes in different sector will lead to confusion for suppliers.

Penalties

23. Do you feel that 1.25 times the buy-out cost (€/kWh), is an appropriate penalty cost?

Yes

Please use the text box provided if you would like to give any additional information in support of your answer:

A penalty cost of 1.25 times the buy-out cost follows the workings of the Energy Efficiency Obligation Scheme, and it is appropriate to align the Renewable Heat Obligation with this. As previously noted, consistency across all renewable fuel schemes on processes, penalties and thresholds will make compliance easier for producers and prevent market distortion and the dominance of one sector.

Obligation Review

24. Do you agree with the review point proposed in year 3?

Yes

Annex 1 – The Strategic Role of Off-Gas Grid Renewable Gases

Liquid Gas Europe & European Biogas Association (2022)

The Strategic Role of

Off-Grid Renewable Gases

Challenges of Off-Grid Decarbonisation

49.2 MILLION

There are **49.2 million rural households in the EU** and most of them are **not connected to a gas grid.** These buildings primarily use fossil fuels for heating, these are generally higher carbon fossil fuels.[2]

36%

Rural building stock is often old, 36% of building stock in the EU was built **before the first thermal regulations in 1970s.**[3]

Gas and electricity **networks are less developed in rural areas,** so the choice of fuels and energy solutions remains limited.[4]

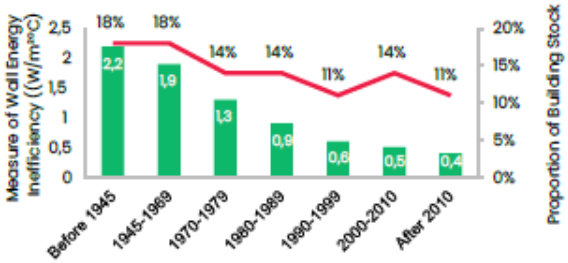
Heat demand varies significantly more than renewable electricity generation throughout the year. Electrification requires constant balancing of supply and demand which will be challenging to meet with intermittent renewable energy.

7%

23%

7% of off grid homes **heat with coal**[3] and a further 23% **with fuel oil**[3]. These fuels have high air pollution and greenhouse gas emissions.

Old Buildings are Common and Less Energy Efficient



Building Stock Diversity and Prominence of Hard-to-Treat Buildings

There is a broad variety of building types and ages in the EU. Generally, older buildings are less energy efficient, as shown on the bar chart above[5], these hard-to-treat buildings are common in rural areas and require more investment to decarbonise.

There is a broad mix of heating technologies in the EU, heating oil and coal are widely used for dwellings not connected to the gas grid[3]. These fuels have high carbon and air pollution emissions.

Different buildings and consumers require different energy solutions suited to their needs and circumstances, as there is no 'one size fits all' solution. Consumers should be provided with a choice to ensure rapid decarbonisation and a just energy transition.

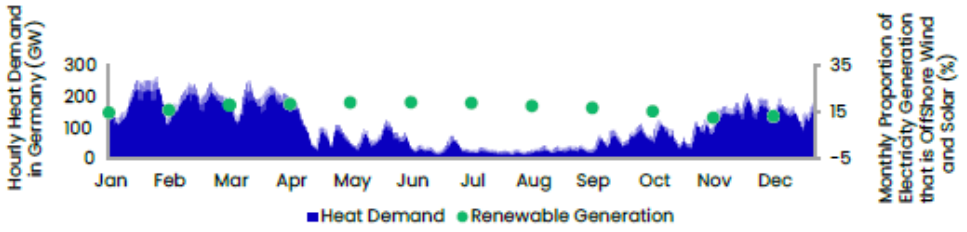
[1] Eurostat (2022) Number of households by degree of urbanisation
[2] Eurostat (2019) Share of fuels in the final energy consumption in the residential sector for space heating
[3] FRAUNHOFER ISI (2021) Space heating market summary 2017
[4] ECOFYS (2018) Rural energy in Europe
[5] European Commission (2020) EU Buildings Database

02

Energy Security and Flexibility

Heating demand varies significantly throughout the year with much higher winter consumption than in summer, as shown on the graph for Germany below[4]. Increasing electrification and penetration of intermittent renewable energy significantly increases the difficulty of operating a reliable electricity grid and managing supply and demand, particularly in off-grid areas which generally have the worst reliability[5]. The graph below shows renewable electricity generation dropping in winter[6,7] as heat demand is highest. Decarbonisation must be achieved in a way that peak demand can always be met.

Heat Demand Variation Will be Challenging to Meet with Renewable Electricity Alone



What Are Off-Grid Renewable Gases?

BioLPG

Chemically identical to conventional LPG, bioLPG is a drop-in solution which can be produced from **sustainable feedstocks** such as plant and animal waste materials, vegetable oils, and biogas, and can be used in existing LPG infrastructure and appliances.

Biogas

Biogas is produced through the **decomposition of organic matter** (such as agricultural wastes, manure and sewage sludge) and can be used as a fuel in vehicles and in typical gas appliances to provide heat and power.

BioLNG

Is produced by **separating methane and other critical components from biogas** to bring it to a methane content **similar to that of natural gas**, and subsequently liquefied.

rDME

Has **similar properties to LPG** and can be produced from **a wide range of renewable feedstocks** – including municipal waste, and biogas. It can be used as a pure renewable fuel or blended with conventional LPG.

How are Renewable Gases Produced?

Bio-Refining

Bio-Refining can be used to **convert biomass into a number of useful products** such as food, chemicals and renewable gases. This is achieved through a number of different technologies including microbial fermentation, biocatalysis and thermochemical processes, to produce renewable gases such as bioLPG and rDME. Renewable gases such as rDME and bioLPG can also be used as hydrogen carriers due to the lower cost of transporting and storing these gases.

Power to Gas (P2G)

Power to gas involves using **electrolysis to convert electricity to hydrogen.** This can then be combined with carbon to produce synthetic hydrocarbons with very low emissions if renewable electricity is used. These renewable fuels are much cheaper and easier to store than pure hydrogen due to their greater volumetric energy density.

Anaerobic Digestion (AD)

Anaerobic digestion **is the breakdown of organic matter using micro-organisms** in the absence of oxygen. This produces **biogas** which can be **upgraded to biomethane.** Biomethane can then be compressed into bioLNG which can be stored in tanks and used in off-grid applications.

Gasification and Pyrolysis

Gasification and pyrolysis use **heat, pressure and steam to convert biomass into renewable gases.** Gasification is a thermochemical process where materials decompose in an environment with less oxygen than is required for combustion. Pyrolysis is a similar process, performed at higher temperatures, but in the absence of oxygen.

[4] Stratego (2018) Creating Hourly Profiles to Model both Demand and Supply
[5] ECOFYS (2018) Rural energy in Europe
[6] IEA (2020) Monthly generation of solar PV in Germany
[7] IEA (2020) Monthly generation of offshore wind in Germany

03

Key Benefits of Off-Grid Renewable Gases

Applications of Renewable Off-Grid gases

Consumer Acceptability

A study by Eurogas suggests that initial renovation work and high upfront expense are the factors that have the highest influence on consumers that will make them unlikely to upgrade their heating system[10]. **Renewable gases such as bioLPG, rDME and biogas can provide an easy decarbonisation solution for consumers.** BioLPG is a drop in fuel for current LPG boilers, while rDME can be used up to a certain percentage blend without any changes to LPG boilers, and with small modifications 100% rDME can be used. Keeping existing heating systems makes it convenient for consumers to opt for solutions that are increasingly renewable and lower carbon.

Factors That Make Consumers Unlikely To Upgrade Their Heating System

(Average % of Countries Surveyed)

38%

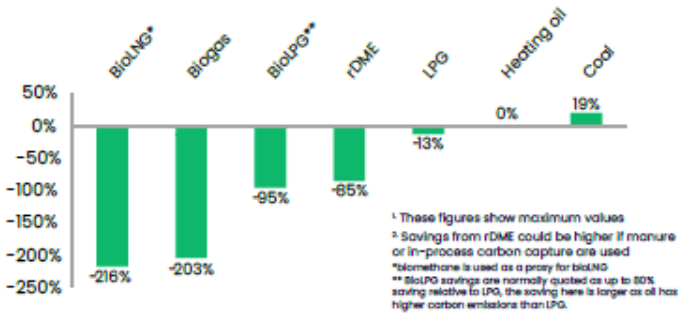
of consumers would be unlikely to upgrade their heating system if **they have to undertake initial renovation work**

36%

of consumers would be unlikely to upgrade their heating systems if **they have to pay an upfront expense.**

[10] Eurogas (2019) Energy Survey 2019

Greenhouse Gas Emission Saving Relative to Oil[11,12]



[1] These figures show maximum values
[2] Savings from rDME could be higher if manure or in-process carbon capture are used
*biomethane is used as a proxy for bioLNG
** BioLPG savings are normally quoted as up to 80% saving relative to LPG, the saving here is larger as oil has higher carbon emissions than LPG.

Emissions

BioLPG, rDME, biomethane and biogas all have greenhouse gas emissions that **are significantly lower than fossil fuels** at a reduction of up to 95%[13], 85%[14], 216%[15] and 203%[16] respectively depending on the feedstock used.

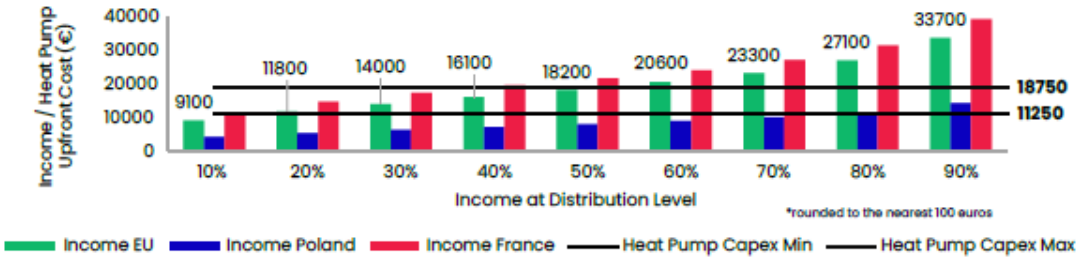
In 2019, 307,000 premature EU deaths were attributed to fine particulate matter ($PM_{2.5}$)[17]. The $PM_{2.5}$ emissions of renewable gases per unit of energy are around 37% less than oil and 99% less than coal.[18]

Affordability

Gas boilers which can run on renewable liquid gases are roughly **a quarter of the investment cost of heat pumps and even cheaper compared to biomass boilers**, making them more affordable for households and business with low levels of disposable income[19].

While heat pumps are an efficient technology, for many the higher costs are prohibitive. The chart below illustrates this by comparing annual income deciles[20] with heat pump capital costs, for example 50% of people in the EU earn less than €18200. This means that for 50% of the EU, annual incomes could be lower than the upfront cost of a large heat pump. The installation of a heat pump would require years of saving for even high-income households to be affordable without a subsidy or loan. Heat pumps are assumed to have a thermal capacity between 15kWth and 25kWth.

Significant Proportion of Households Cannot Afford Heat Pumps*



System Benefits

Flexibility of renewable gases is much easier to manage than renewable electricity due to cheaper storage and more consistent generation.[21]

The use of renewable gases results in **reduced peak electricity demand**[22], this significantly reduces power grid reinforcement and dispatchable power costs.

Hybrid systems help balance peak demand on the electricity grid. They can be installed with less requirement for electricity grid or radiator upgrades and the low carbon heating system can be installed before insulation upgrades.[23]

Off-grid renewable gases can be **produced locally** reducing energy distribution requirements.

[5,17] European Environment Agency (2021) Air Quality in Europe 2021
[13,15] NAEI (2020) Emission factors detailed by fuel and source
[11] Cedelft (2021) Emissions of (bio)LPG and other energy carriers in domestic heating, BBQs and forklift trucks
[14] SHV Energy (2022) Renewable DME
[12] JRC (2017) Solid and gaseous bioenergy pathways: input values and GHG emissions
[15] Bilans Ges (2022) Direct Emissions and Upstream Fuels
[19] European Commission (2018) Decentralised heat pumps: system benefits under different technical configurations
[20] Income deciles are 9 income figures that divide the population into 10 equal sized groups, the first decile represents the poorest 10% of the population. Eurostat (2022) Income Distribution by Quantiles
[21] Imperial College London (2020) The flexibility of gas: what is it worth?
[22] Entsog & Entsoe (2020) Scenario Results
[23] Energy (2016) Electricity, gas, heat integration via residential hybrid heating technologies

Biogas Supporting Sustainable Dairy Farming and Green Community Building

A 499 kWe AD plant in western France **combines the effluents from 12 farms** located less than 8 km away to produce energy for the local area.

The biogas produced by the AD facility is **used as fuel for hay and cereal drying as well as cogenerator fuel** which provides electricity and heat.

The 1,500 MWh/year of heat generated feeds into a community heating network, providing **heat for the local swimming pool, secondary school and communal buildings**[24]. Image copyright Déméter Energies.

BioLPG For Hard-to-Treat Rural Homes

26%

Over a quarter (26%) **of Germany's population live in rural areas**; of these homes, 25% use heating oil.

Installing a bioLPG ready boiler, alongside thermal insulation would result in:

90% annual CO_2 savings of 63%, rising to **90% when using bioLPG.**

68% **66%** **68% NOx savings and 66% PM** emissions savings.

€933 **€933 annual energy bill savings** and a capital cost back period of 8.4 years.[25]

BioLPG Supporting Net Zero Targets of a Cosmetic Industry

La Roche-Posay, offering innovative skincare solutions for fragile skin, became the first industrial site in France to use bioLPG in 2018.

This was a simple transition, as the product has no impact on the performance of their manufacturing activity and is easily incorporated into the distribution network of Primagaz France.

In 2005, the La-Roche-Posay site was producing 192tCO_2 per year, which fell to zero in 2019 – with bioLPG being the last step towards carbon neutrality on the industrial site.[25]

[24,25] EBA (2020) Biogas Success Stories 2020
[25] Liquid Gas Europe (2019) Beyond the Gas Grid: Residential and Industrial Case Studies

06

Policy Landscape

The EU has a target of a **55% reduction in greenhouse gas emissions by 2030** and a net zero ambition by 2050. It is critical that the legislative frameworks and associated policies enable a Just Energy Transition where no one is left behind. Solutions that are available, easily deployable, cost effective and socially acceptable will be needed to achieve ambitious climate targets, and in view of rising energy security concerns it is equally important to consider solutions that ensure supply security and energy system resilience. The **role of off-grid renewable gases is critical in this respect as they can facilitate the sustainability journey of communities in rural areas** that often do not have the luxury to choose from many sustainable alternatives that are cost effective as well as lower carbon.

Rural Areas Require Attention

Rural areas **represent 83% of EU territory**, and include 25% of all households in the EU which equates to 49.2 million households these are often not connected to the grid.[27]

of EU households are **located in rural areas.**

33% in towns & suburbs.

42% in cities.[28]

GDP per head in rural regions is lower than urban regions at 75% and 125% of the EU average respectively.[28]

The percentage of population **at risk of poverty or social exclusion is higher in rural areas** (22.4%), compared to cities (21.3%) and towns and suburbs (19.2%).[30]

Policy Recommendations

Recognise all Renewable Gas Production Pathways

All renewable gas production pathways and related technologies should be recognized in policy frameworks to support their development and uptake. This will help to diversify supply, ensure supply security and maximise production. Renewable gases can be produced through a host of technologies such as hydro-treatment of vegetable oils, fermentation, gasification, pyrolysis, anaerobic digestion, etc.

Support Renewable Ready Gas Boilers

Policies should support the use of gas boilers that can operate on renewable gases. Hybrid solutions must also be considered where gas boilers are combined with heat pumps or solar thermal units and can offer flexibility and resilience to the energy system on top of GHG emission reduction benefits. It is important that efficient renewable ready gas boilers are recognized as an energy efficiency measure in building regulations and energy performance certificates.

Develop Markets for Renewable Gases

Financial incentives in the form of tax rebates, capital grants and fuel subsidies should be deployed to encourage switching to all renewable technologies including renewable gases. Renewable gases that are produced off-site must be allowed to contribute to zero-emission buildings. Renewable gases use the existing infrastructure in achieving decarbonisation objectives and therefore can make the energy transition cost-efficient and affordable for end consumers. Intelligent policy design is needed to make sure that incentives for renewable liquid and gaseous fuels in one sector do not artificially raise their price in other sectors.

Facilitate Consumer Choice

There is no 'one size fits all' solution, certainly not for heat decarbonisation. Consumers should be made aware of possible options for decarbonising heat, including the benefits of using renewable gases in their current heating system. Policies should not pick favourites but instead should help guide consumer choices and help them decide what fits their needs while remaining aligned with our collective climate goals.

[27] Eurostat (2022) Number of households by degree of urbanisation
[28,29,30] EU Commission (2021) A long-term vision for the EU's rural areas