WBA response to:

Consultation on the Introduction of a Renewable Heat Obligation

The World Biogas Association (WBA) is a trade association representing the global anaerobic digestion (AD) and biogas sector. With rapidly growing membership – currently standing at 58 companies and organisations – WBA are committed to building a circular economy in which organic wastes and feedstocks are recycled into renewable biogas.

Recycling organic wastes

AD is a recycling technology capable of managing all of societies' organic wastes – including food waste, sewage, manures, slurries, and crop residues. In a sealed tank without oxygen, organic wastes are digested via microorganisms, producing three key products: biomethane, bio-CO_2 and bio-fertiliser. Deployed worldwide, the technology is well established and highly flexible. Biogas meets the needs of a community, whether that may be recycling livestock waste on an individual farm or treating the wastewater/food waste of an entire city.

Over 105 billion tonnes of organic waste are produced worldwide each year, and yet just 2% of these wastes are effectively managed. Poorly managed organic wastes are responsible for polluting waterways, reducing biodiversity and releasing methane, a potent greenhouse gas, directly into the atmosphere.

Delivering deep decarbonisation

AD transforms these organic wastes from a problem into a valuable bioresource. Methane emissions are captured, preventing their contribution to GHG emissions, and harnessed as a source of renewable energy, displacing the use of fossil natural gas. Nutrients are recovered in the form of digestate, an organic-rich biofertiliser capable of displacing the use of carbon-intensive artificial fertilisers and increasing carbon sequestration in soils. And, bio-CO_2 is created, suitable for industrial use (e.g. food and drinks manufacture) or long-term carbon storage, removing carbon from the atmosphere.

In combination, AD can deliver a 10% reduction to annual global emissions – simply by recycling societies' unavoidable organic wastes. The EU Commission's Deputy Head of the Renewable Energy Unit, Antonio Lopez-Nicolas, recognises that *"**There can be no net zero without biogas**"*.

Increasingly governments and industries are recognising the economic, environmental, and social value of biogas. Consequently, the sector is growing rapidly worldwide, and too WBA's membership base. In April 2021, the WBA published its report Biogas: Pathways to 2030, exploring how countries can scale up their biogas sector to deliver the full decarbonisation potential from their organic wastes. The report provides policy recommendations to ensure sustainable industry growth, reaching its full potential by 2030.

Biomethane for heat

Biomethane is a highly versatile green gas capable of immediately decarbonising Ireland's heat sector. The gas is chemically identical to fossil natural gas and can therefore be used as a like-for-like substitute. It is compatible with all existing gas infrastructure, from national gas grids to domestic cookers and boilers. The use of biomethane does not incur any additional costs or disruption to energy networks, gas suppliers, or end-users.

Heat can be decarbonised with biomethane *immediately*. Organic wastes are ready to collect and digest. In the UK, the Committee on Climate Change (CCC) designated AD and biogas as a "no-regrets option", paving the way for the introduction of a Green Gas Support Scheme (GGSS) in 2021, set to support the development of around 45 new biomethane. This support scheme will bring up to £150 million per year to the biogas industry, rewarding the production of biomethane for heat.

EU-US-led Global Methane Pledge

At COP26, the EU and US will launch their Global Methane Pledge, establishing their commitment to cut methane emissions by 30% from 2020's levels by 2030. As a greenhouse gas, methane is over 84 times more potent than CO_2 over a 20-year period. Consequently, methane emissions are responsible for almost a quarter of global warming. The Global Methane Pledge follows recommendations from the IPCC urging governments to immediate tackle methane emissions. Climate targets cannot be met if methane emissions are not addressed.

The majority of methane emissions are derived from three key sectors: (i) **poor organic waste management**; (ii) leakage from oil and gas industry; and (iii) coal mining. The biogas industry directly cuts methane emissions from poor organic waste management - the following outlines how:

a. **Landfill**. Any biodegradable waste sent to landfill will breakdown in anaerobic conditions (i.e. without oxygen present) to produce methane. Landfills can be retrofitted with infrastructure designed to capture this gas, thus preventing these GHG emissions and creating a source of low carbon gas.

b. **Food and garden waste**. The EU aims to ban the disposal of all organic wastes to landfill by 2030, mitigating landfill emissions. By collecting food and garden waste separately from non-organic waste facilities their recycling via AD. Again, methane emissions are captured as a valuable source of energy.

c. **Manures and slurries**. Livestock waste is often collected on-farms and spread to land untreated. This process releases significant quantities of methane as the waste rots in stores and soils. Managing these wastes via AD produces *carbon negative* biogas as recognised by the EU's Renewable Energy Directive II (REDII), accounting these avoided methane emissions – around -45 gCO_2e/MJ of biogas produced.

d. **Wastewater**. Poorly managed wastewater treatment plants release high levels of methane. Sewage can be biologically treated via AD, avoiding methane emissions and, in turn, generating enough energy to be self-reliant.

Overall, the biogas industry could deliver 50% of the Global Methane Pledge – simply by recycling organic wastes and preventing releasing methane directly into the atmosphere.

The Renewable Heat Obligation could be an excellent opportunity to address multiple issues at once – cutting methane (and GHG) emissions and generating renewable biogas for heat.

Consultation questions

Q1: Do you think that a Renewable Heat Obligation is an appropriate measure to introduce?

Yes.

Heat is one of the hardest sectors to decarbonise. As recognised in the consultation, Ireland is lagging behind every other EU country, with just 6.3% of energy for heat sourced from renewable sources.

A renewables obligation is a proven mechanism to scale renewable energy generation within a specific sector. From a government perspective, there are a couple key advantages to an obligation. First, the obligation can remain technology neutral, permitting any viable technology to deliver the scheme's objectives. This neutrality can develop resilience within the energy network, as multiple technologies can work towards a common goal, and incentivise innovation to optimise current technologies – or even identify find new low-carbon solutions. And second, an obligation is a market-driven support scheme, reducing government spending. However, considering its costs are typically passed down to the end-user, the obligation level and rate of increase must be carefully managed to minimise risk of rising fuel poverty.

However, WBA strongly advises that Ireland's DECC learns from of similar schemes, such as the Renewable Transport Fuel Obligation (RTFO), to maximise carbon savings delivered:

- **Focus on carbon intensity of fuel supplied**
  The primary objective of the Renewable Heat Obligation is to decarbonise heat in Ireland. Consequently, the Obligation should incentivise the production and use of energy with the greatest carbon savings. The lower the energy's carbon intensity, the greater its contribution to an obligation – and therefore, greater the value of fuel.

  For comparison, the UK's RTFO rewards energy producers with one certificate (RTFC) per litre of renewable fuel used for transport. To be granted a certificate, the producer must demonstrate that the fuel delivers a >60% GHG saving, compared to fossil fuels. While the scheme does reward biofuels derived from wastes with double certificates to partially account for carbon savings, the RTFO priorities the quantity of fuel produced over its carbon savings.

This focus on energy production has unintended consequences. Energy producers (e.g. AD plants) are incentivised to only treat waste feedstocks with a high biogas yield, such as food waste. With a high energy potential, these feedstocks deliver more energy per tonne of waste treated, thus maximising revenue from the RTFO. Consequently, lower biogas yielding organic wastes, such as manures and slurries, are overlooked. Producing less gas per tonne, the support received via the scheme is not enough to encourage the treatment of wastes.

Biogas produced from manures and slurries can be carbon negative – i.e. greater than 100% carbon savings, acting to reverse GHG emissions. The REDII methodology calculates an emission saving of (-)45gCO2e/MJ of biomethane derived from manures and slurries. Considering Ireland's sizable dairy sector, there is a significant potential for AD to generate carbon negative biogas to heat homes, maximising decarbonisation of agriculture and heat. The following estimates the biogas and decarbonisation potential of Ireland's manure, if treated via AD:

Input		
Cattle population in Ireland	6.9	million[1]
Manure produced per cow per year	19.3	tonnes[2]
Total dairy manure produced per year	**133.5**	**million tonnes**
Output		
Biogas yield of manure	32	m^3/tonne[3]
Total energy produced	24.7	TWh
Carbon savings from avoided methane emissions	4.0	$MtCO_2e$
Carbon savings from displaced fossil natural gas	5.0	$MtCO_2e$
Total carbon savings	**9.0**	**$MtCO_2e$**

If managed using AD, cattle manure could generate 24.7 TWh of carbon negative biomethane per year – far exceeding the Renewable Heat Obligation's 1.6 TWh target by 2030. Moreover, it could cut annual emissions by 9.0 $MtCO_2e$ – representing 16% of Ireland's total GHG emissions per year.

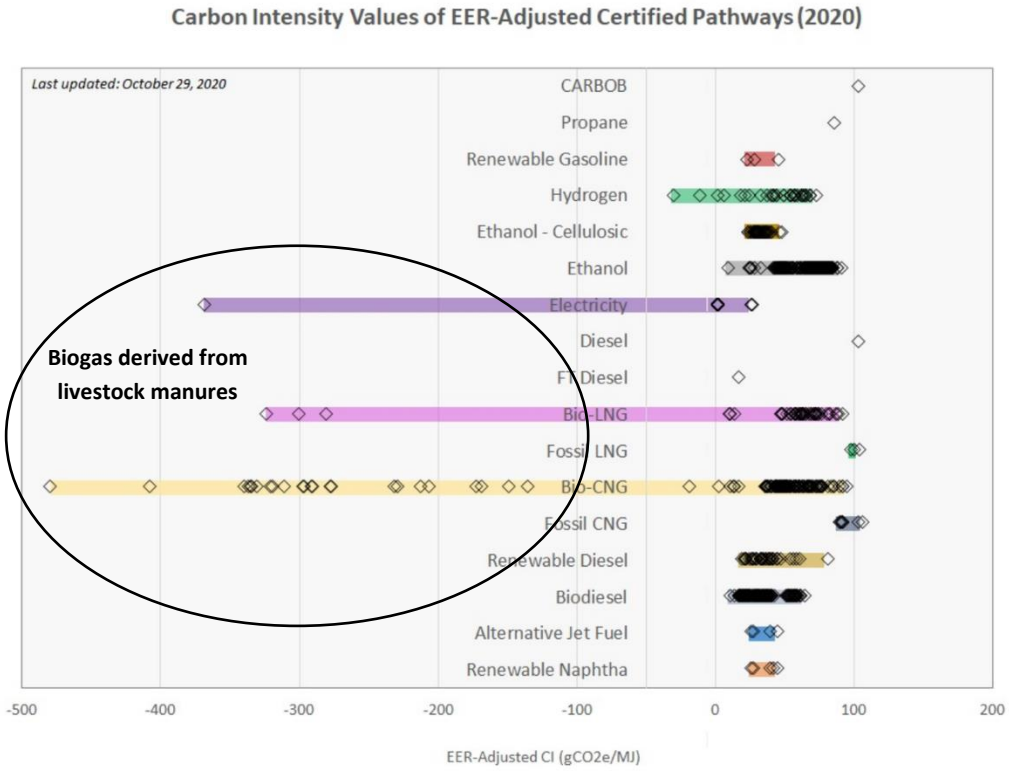
The Renewable Heat Obligation is an opportunity to deliver these carbon savings and green energy. Again, to do so, the scheme must account for carbon savings, not just energy production. The following outlines a few mechanisms to account for the carbon:

a. **Set the Obligation on energy suppliers' emissions – not energy supplied**. For example, a gas supplier may sell 5 TWh of gas per year, 100% sourced from fossil natural gas. Consequently, based on natural gas emissions (203 kgCO2e/MWh[4]), this company would emit 1.0 $MtCO_2e$

[1] https://www.cso.ie/en/releasesandpublications/ep/p-fss/farmstructuresurvey2013/detailedanalysis/livestock/
[2] https://www.sciencedirect.com/science/article/pii/S1364032118304714
[3] https://borrg.soton.ac.uk/resources/adat/
[4] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021

per year. The Renewable Heat Obligation could start reducing these emissions, implementing a 1% annual reduction. To meet this obligation, the supplier could either produce low carbon energy, or purchase certificates verifying carbons savings. The carbon intensity energy would be detailed on the certificate, such that the lower its carbon intensity, the greater contribution to the supplier's obligation.

This setup is similar to California's Low Carbon Fuels Standard (LCFS)[5] where transport fuel suppliers are required to deliver carbon savings on total fuel supplied. This scheme also recognises the decarbonisation potential of AD, where biogas-derived from manures delivers the most carbon negative fuels available:



b. **Tier certificate allocation according to carbon savings**. The lower the energy's carbon intensity, the more certificates it receives. For example, 1 MWh of renewable energy with a 50-75% GHG savings receives one certificate, a 75-100% receives two certificates, and a >100% GHG saving receives three certificates. Again, this actively incentivises energy producers to optimise the carbon savings delivers. It encourages the uptake of any technology which can further increase savings and therefore earn more certificates.

However, tiering can cause producers to target the less favourable bounds of carbon savings. If they are unlikely to move from one tier to the next, producers may prioritise energy production, over carbon savings. This cliff-edge approach does not incentivise

[5] https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard

producers to optimise GHG savings throughout the supply chain – investment and changes would only be made if it can take the fuel produced to the next tier.

- **Set a floor price for energy generated**

Developing an AD plant represents a sizable capital investment with on-going operational costs. A mid-large scale food waste plant producing biomethane (5MW capacity) may cost around €10-12 million to construct and around €1.0-1.5 million to operate per year.

Setting a floor price for renewable energy provides investors with a level of finance certainty. Economic models can forecast annual income and estimate return on investment (ROI). This can greatly reduce financial risk, and consequently reduce interest rates and insurance costs. Tackling financial risk lowers overall costs and helps deliver value for money to the end-users.

A floor price can be implemented in one of two ways:

1. Regardless of the market supply and demand, all certificates have a **fixed minimum price** which suppliers must pay.

   For example, if floor price is set at 0.05€/kWh, an energy supplier will always purchase certificates at this price or more.

2. Energy suppliers purchase certificates at their market price where, if this price is below the fixed floor price, the **government will 'top-up'** the price to reach the minimum value.

   For example, if the floor price is set at 0.05€/kWh and the certificates are trading for 0.04€/kWh equivalent, the government will pay an additional 0.01€/kWh to energy producers, thus reaching the target level.

Both mechanisms deliver the financial certainty necessary to encourage green investment. The former supports market stability, and the latter increases market fairness.

While guaranteeing this financial certainty is critical for investment, the value for certificates need not fall to floor price (or below). The DECC can influence the market by adjusting the obligation level. As demonstrated by the RTFO, year-on-year increases to the main obligation level has driven a strong market for certificates. RTFC index price has increased fairly consistently over the last two years. This year's amendment to the scheme has led to an additional 5% increase to obligation level, aiming to further increase carbon savings delivered. Again, this is forecast to further increase certificate demand and price, bring more financial support to producers of renewable energy.

A Cost Containment Mechanism (CCM), akin to one deployed on the EU's ETS, can ensure prolonged periods of extremely low (or high) certificate prices can trigger a scheme adjustment to stabilise the market. A Renewable Heat Obligation could deploy such a mechanism to ensure the certificate prices remain within a sustainable level. Too low, the DECC could increase the obligation to stimulate demand and price. Too high, it could decrease the obligation level to minimise the financial impact on customers.

Crucially, **despite the strong market for RTFC at present, its lack of floor price has prevented the development of any biomethane plants based solely on this scheme.** All biomethane plants in the UK have secured a fixed tariff rate under the Renewable Heat Incentive (RHI), thus providing investors with the necessary financial certainty. These plants are free to proportion biomethane to the RTFO, with the RHI scheme effectively providing the floor price for energy generated.

The WBA strongly recommends that the DECC implement a floor price to the Renewable Heat Obligation.

- **Establish scheme duration.**
  AD investors and operators need assurance that any schemes in place will provide support for the plant's entire life cycle. Much like the floor price, clear communication about the scheme's duration can provide the financial certainty necessary for investment. Concerns that the scheme will close in ten years' time would likely dissuade investment into biogas plants, and other producers of renewable energy.

  Note it is important to communicate that, even if the obligation level plateaus and stops increasing each year, the scheme will remain open. The UK's Department for Transport failed to communicate clearly that the RTFO will not close in 2032, just because the obligation is not set to increase further. Consequently, some producers considered the scheme a short term solution, not worth considering over their fixed tariff rate.

Q2: If not, what alternative measures would you consider appropriate to increase the use of renewable energy in the heat sector?

Alternatively, DECC could consider a fixed tariff rate (€c/kWh) for the production of renewable heat, akin to the UK's Renewable Heat Incentive (RHI) or incoming Green Gas Support Scheme (GGSS). Providing a tariff rate is well-proven mechanism for incentivising plant deployment and renewable energy production. Tariff rates in the UK, Germany and Italy have all resulted in rapid industry growth. Providing a fixed rate over a well-defined period of time arguably drives the fastest growth, compared to any other mechanism.

Tariff rates are not necessarily funded by government directly. As demonstrated by the GGSS, a complementary Green Gas Levy will be introduced, charging an additional fee to every gas metering point in the UK. These charges will directly fund the production and injection of green gas into the national grid. The scheme's peak, it is expected to increase domestic gas bill by just £4.80 per year.

However, as discussed in Q1, tariff rate schemes in the UK and Germany have been based on energy production, not carbon savings. Consequently, plants have sought to maximise the proportion of bioenergy crops within the feedstock mix and overlooked the treatment of manures and slurries. With Ireland's significant agri-food industry, DECC should ensure that all organic wastes are recycled to maximise carbon savings and energy production.

Q3: Do you agree that the obligation should apply to all non-renewable fossil fuels used for heating as set out above?

Agree.

The combustion of peat for heat should be banned immediately.

Q4: It is intended that electricity used for heating purposes and renewable/waste district heating systems would be exempt from this obligation, do you agree with this approach?

Agree.

Q5: Do you agree that the portion of fossil fuel input used in CHP plants to generate heat would be considered to be part of the obligation?

Somewhat agree.

Policy must incentivise the capture and use of the heat generated by CHP engines – failure to do so, wastes valuable heat energy. However, if the CHP is powered by fossil fuels, it is not generating renewable electricity or renewable heat. It is simply increasing the inefficient of energy generated from fossil fuels.

If the heat produced does count towards the obligation, its carbon intensity should be considered. If it only represents a 5-10% GHG reduction, for example, then its contribution to an energy supplier's obligation will be minimal. A benchmark could be set representing the emissions from the direct combustion of fossil natural gas – all other scenarios reflect emissions savings compared to this benchmark scenario.

Q6: Are energy suppliers the most appropriate bodies to become the obligated parties in the heat sector?

Agree.

Q7: Is the 400 GWh of energy supplied an appropriate level for a supplier to become obligated?

Agree.

Q8: Do you agree with the 2023 start date for the obligation?

As soon as possible – preferable 2022

Q9: In terms of the obligation rate, do you agree with the proposed initial level of obligation of 0.5%?

Agree.

Q10: In terms of ambition for a 2030 target, what level of ambition do you think is appropriate?

- 3% minimum
- 5% medium ambition
- **10% higher ambition**
- Other?

10% higher ambition

Urgent and rapid decarbonisation is required worldwide. All countries must be more ambitious.

As shown above (Q1), Ireland yields a high biogas potential. The IEA also estimates that Ireland could generate 153.8 MJ (42.7 TWh) of biomethane at full potential – enough to displace **85%** of Ireland's natural gas demand. The following graph, taken from IEA's Green Gas report[6] breaks down the feedstocks available to generate this energy:

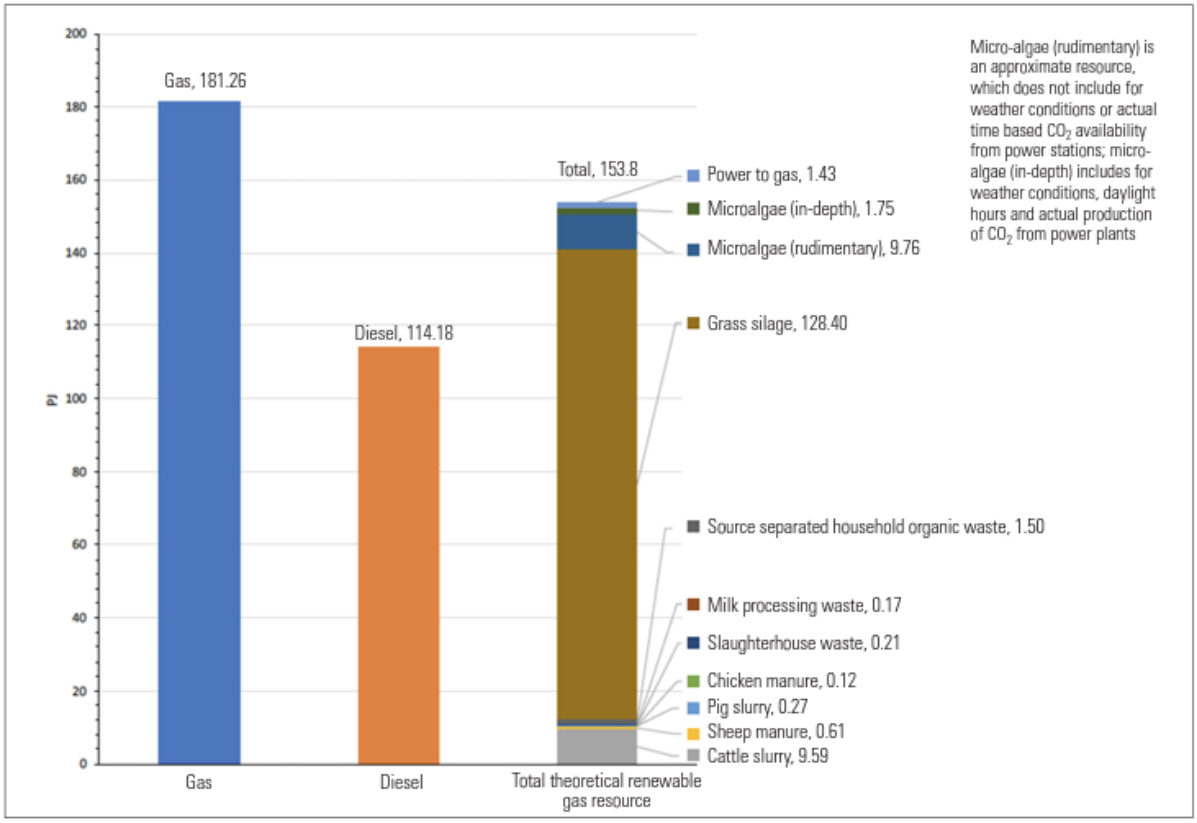


Figure 6.1 Ireland's total theoretical biomethane potential resource from identified feedstocks as compared to natural gas consumption and diesel consumption. Data on gas demand and diesel demand adapted from (Howley & Holland, 2016; O'Shea et al., 2016a; O'Shea et al., 2016b).

[6] https://www.ieabioenergy.com/wp-content/uploads/2018/04/green_gas_web_end.pdf

Ireland must be more ambitious. It holds the potential to be a world-leader in agricultural AD, recycling livestock waste and grass silage to generate renewable energy and biofertiliser. The latter returns nutrients and organic carbon to soils, regenerating soil health and productivity.

Targeting 1.6 TWh by 2030 (from a 3% obligation level) is just a small fraction of the biomethane potential in Ireland. A 10% obligation level could increase the generation of renewable heat to 5.3 TWh. This is also deliverable and still represents a small proportion of the full potential.

Moreover, it is important to consider the additional externalities of biomethane production. AD is a decentralised industry, creating jobs across the country and supporting investment into rural economies. Biomethane production also increases energy security, reducing Ireland's dependence on the import of fossil resources.

Q11: Do you agree with the first obligation period being multiple years 2023-2025 to give the industry time to develop supply lines?

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Q12: Once the first period 2023-2025 expires, do you agree with the obligation then becoming an annual obligation?

Agree – an increasing annual obligation drives deliverable and sustainable decarbonisation.

Q13: Do you agree with suppliers being able to trade credits in order to meet their obligation?

Agree
As previously discussed (see Q1), the WBA recommends that credits or certificates reflect the carbon intensity of fuel used, to optimise the carbon savings delivered from the scheme.

Q14: Do you agree with allowing 10% carry over of renewable credits to be used in the following year's obligation?

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Q15: What are the sustainable energy sources likely to meet the Renewable Heat Obligation at an obligation rate of (i) 3%, (ii) 5%, (iii) 10% by 2030?

Biomethane from AD is more than capable of delivering all the renewable heat for the scheme. It is a ready to use technology established worldwide. Ireland has the benefit of learning from other countries as they have scaled up their own biogas industries and implement new technologies capable of enhancing industry performance.

Again, when treating organic wastes, biomethane can generate carbon negative energy. It is critical that Ireland optimises the generation and use of these fuels if climate targets are to be accomplished.

Q16: Will there be enough sustainable indigenous supply to meet this demand?

Yes – see Q10.

Q17: Do you agree that for renewable fuel delivered directly to a consumer that this will be the point of supply?

Agree

Q18: Which option to you think should be applied for renewable energy that is indirectly supplied (e.g. via the natural gas grid)?

Option A

Energy suppliers utilising the gas grid can sell green tariffs to customers, where gas consumed can be accounted for via the purchase of renewable heat certificates. If the proportion of green energy supplied is below the obligation level, the supplier would need to purchase additional certificates, sharing this additional cost across all of its customers.

Q19: Do you think the costs set out above are reflective of likely costs?

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Q20: Are these costs reasonable to impose on consumers?

-

Q21: Do you agree with the intended position in relation to penalties for non-compliance?

-

Q22: Do you think the proposed obligation poses a significant risk to increased energy poverty?

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Q23: How best could the impacts on energy poverty be minimised?

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Q24: Do you agree with the outlined approach for additional support for green hydrogen?

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Q25: Do you think that offering multiple credits for green hydrogen in the heat sector might have unintended consequences for supply in other sectors such as transport?

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