REA response to DfE Developing Biomethane in Northern Ireland: Call for evidence.

The Association for Renewable Energy & Clean Technology (REA) is pleased to submit this response. The REA represents industry stakeholders from across the sector and includes dedicated member forums focused on green gas & hydrogen, biomass heat, biomass power, renewable transport fuels, thermal storage and energy from waste (including advanced conversion technologies). Our members include generators, project developers, heat suppliers, investors, equipment producers and service providers. Members range in size from major multinationals to sole traders. There are over 500 corporate members of the REA, making it the largest renewable energy trade association in the UK.

In addition to the GHG savings, Biomethane has a wide range of benefits. Russia's invasion of Ukraine and high energy prices have led to an increased emphasis on the importance of energy security. Given the progress made in decarbonising the electricity grid and higher conversion efficiencies, it makes sense for biogas and biomethane production to be recognised for its continuing ability to decarbonise transport fuels and the gas grid.

The REA welcomes the opportunity to provide evidence for developing biomethane in Northern Ireland. Having recently engaged in the DESNZ Future Biomethane Framework, the ability to have a framework that spans the whole of the UK was included within the call for evidence. The REA agreed that it was important that the opportunities to build the biomethane sector with ambitious targets, was extended to all UK regions. The particular circumstance in Northern Ireland means this is a relatively untapped resource for decarbonising the gas grid but with many potential deployment opportunities. In relation to this, having recently responded to the DESNZ consultation on the UK Emissions Trading Scheme (ETS), we also take the opportunity to highlight the need to include biomethane within the UK ETS – and the importance of support from the Devolved Administrations to achieve this. It would not only support the growth of the biomethane market by allowing this but also help unlock the decarbonisation of hard to abate sectors. The REA look forward to continuing to engage with the department on these and related policies.

Chapter 1: Design and scope of a new framework

Question 1: What are your views on the primary role that biomethane might play in supporting our path to net zero, e.g. decarbonising the gas network; sustainable transport fuel; for direct use by industry; other uses?

Biomethane has a wide range of benefits and is a significant tool in decarbonising the gas grid, renewable fuels and industry. There has already been significant progress and focus made in decarbonising the electricity grid. Biogas and biomethane production should be recognised for its ability to decarbonise transport fuels and the gas grid, as has already been the experience in the rest of the UK although with much ambition still to achieve. A zero-carbon gas grid can allow an easier and cheaper option for domestic heating and a greener choice for those that are restricted by alternatives such as electrification or economics.

Increasingly, even before the UK ban on diesel vehicles, alternative transport fuel opportunities have been considered. Although the domestic market favours electric vehicles (EVs), there are other fleet and heavy-duty cycle vehicles that require renewable fuel options where EV isn't suitable. These vehicles have initially turned to Hydrotreated Vegetable Oil (HVO). Although hydrogen is being considered where production and refuelling can be provided consistently, this is still relatively niche. Biomethane is a fuel that is already being used, and its use is expected to increase. The increase in the number of refuelling stations and new vehicle options such as the 5 and 6 axle Heavy Goods Vehicle (HGV) that are built to run on Bio-CNG are a testament to the change. Increasing biomethane use also benefits the agricultural sector, particularly those covered under the Non-Road Mobile Machinery (NRMM). On-farm anaerobic digestion (AD) deployment with combined refuelling options could also be important for decarbonisation and the circular economy.

There are already several projects within the UK where biogas is delivered direct to industry. This is particularly prevalent in food and drinks manufacturing such as whiskey distilleries and dairy production plants. The benefit is circular where feedstocks are also supplied by the industries waste by-products.

AD is the optimum treatment technology for many wet wastes. The digestate from wastes, residues and crops supports the circular economy by improving soil health and reducing the need for mineral fertilisers. Other technologies for biomethane production, such as syngas production from Advanced Conversion Technologies, are also compatible with circular economy and net zero ambitions. There is also potential in other strategies such as with the H2 Boost project in conjunction with dark fermentation[1] investigating hydrogen production as a pre-process to AD.

Question 2: What are your views on how the optimal use of biomethane might evolve over time, i.e. in the short-term (up to 2028); in the medium-term (up to 2035); and in the long-term (up to 2050 and beyond)?

Biomethane currently plays a crucial role in decarbonisation, particularly in sectors with limited low-carbon alternatives, such as high-temperature heating, petrochemical feedstocks, heavy-duty transport, and maritime shipping. While the gas grid remains essential in its current form, biomethane is the only viable option for decarbonising it. Although natural gas usage is expected to decline as electricity becomes more dominant, some gas will still be needed to achieve net-

[1] https://assets.publishing.service.gov.uk/media/649a97979e7a8b000c932be2/university-of-leeds-ph1-redacted-report.pdf

zero emissions. Over time, biomethane can help decarbonise the grid by gradually reducing the proportion of natural gas and potentially replacing it entirely post-2050.

There has been significant interest in using hydrogen as a replacement for natural gas, including plans to blend hydrogen into the existing gas grid to provide flexibility as the hydrogen network expands. However, due to slower-than-expected progress in hydrogen infrastructure, there has been a renewed focus on biomethane.

Biomethane usage is growing in heavy-duty transport, especially for those seeking to transition their fleets now, given the limited availability of hydrogen technology and concerns about using hydrotreated vegetable oil (HVO). Organizations like Zemo have increasingly supported biomethane as a viable option for heavy-duty vehicles, particularly HGVs[2]. Biomethane producers under the Renewable Heat Incentive (RHI) and Green Gas Support Scheme (GGSS) programs have had the flexibility to inject biomethane into the grid and use it as renewable transport fuel under the RTFO. This flexibility supports the development of multiple applications for biomethane, reducing the risk of stranded assets as market demands evolve.

Additionally, AD production presents a significant opportunity to decarbonise agriculture. Individual farms can manage local waste and generate biogas for various uses, offering similar benefits on a smaller scale alongside the production of nutrient-rich digestate. In areas with limited grid access, conversion through Combined Heat and Power (CHP) systems for electricity under the Northern Ireland Renewable Obligation (NIRO) is a common method. There is also potential for cooperative biomethane injection and collection, along with its use for heat generation and fuel, which aligns with ambitions to provide community heat through networks.

The flexibility of biomethane is one of its key strengths, allowing it to adapt to market needs. As the gas grid evolves, potentially shifting towards more electric or hydrogen-based systems, regional demands may change as we approach 2030, 2040, and 2050.

Question 3: Do you think we should set an annual production target for biomethane? If so, on what should the target be based?

Production targets are essential for driving progress and emphasising the significance of the sector. In the case of biomethane, targets like the EU's 35 bcm by 2030 provide a clear, measurable goal, enabling periodic review and action to ensure progress. However, long-term investment in biomethane is currently hindered by uncertainty about its future, particularly regarding the gas grids. In the UK, the Biomass Strategy's estimate of 30-40 TWh by 2050 sets some ambition, but without a formal target, there is no guarantee that the UK will support biomethane production in the long term, especially if subsidies are phased out. There is also a risk that the UK could fall behind Europe, which has already set a biomethane target.

Feedback from industry members shows broad support for introducing a production target for biomethane. The key question is what that target should be. Many believe that the 30-40 TWh by 2050 estimate is both conservative and unambitious. Given the timelines in the current Call for Evidence, there is hope that, if a decision is made to pursue a target, further consultation will occur to determine an appropriate level based on solid evidence. Recent reports on potential biomethane production offer varying estimates. For example, the ADBA previously suggested a target of 57 TWh, while more recent predictions go as high as 100 TWh, especially when rotational crops are included in feedstock allowances. Other reports, such as one commissioned

[2] Section 4 of https://www.zemo.org.uk/assets/reports/Renewable%20Fuels%20Guide%202023.pdf

by Grissan and ongoing research by the REA in collaboration with Imperial College, aim to provide a realistic estimate of biomethane volumes up to 2050 to inform the next Carbon Budget. Some evidence suggests that a Biomethane Grid of 250-300 TWh per year could be sustained by combining gasification, AD, and imported Renewable Natural Gas. With such a range of figures, there is a clear need for consistency and a realistic yet ambitious target that considers competing sectors and all relevant factors (including feedstock and landbank for digestate).

Rather than proposing a specific target volume or defaulting to the Biomass Strategy's figures, it would be more effective to establish a cross-industry workshop involving key stakeholders and DESNZ to agree on a suitable target.

It is also important to note the surge in hydrogen projects and the increased interest that has resulted from clearly defined hydrogen targets, funding, and business models. This highlights how government support and clear ambitions can stimulate sector growth. Biomethane could similarly benefit from a combined green gas target, alongside hydrogen.

Europe's Biomethane Action Plan could serve as a model, and the UK might consider developing a similar plan as part of setting a biomethane production target. This plan could consolidate all relevant strategies into one document and link to the broader framework.

Finally, there is the question of whether Northern Ireland should set its own production target, regardless of any new UK-wide target. Given Northern Ireland's limited biomethane production compared to the rest of the UK, (no biomethane was injected into its gas grid until 2023 with the connection of Granville Eco Park project in County Tyrone), setting a target might be more feasible, especially given the existing expertise and knowledge in this sector.

Chapter Two

Question 4: How would you propose to increase the proportion of domestic and commercial biodegradable food waste diverted from landfill to AD plants?

The generation of food waste should be minimised wherever possible, and continued support should be given to the programmes promoting food waste minimisation and re-distribution.

For unavoidable food waste, implementation of a food waste collection service accessible to all residents alongside a requirement for businesses to separately collect food waste, ensures the greatest capture of food waste, allowing it to be recycled while also diverting it from landfills.

In Northern Ireland, nearly eight in ten residents (78%) use a food waste service, and areas where this service has been fully implemented have seen significant increases in the volumes collected. WRAP statistics indicate that public attitudes toward food waste are largely positive, with 91% of Northern Ireland citizens agreeing that recycling food waste is their responsibility[3]. This reflects broad support for food waste collection services.

However, figures from WRAP[4] also show that almost a third of the average residual waste bin in Northern Ireland is still made up of food, most of which could've been eaten. There is therefore potential for further improvement of food waste collections to increase the diversion of this food waste into AD.

[3] https://www.wrap.ngo/resources/report/recycling-tracking-survey-northern-ireland-2023-report
[4] https://www.wrap.ngo/media-centre/press-releases/new-data-shows-northern-ireland-households-are-throwing-out-food-they

There needs to be some responsibility for Local Authorities to design their collection system to ensure the quality of material collected is suitable for recycling. Quality is an on-going issue and there needs to be more focus on ensuring there are adequate resources available for education and communication campaigns to change citizens' behaviour and ensure there are high performing food waste collections, both in terms of the amount of food waste that is captured, and in terms of the quality of the material (i.e. lack of contamination).

Education is the single biggest factor for increasing the recycling of food and garden waste and improving the quality of materials collected. It is essential that this is delivered on an on-going basis, not just during the roll-out of changes, to ensure long-term awareness of what materials are accepted. Studies[5] have demonstrated that education programmes, along with the correct tools (i.e. kitchen caddies and liners for food waste) have resulted in increased capture rates, lower levels of contamination and a reduction of food waste in the residual bin. Therefore, REA strongly encourages proper funding for effective education and communications about appropriate recycling practices.

The REA strongly supports the rights of LAs to choose what type of food and garden waste works best for their local circumstances. The priority should be maximising the amount of biowaste that is separately collected. We do not believe that separate collections of food and garden waste are necessary for building an environmentally and economically efficient organic waste recycling industry in Northern Ireland.

Separate food waste collections (i.e., separate from garden waste) may be appropriate for some areas but this should not be seen as the only option. We believe councils should be empowered to make their own decisions based on their circumstances. This will enable individual LAs to take account of their own contractual situations and the end technologies associated with the recycling of organics in their areas. We are aware of examples where co-mingled food and garden waste collections result in food waste tonnages comparable to the estimated tonnage from separate food waste collections. These include East Riding of Yorkshire, Manchester, Stockport, Rochdale, and Trafford. There are also examples of LAs with top 20 overall recycling rates who offer co-mingled food and garden waste collection. This is why local decision making is important. High recycling performance and achieving the overall policy objective of diverting food waste from the residual bin should be the priority, leaving the approach to be decided by individual LAs.

In the DAERA 'Rethinking our Resources' consultation,[6] REA supported four additional proposals that could increase the proportion of domestic and commercial biodegradable food waste diverted from landfill to AD plants and improve the quality of digestate produced via AD.

First, we supported the proposal to allow LAs to levy fixed penalty notices when householders place the wrong materials in waste and recycling bins as long as any penalties introduced are pre-dated by well-constructed, thoughtful education and communication to householders about their responsibility to dispose of their waste correctly.

Second, the proposal to restrict the capacity of residual waste for average households to 90 litres per week. As people recycle more, they require less residual waste capacity. Evidence from WRAP[7] indicates that where residual waste capacity is restricted, recycling services perform better. For the successful delivery of restricted residual waste capacity, LAs should be required to

[5] https://www.r-e-a.net/compostable-coalition-uk-unveils-successful-consumer-behaviour-trial-with-compostable-packaging/
[6] https://consultations2.nidirect.gov.uk/daera/rethinking-our-resources/
[7] https://static.wrap.org.uk/consistancy/Learn_more_about_the_evidence.pdf

measure and report the amount of food waste that remains within the residual waste stream. This will help Northern Ireland understand how successful the restriction and associated changes to food and garden waste recycling have been and identify what additional support may be needed to improve household recycling behaviours.

Third, mandatory reporting for food surplus and waste by businesses will also help to target actions to increase diversion from landfill. We would like as many businesses as possible to analyse and report their food waste data, as a requirement to report would mean businesses are measuring food waste. The measurement of food waste makes it more visible and allows for more effective actions to reduce it.

Finally, we supported the proposal for supplying liners for kitchen food waste caddies and kerbside food waste bins to householders. It is well known that this increases the amount of food waste that is separately collected, diverting more organic waste from residual waste bins. Householder surveys carried out by WRAP in 2008-2009[8] suggests that participation in food waste recycling would be significantly affected if supplies of free liners were removed and residents were required to purchase liners from retailers. More recent research from WRAP found that householders without ongoing or adequate liner supplies tended to stop participating in food waste recycling. REA supports evidence-based guidance on caddy liner material types.

REA also responded to a separate consultation on nearly eliminating biodegradable waste from landfills.[9] While the final decisions are still pending, this could further reduce landfill use. It is important to note that many local authorities and larger waste management companies may have existing contracts to dispose of waste through Energy from Waste (EfW) plants. Thus, while a landfill ban might be helpful, it may not fully address the issue.

Question 5: Do you believe farmers should be encouraged to produce grass silage for AD plants to produce biomethane? If so, how?

Some reports[10] suggest that using grass as a feedstock for AD could be a more sustainable option compared to energy crops. This is because cutting and regrowth of grass lead to less disturbance, reduced erosion, minimal or no fertiliser use, and lower greenhouse gas emissions. Additionally, fuel consumption may be lower for cutting grass compared to harvesting energy crops.

One advantage of using grass is that it does not require changes in land use, as it can be grown on existing grasslands, avoiding competition with food production. However, it's important to assess whether this practice would represent a change in land use. It should also be noted that the biogas yield from grass is lower than from first-cut silage, which is comparable to some energy crops and food waste, meaning more grass would be needed to produce the same amount of biogas. Nonetheless, grass silage can still be a viable feedstock if there are no significant changes to the input mix over a short period.

Moreover, the AD industry has been increasingly collaborating with farmers to promote regenerative[11] farming practices, including:

- Minimum tillage
- Diverse rotation
- No bare soils (cover and break crops)

[8] https://www.wrap.ngo/resources/guide/household-food-waste-collections-guide, Section 4.2
[9] https://www.gov.uk/government/consultations/near-elimination-of-biodegradable-waste-to-landfill
[10] https://www.ecotricity.co.uk/our-green-energy/green-gas-mills-fact-sheet
[11] https://www.futurebiogas.com/farming/

- Return of nutrient and organic matter

These practices also focus on enhancing soil carbon sequestration using organic matter. While grass feedstock could be part of a sustainable solution, it is not likely to be the sole solution.

Question 6: Should farmers be encouraged to participate in the widescale separation of slurry to produce feedstock for AD? If so, how can farmers be encouraged to separate their slurry?

On-farm AD plants play a crucial role in decarbonising agriculture. They are effective in utilising feedstock, such as manures and slurries to generate biomethane as well as nutrient-rich digestate, instead of directly spreading slurry to land. They also contribute positively to the social acceptance of AD.

The National Non-Food Crops Centre (NNFCC) describes the advantages to capturing slurries and manures for AD rather than land spreading, "In the UK an estimated 90 million tonnes of manures and slurries are generated each year. These are generally used on the farms where they arise, recycling the nutrients that they contain … The Nitrate Vulnerable Zone (NVZ) Regulations[12] mean that many organic manures cannot be spread in certain periods of the year and must be stored for an extended period before being land spread as fertilisers. There is potential for AD to be used in this situation to capture methane from stored slurries and manures, and also to stabilise and treat these materials."[13]

The geographical distribution of farming in the UK means that large herds are often not located near arable farms. Chicken manure, with its relatively high dry matter content, is gaining interest as an AD feedstock. However, using it in large quantities can disrupt digester biology, although mitigation strategies are available, and some plants are successfully processing this waste stream. The growing interest in chicken manure has driven up its price, potentially making it too costly for some projects. Developers may need to explore alternative waste streams, such as food production residues, though environmental permits or planning consents may impose restrictions.

The biogas yield from slurries and manures is significantly lower than from most other feedstocks, making it difficult to achieve commercial viability with manure alone, especially with pig and cattle manure (see Biogas Yields and Feedstock Productivity table).[14] However, manures and slurries remain significant waste sources that, if not properly managed, pose environmental risks, including methane emissions from slurry storage. The Environment Agency (EA) is addressing this issue through consultations on biogas capture from slurry lagoons[15] and targeted methane emissions reductions initiatives,[16] supported by an inquiry through the UK Parliament's House of Lords.[17]

Manures and slurries are commonly used as AD feedstock, particularly in on-farm plants where they make up a high percentage of the input. For larger, more commercial projects, however, they are unlikely to be sufficient as a sole source of feedstock. The biggest disincentive for

[12] https://www.gov.uk/nitrate-vulnerable-zones
[13] https://www.biogas-info.co.uk/about/feedstocks/
[14] https://www.biogas-info.co.uk/about/feedstocks/
[15] https://www.gov.uk/government/consultations/environmental-permitting-standard-rules-consultation-27
[16] https://www.gov.uk/government/publications/environment-agency-methane-action-plan/environment-agency-methane-action-plan-2024-to-2026
[17] https://www.parliament.uk/business/lords/media-centre/house-of-lords-media-notices/2024/march-2024/methane-inquiry-launched-by-lords-environment-and-climate-change-committee/

farmers is the cost of collecting, sorting, and transporting these materials. A significant revenue stream or tax incentive could encourage a shift in practice, proving more effective than penalties.

Question 7: How do you believe digestate from AD should be managed to assist in dealing with the excess nutrient issue in Northern Ireland?

While digestate is an excellent source of readily available nutrients, it is primarily produced as a liquid, which presents challenges in terms of storage, transportation, and spreading. It is essential that digestate is managed properly to maximise the benefits of nutrient application and minimise the risk of emissions from the application. The cost of transporting digestate has risen due to increasing fuel prices, higher staff costs, and growing demand. Digestate should only be spread on land when crops need the nutrients, necessitating storage until the appropriate time for application. However, building new storage facilities is expensive and requires planning permission. Government support for the building of new stores, alongside streamlining the planning system would help to ensure that there is adequate storage for digestate available, and that it can be used when it is needed and not cause issues with excess nutrient application.

Spreading digestate should be done using low-emission equipment, which farmers may need to hire or contract out, adding further expenses. Although further processing of digestate could mitigate some of these issues, it incurs additional costs and faces regulatory challenges, as such further processing is not yet recognized in the AD Quality Protocol (QP). Moreover, the current market value of digestate may not justify the investment in further processing. Producing dried digestate is another option, but it is only cost-effective if the material holds sufficient value.

While digestate can provide readily available plant nutrients and act as effective fertilisers, it is not always the best option for every circumstance. Composts provide valuable organic matter that can rejuvenate soils, and dry-AD provides an alternative organic recycling method that produces biogas without the significant liquid digestate output found in wet-AD. Both composting and dry-AD use co-mingled food and garden waste as feedstocks. These recycling processes are equally important as wet AD in Northern Ireland's move towards a circular economy and healthier soils.

Excess nutrients can cause environmental problems, especially when they leach into watercourses. This runoff can stem from incidents of over-fertilisation or poor land spreading practices. However, digestate has a lower biological oxygen demand compared to untreated manure, making it a more uniform and easily calibrated fertiliser. Nutrient management practices must consider the specific characteristics of the area, such as soil type, rainfall levels, and land use and should be based on advice from a qualified professional.

Areas prone to nutrient problems should be part of a nutrient neutrality remit, assessing how soil and land behaviours impact nutrient leaching and runoff. For example:

- Total nitrogen is a concern in areas with freely draining soils, high rainfall, and heavy nitrogen usage.
- Total phosphorus is a concern in areas with impermeable soils, high rainfall, and where soil erosion or high phosphorus levels are present.

These factors not only influence how fertilisers and digestate should be applied but also affect crop selection. For instance, maize, a common energy crop for feedstock, can exacerbate soil erosion in certain regions.

Other considerations include topography, weather patterns, and the use of land breaks and natural barriers. There has been some research on these issues, such as work done by our member Anna Becvar from Earthcare Technical (admin@earthcaretechnical.co.uk).

Chapter Three

Question 8: Are there any other feedstocks/feedstock blends which we should model and analyse?

The industry is well-established and has already identified the optimal feedstock types and mixtures. Additionally, sustainability criteria set by subsidy models like the GGSS, and the Renewable Transport Fuels Obligation (RTFO) determine which feedstocks are eligible, making them a useful reference for comparison.

As previously mentioned, chicken manure is currently a feedstock of interest due to its relatively high dry matter content. While using chicken manure in large quantities can disrupt digester biology, effective mitigation strategies exist, and some plants have successfully processed this waste stream. Similar considerations apply to grass. However, operators generally aim to optimise biogas yield from the available feedstock, especially when compensation is based on production volume.

Given that studies on optimal feedstock mixtures exist, it would be beneficial to access these resources. Specific information can be obtained from operators, but members like the NNFCC are also recommended for their expertise and reporting on feedstock.[18]

There is also growing research on the best crops for specific conditions. For example, Miscanthus, a hardy perennial, is fast-growing, high-yielding, and can thrive on marginal land, poor soil, or slopes. It competes with other short rotation coppices like willow and cereal straw but offers higher biomass yields. Thus, it is important to assess crops based on both land suitability and yield potential.

Another critical point concerns the feedstock mix. The GGSS and the earlier RHI set a requirement that at least 50% of the feedstock must be waste to qualify for payments, with reconciliation enforced if this ratio is not met. This requirement has posed challenges, particularly where waste feedstock availability has been limited due to delays in implementing the Simpler Recycling mandate. While ensuring that food waste is directed to appropriate treatment facilities is important, it may not be practical to impose overly stringent limits, given geographical variations in waste availability.

If so, please provide any available data which might assist with modelling of the costs and revenues for biomethane production from these feedstocks.

As previously mentioned, extensive studies have been conducted on this topic and we recommend looking into existing resources. Operators can provide more specific information as this request reaches them, but we also recommend consulting our members, such as the NNFCC, for their expertise and detailed reporting on feedstocks. Their resources are particularly useful for anyone seeking in-depth information on this subject.

Question 9: Do you think the development of the local biomethane sector should be based on large-scale, centralised AD plants? Why/why not?

It is accurate to suggest that the uptake of projects under the UK's current GGSS has been limited. However, this does not truly reflect the ambitions of the sector. Evidence supporting this claim was provided during discussions on extending the scheme's closing date. It is important to note that new projects generally need to be of a certain scale to maximise returns due to

[18] https://www.nnfcc.co.uk/feedstocks

economies of scale. Current barriers, such as planning delays and objections, supply chain issues, and the costs and limitations associated with gas grid injection, make it increasingly likely that only larger organizations can proceed with new projects.

For new plants at agricultural sites, justifying the choice of location becomes challenging, especially if the feedstock used is not sourced from local agriculture. Additionally, obtaining assurances of supply at the levels required by funders before a digester is constructed, is difficult. This gives developers who control these materials a considerable advantage over the rest of the market. It is no coincidence that new applications to the GGSS, excluding those that previously applied for an RHI tariff guarantee, were dominated by projects from a single such developer.

Economies of scale and proximity to CCUS facilities may also limit smaller or single-plant operators. While most new plants are being designed with the option of carbon capture, not all are in the same position as Future Biogas with their Carbon Harvest project, which captures, liquefies, and transports CO2 to geological storage. Therefore, short-term solutions are being considered due to the significant GHG savings compared with using fossil gas. Capturing and utilising CO_2 is also preferable to venting.

Despite these challenges, there are significant advantages to incentivizing small-scale and on-farm AD. These facilities can treat wastes that are not typically captured or treated by larger AD plants and can address some environmental impacts when these materials are left untreated. There has been a notable decline in similar-scale plants since the Feed-in Tariff (FIT) closed to new applications. Wet manures, while having relatively little value as biogas feedstock, would need to be sourced from large herds or transported over long distances to make a substantial contribution. This approach is undesirable due to its GHG impact and is unlikely to make economic sense given haulage costs. Additionally, the waste-to-crop mix required under the GGSS has proven difficult for farm-based projects to achieve, particularly the 50:50 ratio, as this would necessitate importing feedstock.

A key aspect of the Future Biomethane Framework consultation focused on the need for effective management of sustainability criteria to support a new mechanism. This included assessing feedstock availability, not only to ensure sufficient supply for the project but also to consider local production and collection. Digestate management was also a consideration. Therefore, careful thought may be needed before imposing size restrictions on plants and in determining how the support mechanism is structured, similar to the size banding used in the current Northern Ireland Renewables Obligation (NIRO).

Question 10: In your view, might adoption of a co-operative model contribute towards growing the local biomethane sector? If so, what are your views on the optimal model?

The REA supports exploring additional models that would facilitate the inclusion of smaller biogas or AD plants. The optimal model will depend on the specific circumstances in each area, with local biogas and AD operators being best positioned to offer advice.

Cooperative arrangements have a proven track record, particularly in agriculture, such as with dairy cooperatives. This model could be used as a comparison. A cooperative model where smaller operators supply feedstock to a central plant for processing and distribution is familiar to the sector. However, the cost difference between this model and the high capital (CAPEX) and operational (OPEX) costs of an AD plant is unclear, and it is uncertain how feasible this model

would be. There may be potential synergies in supplying heat and energy directly to a dairy processing plant.

As previously mentioned, both cooperative models could be viable if the investment terms are suitable for all parties involved. In the first model, where a central plant sources feedstock from smaller operators or farms, the investment required would be more significant than the typical gate fee for feedstock supply.

Pooling resources to operate a single plant can offer advantages, such as economies of scale and more consistent input feedstock. Individual farmers might be hesitant to undertake an AD plant due to the complexity of the support mechanisms and paperwork, making tax incentives a more attractive option. However, it is noted that a significant percentage of current plants in Northern Ireland are farm-fed, with approximately 70% classified as medium-sized.[19]

Deploying numerous smaller sites may not be as preferable due to cost concerns. However, a single injection point might be feasible, especially if transitioning from existing electricity and heat plants under the RHI and NIRO, where gas grid connections may pose challenges. There are examples in the rest of the UK where such setups have been implemented, although there have been delays in payment allocations under the NDRHI due to metering complications. OFGEM is aware of these issues, so clear guidelines from the outset would be advisable. We can advise members who have experience in this area, both as shippers and consultants.

Question 11: Do you agree with the above findings on costs and revenues for an AD biomethane plant? Do you have any data which would indicate different outcomes and, if so, could this be shared with DfE?

As a trade association representing members across various production methods, we are concerned that producing accurate costings within the timeframe of this Call for Evidence may not be feasible for reliable financial decision-making. Given that the Department for the Economy (DfE) has engaged directly with trade representatives, they are likely in a better position to address commercial sensitivity issues and build a more accurate financial picture. Nevertheless, we are available to consult further on any specific technologies or additional information if needed.

Question 12: Are there other costs or revenues that DfE should consider in its financial modelling? If so, what are they?

It is widely recognized that AD plants face relatively high capital and operational expenditures, making the deployment of new facilities less likely without financial incentives. These challenges have been exacerbated by rising costs due to high inflation and supply chain issues stemming from Covid and Brexit. Despite the introduction of the GGSS, the deployment of new plants has significantly declined compared to the period under the FIT and RHI. This decline is partly because the GGSS has primarily targeted large-scale plants due to economies of scale, while smaller plants have been disincentivised. Additionally, barriers related to gas grid connections, such as propane requirements, grid capacity, and uncertainties about the future of the gas grid, have been noted by the industry.

Issues such as excessive and inconsistent calorific values (CV), and what some members view as unnecessary propane requirements (not aligned with EU standards), not only increase operating

[19] https://www.nnfcc.co.uk/publications/report-anaerobic-digestion-deployment-in-the-uk-24

costs but can also affect injection capabilities, increase the need for flaring, and impact overall system GHG savings, especially if fossil-derived propane is used.

Capacity concerns have led to discussions about injecting into the transmission system (NTS) rather than the distribution network (GDN) and exploring solutions like reverse compression. Efforts are underway, such as the ENA's Gas Goes Green program,[20] to investigate how biomethane can be integrated and managed within gas networks, which may be converted to hydrogen in the future. However, there is concern about the perceived future of the gas grids, which may deter investors in both network infrastructure and production plants, given conflicting messages from reports like the National Infrastructure. [21]

Furthermore, the increased support for hydrogen production may have shifted investment away from biomethane projects. This shift is partly because hydrogen production models, which often work independently of biomethane, might be more incentivised, leading to competition for investment. Similar concerns apply to gasification plants, where incentivised hydrogen models could be drawing investment away from biomethane projects.

Question 13: What are your views on the level of return on investment (in percentage terms) necessary for an AD biomethane plant to appear attractive to a producer or investor?

As a trade association, we are concerned that the cost estimates produced within the given timeframe for this Call for Evidence may not be accurate enough for financial decision-making. We believe the DfE, having consulted directly with the trade, is better positioned to provide a clearer picture. Additionally, speaking with project developers and suppliers may offer more reliable information.

Historically, the guaranteed income period for AD plants under previous models has significantly reduced deployment risks. These schemes have typically lasted 15-20 years, matching the plant's lifespan. However, some plants have faced difficulties due to unforeseen changes during the contract period, such as shifts from receiving a gate fee for feedstock and digestate to having to pay for disposal. The rising costs of energy and operational expenses, while affecting many industries, can be particularly restrictive when only a set unit rate is received. Additionally, some UK plants have faced unexpected increases in business rates due to regulatory changes, leading to backdated payments and ongoing negotiations that place substantial financial pressure on these plants.

There are potential future revenue opportunities from additional sources. Changes in how digestate is valued could be significant, provided it is managed appropriately. The value of Green Gas Certification, among other factors, is discussed further in Q15. Once a viable income stream from biomethane, by-products (including CO_2), and carbon accounting is established, the sector could consider moving towards a less subsidised model with reduced risks. For example, our member Future Biogas has adopted this approach with a long-term biomethane supply contract with AstraZeneca.[22]

[20] https://www.energynetworks.org/work/gas-goes-green
[21] https://nic.org.uk/studies-reports/national-infrastructure-assessment/second-nia/
[22] https://www.futurebiogas.com/astrazeneca-partners-with-future-biogas-to-deliver-net-zero-target/

Question 14: In your view, could digestate and/or biogenic CO2 be developed as viable income streams to support the economics of biomethane production? Can you provide any data on potential costs and revenues?

Biogenic CO_2

Previously, food and drink manufacturers could obtain CO_2 as a by-product at a very low cost through various routes, which hindered market competition. However, global events have reduced some of these routes, such as those through fertiliser production. Biomethane production now offers a valuable, domestic, and carbon-neutral source of CO_2 for these markets, potentially creating an initial market incentive for capturing and processing CO_2 for resale.

Food safety remains a top priority, and plants are required to conduct a Hazard Analysis and Critical Control Points (HACCP) assessment to manage risks from feedstocks through to processing and delivery. Recent years have seen significant work in qualifying new feedstocks, such as manures, in addition to the original crop-based materials used since around 2016, following the approval of AD in global standards. However, this area remains complex and is largely self-regulated. Producers face challenges in understanding long-term CO_2 pricing and how markets for existing uses, storage, and emerging markets like e-methanol and e-SAF will develop. Recent volatility in traditional CO_2 markets in Great Britain, along with potential fluctuations between under-supply and oversupply, could impact the growing AD and biomethane market in Northern Ireland.

Most new AD plants will incorporate carbon capture in their permit applications. Currently, in England, the EA's permit guidance requires all CO_2 to be processed to food grade, limits storage to 150 tonnes, specifies an 80% capture rate, and may also require additional permits or permit variations. These requirements add costs that must be considered.

Carbon sequestration, particularly through BECCS (Bioenergy with Carbon Capture and Storage), is a focus, with long-term geological storage options available. However, access to these sites is currently limited, especially for plants without direct pipeline connections to Track 1 and 2 clusters. Plants like Future Biogas (Carbon Harvest) are exploring options as far afield as Norway, while short-term routes are also being considered. Despite the development of business models, there is uncertainty due to permitting and policy decisions. Dates for some storage projects are projected between 2026 and 2030, but there is little confidence in these timelines or clarity on reward mechanisms, making it difficult for AD plants to make investment decisions.

While carbon removal offers benefits, the logistics of capturing, storing, compressing, and transporting CO_2 can limit long-term storage options in favour of short-term uses like food and drink grade manufacturing or construction. These logistics add significant costs beyond those for upgrading processes required for biomethane production. Currently, sites routinely vent CO_2, which, although carbon-neutral, has potential value if captured and stored. New sites or expansions could be conditioned on the ability to capture and store CO_2, even if initially just carbon capture ready.

The impact of COVID-19 on sources of food-grade CO_2 from fertilizer by-products has reduced overall supply and value, with some production plants closing. Biomethane production could

provide a useful biogenic CO_2 source for these markets. As BECCS routes are established, more options and availability will emerge. However, concerns remain that Biomethane BECCS may struggle to compete unless measures are in place to ensure a level playing field.

Local CO_2 grids and central collection points for geological storage could open opportunities for more plants to access BECCS, given the reported 78 billion tonnes of carbon storage capacity in the UK. Members support capturing and effectively using or storing CO_2, but access to routes and financial burdens will be key factors. The recent consultation on non-pipeline transport[23] addresses some of these issues and could benefit many AD plants and similar industries, depending on the outcome.

Digestate

The value of digestate is often under recognised in the market, despite the high value of the readily available nutrients and the associated costs of storage, haulage, and spreading can make recycling digestate economically challenging for producers. There is potential for further processing of digestate which can help to overcome some of the issues (such as haulage and spreading of large volumes of liquid). However further processing also comes at a cost and may require additional infrastructure, equipment and modification of planning and permits, all of which can hinder further processing of digestate. To address these issues, there is a need for incentives and support to promote the use of digestate over mineral fertilisers or peat-based products. One suggestion from the NFU is to enhance the recognition of the biofertiliser standard (PAS110) within the Environmental Land Management Scheme. The revision of the Anaerobic Digestion Quality Protocol (AD QP) is in progress, and we encourage the Northern Ireland Environment Agency (NIEA) to continue to support this end of waste position.

Due to the consistent process of AD, digestate is produced even when land spreading is not suitable, often due to weather conditions. Currently, there is little incentive for additional treatment of digestate—such as dewatering, thickening, pressing, pelletisation, or evaporation—partly because of permit constraints[24] limiting on-site storage to temporary measures and also restrictions on further processing in the AD QP. If digestate were more valued for its benefits in nutrient management, diffuse water pollution control, soil health enhancement, and soil carbon storage, a consistent market for such products could develop, making additional treatment more feasible.

The potential revenue from digestate varies based on several factors, including its quality, certification with End of Waste rules (PAS110 and the AD Quality Protocol), market geography, the extent of further processing, the availability of other organic materials, and existing incentive schemes.

Digestate quality largely depends on the feedstocks used for AD. While upcoming reforms may increase food waste availability as feedstock, issues with physical contaminants (PCs) persist. Although AD operators have technology to remove most PCs during waste treatment, it is not

[23] https://www.gov.uk/government/calls-for-evidence/carbon-capture-usage-and-storage-ccus-non-pipeline-transport-and-cross-border-co2-networks/ccus-non-pipeline-transport-and-cross-border-co2-networks-call-for-evidence
[24] https://www.gov.uk/government/publications/sr2021-no-10-anaerobic-digestion-of-non-hazardous-sludge-at-a-waste-water-treatment-works-including-the-use-of-the-resultant-biogas/sr2021-no-10-anaerobic-digestion-of-non-hazardous-sludge-at-a-waste-water-treatment-works-including-the-use-of-the-resultant-biogas

always perfect, leading to additional costs and water usage for washing and processing the contaminants. In addition, PCs removal drags adhered biowaste out of the process or drives extra costs and water usage for washing the removed PCs and drying them and for feeding the washings onwards for digestion. Therefore, preventing contamination at the point of disposal is incredibly important for maximum digestate yield and for producing quality digestate that can be safely applied to land for soil health benefits. The International Solid Waste Association (ISWA) report on 'Preventing and Managing Contaminants in Organic Waste Recycling' includes a 'Contaminant Management Hierarchy' which is useful for understanding (1) the importance of reducing organic waste contamination and (2) the preferred steps for reducing contamination. They recommend careful selection of feedstocks, separate collections, and targeted communication and education for waste producers as the most effective steps for contamination prevention.

The nutrient composition of digestate can vary widely due to differences in feedstock types, geographic location, and seasonal variations. Whether digestate is separated or further processed also affects its nutrient concentrations. Ongoing research on digestate nutrient quality is essential for understanding its role in meeting nutrient neutrality requirements. Ensuring that digestate's nutrient quality is suitable for its intended use and clearly communicated to end-users is key to building market confidence. Research that opens new markets for digestates, such as those derived from specific feedstock types, could enhance revenue opportunities for AD operators.

Certification of digestate compliance with End of Waste (EoW) criteria and communicating the benefits of using digestate in soil applications are crucial for building market trust and ensuring consistent quality. Certified digestate must meet the minimum quality standards set by PAS110, be 'fit for purpose' according to agreed quality limits and be produced under a quality management system at the AD facility. Support from Biomethane Frameworks could help AD facilities produce high-quality, EoW-compliant digestate.

Market geography also affects digestate revenue. The distance between AD plants and potential markets impacts transportation costs, which can make digestate recycling more expensive. Regulatory requirements for land application of digestate vary by region, leading to unequal regulatory costs for AD plants. Demand for digestate can also be influenced by regional factors, such as the presence of an organic farming community or consumer demand for sustainably produced food. To improve revenue potential, future frameworks should ensure regulatory consistency, invest in market analysis, and develop strategic partnerships to reduce transportation costs.

Further processing and agricultural incentive schemes can enhance digestate profitability. Converting digestate into products like pellet fertilisers, granulated fertilisers, or aerobically matured separated fibre can expand market opportunities. Sustainable farming incentives that promote the use of digestates and composts as fertilisers and soil conditioners can drive demand and increase revenue potential. Reports, such as those from the WRAP DC Agri project[25] and the recent POSTnote on the future of fertiliser use,[26] highlight the environmental and

[25] https://wrap.org.uk/resources/report/digestate-and-compost-agriculture-dc-agri-project-reports.
[26] https://post.parliament.uk/research-briefings/post-pn-0710/#:~:text=Fertilisers%20are%20a%20key%20component,the%20use%20of%20artificial%20fertilisers.

economic benefits of replacing artificial fertilizers with organic alternatives like digestates and composts.

As a trade association, we are concerned that cost estimates provided within the timeframe of this Call for Evidence may be inaccurate for financial decision-making. We believe that DfE's direct consultations with trade representatives will provide a clearer picture. Alternatively, consulting with project developers and suppliers may offer more reliable insights.

Question 15: What other income streams or future revenue streams might be considered? Can you provide data on potential costs and revenues from any other revenue streams?

The potential for additional revenue streams in the biomethane industry has been limited by feedstock uncertainty and gate fees, which similarly affect digestate and CO_2 capture. These issues will be explored in greater detail in later sections. It is important to note that the industry has struggled to generate substantial additional income beyond the revenue from gas injection or electricity and heat production.

One notable exception is the Green Gas Certificates (GGCS/RGGO), though their contribution has been modest, and the scheme is not yet included in the UK ETS. The Green Gas Certification Scheme (GGCS), managed by REAL—a subsidiary of REA—oversees certification for compost (Compost Certification Scheme, CCS) and digestate (Biofertiliser Certification Scheme, BCS) to demonstrate end-of-waste status.

The GGCS has stated on their website that,

> "*Sale of RGGOs – prices have historically been over £1/MWh. This means that the RGGO market has never suffered from the extremely low values seen in the electricity GoO system, which underpin many of the accusations of greenwash and the lack of additionality in that sector. In the £1-3/MWh range RGGOs represent a small percentage of the total income secured by biomethane producers but do represent a useful value stream to help ensure the economic operation of plants.*"

Despite reaching a high of approximately £20/MWh last year, RGGO prices have since fallen to just below £5/MWh. This fluctuation highlights the importance of having a stable and substantial revenue stream to encourage long-term investment and reduce reliance on subsidies. For the biomethane industry to attract more investment, a reliable and valuable revenue from green credentials is essential.

The ability to trade biomethane within the EU ETS is also crucial. Current restrictions on the Union database for third countries could significantly impact potential revenue opportunities. Clear guidance is needed on how biomethane can be utilized in Market-Based reporting for the GHG Protocol and Science-Based Targets Initiative (SBTi). For the UK to achieve decarbonisation goals and boost biomethane deployment, biomethane should be treated differently from fossil fuels in the UK ETS. This approach aligns with European regulations where new Monitoring and Reporting rules (ETS MRR) introduced a zero-emission factor for biomethane and categorized it under zero-emission fuels for road and maritime transport.

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This approach is consistent with proposals to include biomass in the ETS, provided it meets sustainability governance arrangements, and to integrate energy-from-waste into the ETS by 2028.

Finally, evolving the ETS to include Greenhouse Gas removals is crucial. This would create a demand for negative emissions and support the investment in biomethane plants and other bioenergy technologies, including carbon capture technology, which is vital for meeting the government's net zero targets.

Regarding feedstock, the challenge lies in meeting sustainability requirements under the RHI and GGSS, which mandate a 50% waste feedstock requirement. The reconciliation for payments can be complicated by varying annual volumes. Although increased availability of waste feedstock through mandatory food waste collection (Simpler Recycling) is expected to ease this issue, it is important to ensure that feedstock supply does not harm the environment. This includes selecting appropriate crops for AD and biomass plants and using regenerative farming practices. A consistent feedstock supply is necessary, and gate fees are often a cost to operators rather than a revenue stream.

Question 16: Is 6.5p per kWh a reasonable assessment of the level of financial support offered by the RTFO scheme?

The RTFO mechanism differs from the GGSS in several key ways. Under the RTFO, fuel must be transported from the production plant to the refuelling station and demonstrated as entering a vehicle, typically verified using Fuel Duty records. In contrast, the GGSS only requires the gas to enter the grid.

The RTFO has been highly effective in decarbonizing heavy transport, with over 90 percent of HGVs and buses running on biomethane in the UK in 2022. Existing sites often leverage the Renewable Transport Fuel Certificates (RTFCs) for flexibility, combining them with the RHI and GGSS. This is particularly valuable when expanding a plant would not yield increased revenues from the RHI or GGSS. Additionally, the RTFO offers double rewards for biomethane produced from waste or residue feedstocks, which enhances its attractiveness compared to the lower-tier tariffs of the RHI and GGSS.

The RTFO's success, along with the efforts to gain ISCC registration (the main biofuel recognition mechanism), has established a solid evidence base for split claims and mass balancing through the gas system, managed in a highly regulated environment between OFGEM and the Department for Transport (DfT). However, the RTFO presents limitations in supporting new production capacity:

1. **Lack of Plant Accreditation**: The RTFO does not accredit or register individual plants. Instead, it creates an overall market for renewable transport fuels and the RTFCs used to account for them.

[27] EBA-position-on-the-ETS-extension.pdf (europeanbiogas.eu)

2. **Uncertain Long-Term Ambitions**: The RTFO targets are only set until 2032, with no clear medium- to long-term goals provided by the DfT. This uncertainty means new investments rely heavily on market conditions rather than assured policy support.
3. **Non-Guaranteed Buyout Price**: Unlike the Renewables Obligation, the RTFO buyout price is not a guaranteed minimum value per certificate but rather a ceiling. The actual value depends on market conditions and is not indexed to inflation, making it less reliable for investment planning. [28]
4. **Demand Dependency**: A gaseous fuel can only obtain RTFCs if there is demand for methane as a vehicle fuel. Investors must assess overall demand for methane and its competitiveness against other producers, both domestically and internationally.
5. **Market Dominance**: The RTFO market is dominated by a few large, obligated parties, with most targets met through liquid biofuels blended into fossil fuels. This concentration gives these parties significant influence over the support value, overshadowing other revenue schemes.
6. **Impact of Import Rules**: Recent changes requiring the importation of all biomethane, not just its green credentials, have resulted in non-UK gas paying a premium. This discrepancy, with higher gas prices in Europe compared to the UK, has incentivised increased UK supply.

Until these issues are addressed, it is unlikely that new projects relying heavily on RTFC revenues will be funded. The DfT is required by the Energy Act 2023 to consult on ways to provide confidence in future revenues for UK producers supplying the Sustainable Aviation Fuel mandate. Insights from this consultation could potentially benefit the RTFO as well.

Question 17: In your view, can the RTFO scheme make a useful contribution towards the development of local biomethane production? Why/why not?

Renewable fuels, especially Biomethane, Bio-CNG, and Bio-LNG, are becoming increasingly viable. This is true not only for facilities upgrading for grid injection but also for those currently under the FIT scheme, who are exploring options as their contracts end or seeking additional revenue.

Operational UK sites already leverage the Renewable Transport Fuel Certificates (RTFCs) to create flexible revenue streams alongside the RHI and the GGSS. This approach is particularly beneficial when expanding a plant would not result in increased revenues from the RHI or GGSS. Future support schemes could incorporate similar flexibility, offering additional revenue options and creating a viable market for biomethane beyond grid injection.

However, until these issues are resolved, it is unlikely that new projects heavily reliant on RTFC revenue will secure funding. The Department for Transport (DfT) is required by the Energy Act 2023 to consult on methods to ensure future revenue stability for UK producers supplying Sustainable Aviation Fuel. Insights from this consultation may offer valuable proposals that could also be applied to the RTFO, potentially enhancing its effectiveness and support for new biomethane projects.

[28] The buyout price increased from 30ppl to 50ppl in January 2021, so DfT could fairly state that they have taken action when it looked like the buyout price might be too low to incentivise the continuing supply of renewable transport fuels. The difficulty is that, without a set process in place for adjusting it, there is no guarantee they would do so again in future.

Question 18: Are you aware of alternative certification schemes or other options which might better fit with local needs? If so, what are they?

Other than the Green Gas Certification Scheme (GGCS), we are not aware of any more localized mechanisms. Expanding the ability to trade biomethane outside of the UK would be highly beneficial, as it would provide a broader trading platform and potentially increase market opportunities.

Question 19: What are your views on the above illustration of the potential impact of a green gas levy on consumers' gas bills and other possible unintended consequences? Do you think domestic gas customers, small to medium-sized businesses, or large energy users would be willing to pay a levy to support the development of the biomethane sector? If so, how much would each be willing to pay?

It's true that there is unlikely to be widespread support for measures that impose additional financial burdens, particularly during a cost-of-living crisis, especially among those already facing financial strain. The controversy surrounding the proposed hydrogen levy illustrates this point. However, it's worth noting that the UK has been operating the GGSS for several years, which includes a levy on gas suppliers. This levy has, in turn, led to additional costs being passed on to consumers through their bills.

As with the hydrogen levy, providing clear and transparent information about the benefits of such measures can help alleviate concerns. There are inevitably costs associated with building up renewable energy infrastructure to replace fossil fuels and achieve net-zero targets, as well as to enhance energy security through domestically produced energy.

Public support for green energy can be seen in the number of consumers who have chosen green energy providers or opted for 100% green tariffs when financially feasible. However, introducing such measures during a period of high inflation and rising costs across the board is a challenging proposition. Nonetheless, it's important to recognize that initial costs for renewable energy projects tend to be higher, but they typically decrease over time, as seen with solar and wind energy.

Small and medium-sized businesses may feel the impact of these costs more acutely, as they were not beneficiaries of government energy caps during the peak of the recent energy crisis and may not be well-positioned to take advantage of fuel-switching options, such as those offered by the Industrial Energy Transformation Fund (IETF). On the other hand, larger and possibly medium-sized businesses are more likely to be affected by the UK ETS and carbon accounting, particularly in relation to Scope 1 emissions and increasingly Scope 3 emissions. Many companies, driven by sustainability and Environmental, Social, and Governance (ESG) commitments, have signed up to voluntary agreements under the Greenhouse Gas Protocol (GHGp) and Science Based Targets initiative (SBTi). These companies may find value in switching to greener tariffs and, as some of our members have noted, there are incentives to establish direct contracts with biomethane producers.

Question 20: In your view, would domestic customers, small to medium-sized businesses, or large energy users be willing to pay a premium to purchase biomethane, i.e. per kWh? If so, how much?

The domestic market for gas faces significant challenges, particularly with the strong push for households to transition to electric heating through subsidized heat pumps. Additionally, some regions are considering or have already implemented bans on direct emission sources for

heating in new builds, which would impact the demand for gas supplied through the grid. As a result, it is reasonable to anticipate a dramatic decline in the number of domestic customers connected to the gas grid over time. However, this decline will likely be gradual and largely driven by consumer choice.

In contrast, industries facing increasing penalties related to carbon accounting will need to explore their options for reducing emissions. For these sectors, investing in biomethane could still be a sound financial decision, especially when compared to the cost of natural gas. This is particularly true for industries where the cost of converting equipment to run on alternative energy sources, like electricity, is prohibitive, or where electricity isn't a viable option.

The long-term focus should be on hard-to-abate sectors, which are likely to continue relying on biomethane as a key part of their decarbonisation strategy. This is also relevant for industries that are hesitant to commit to hydrogen, particularly those located away from production clusters and networks or facing extended delivery timelines. Furthermore, sectors that are decarbonising transportation are showing continued interest in biomethane, as evidenced by companies like Waitrose investing in fleet technologies that will be in use for years to come.

Question 21: What action might be taken to make the cost of biomethane affordable to domestic customers, small to medium-sized businesses, or large energy users?

The REA strongly supports the development and expansion of biomethane production while recognizing that the sector currently relies on CAPEX (capital expenditure) and OPEX (operational expenditure) support for most deployments. The long-term goal is to transition the sector towards unsubsidised models. Although some operators are already moving in this direction, the broader roll-out of unsubsidised models is not yet feasible for much of the industry. Key factors such as additional revenue streams and robust carbon mechanisms will be crucial to making this transition possible.

One promising strategy to move away from subsidies is the encouragement of Gas Sale Agreement (GSA) opportunities, particularly on a long-term basis (around five years). Such agreements provide stability and reduce financial risk, thereby decreasing the reliance on subsidies. GSAs often require unsubsidised green gas to fully account for the carbon savings, making them an attractive option for operators. The potential for increased market value through mechanisms like the inclusion of biomethane in the UK ETS and clarity on its position within market-based mechanisms (like the Greenhouse Gas Protocol, GHGp, and Science Based Targets initiative, SBTi) would further support this shift. Setting national and regional targets for biomethane production could also boost investor confidence, creating a more stable and attractive market.

Moreover, access to the EU ETS is critical, as Europe, especially Germany, has been a significant purchaser of UK Green Gas Certificates (GGCS) in recent years. The current uncertainty surrounding the Union database for third countries could impact potential revenue opportunities. The REA, alongside other organizations such as ERGar and Eurogas, has been actively working to resolve this issue, as the inclusion of biomethane in the EU ETS could significantly influence and drive the certification market.

Cost reduction strategies, such as expanding and converting existing sites where feasible, could also play a vital role in reducing CAPEX and thereby lowering the overall costs for future projects. This would make biomethane production more economically viable without the need for extensive subsidies.

In conclusion, while subsidies remain necessary for most of the sector, strategic moves like long-term GSAs, inclusion in carbon trading schemes, and cost-reduction measures could pave the way for a future where the biomethane industry thrives without relying on government support.

Question 22: What are your views on how we might reach a sustainable price for biomethane and how might this relate, or not, to the price of natural gas at the National Balancing Point?

In addition to the points previously discussed, the industry strongly believes that the process offers carbon neutrality by removing CO_2 from the atmosphere. Captured CO_2 presents an additional revenue opportunity, particularly when it replaces fossil-derived sources, similar to how digestate can substitute chemically produced fertilizers. There is also potential to combine captured CO_2 with hydrogen to produce fuels like Sustainable Aviation Fuel (SAF). Looking ahead, biochar offers a possibility for long-term carbon storage, which should be especially valued for its carbon-negative impact. While these processes may add to OPEX costs, they also have the potential to create revenue streams that can offset these expenses.

Question 23: Which mechanisms are most likely to promote the development of a sustainable biomethane production sector here at an affordable cost to consumers and why?

We recognize that CfDs are increasingly being used by the government to ensure value for money, particularly when a consistent and successful mechanism is needed. Both CfDs and Supplier Obligation (SO) options offer the potential for a guaranteed minimum value, providing a degree of assurance. However, while both options have their advantages, there are also concerns regarding their suitability for all production methods and scales.

The "GB Future Biomethane Framework" call for evidence suggested that CfDs are more likely to attract larger-scale plants because these operations can benefit from economies of scale and compete on a more level playing field. As a result, smaller plants might find it difficult to compete under this model, potentially leading to a situation similar to the GGSS, where only larger gas grid injection projects were viable. Larger-scale plants could offer advantages in terms of cost margins and the ability to access long-term carbon capture and storage opportunities. However, these benefits come with challenges, such as managing feedstock (unless the operator is partnered with a farm), managing digestate over a wider area, and addressing local planning issues due to community objections. These factors would require careful consideration to meet sustainability objectives. Furthermore, to accommodate more expensive production methods, mechanisms like "pots" or minima/maxima, similar to those used in power CfDs, might be necessary. Some members have expressed support for the CfD approach, particularly those organisations with both producer and supplier responsibilities, who see this as a preferable option from a supplier perspective.

The SO provides an alternative model that is already familiar in the UK through the Renewables Obligation (RO) and RTFO schemes. However, the same concerns regarding the difficulty of creating a level playing field for all technologies apply here as well. To address this, the SO might also require further banding. The SO model under the RTFO is quite different from that of the RO; the RO provided long-term investment security, whereas the RTFO is a weaker policy when it comes to securing investment in UK production, as detailed in our response to question 11.

For investor confidence, especially for plants with a lifespan of over 15 years, the scheme design would need to closely align with the RO. Some members support this approach, seeing potential

for growth and a clear trajectory for the future. While the paperwork for policies like the RO and GGSS is less burdensome than that for CfDs or equivalent agreements for hydrogen (e.g., Low Carbon Hydrogen Agreement), the SO model could be more manageable for typical biomethane projects. Additionally, a supplier obligation could be designed to adjust rewards in line with wider gas market variations, though this might suggest that a simplified CfD approach could be more appropriate.

Historically, grants such as the Anaerobic Digestion Loan Fund (ADLF) and On-Farm Anaerobic Digestion Loan Funds have been perceived as cumbersome and bureaucratic, with low uptake. Smaller-scale and on-farm sites are unlikely to be attracted to a CfD mechanism, and the same may be true for an SO-style commitment. These sites may benefit more from tax incentives. Plants below 250 KWe, which found the FIT appealing due to its simplicity and the lower costs of connecting to the grid, may find CHP technology more manageable. Therefore, a separate and limited budget could be allocated to stimulate growth in this segment, fostering a more diverse biomethane production landscape and enhancing the security of the supply chain by engaging more plants. While on-farm plants might not contribute significantly to national biomethane targets, they play an important role in decarbonizing agriculture, utilizing feedstock for manure/slurry treatment, and enhancing the social acceptance of AD.

Do you have any further suggestions that the Department should consider?

Both the Contract for Difference (CfD) and Supplier Obligation (SO) mechanisms could be implemented without being significantly affected by sustainability criteria, such as threshold limits, and would require efforts to address gas grid and planning barriers. However, neither option stands out as more capable of impacting the key principles, except in terms of commercial viability.

A straightforward SO would provide support per unit of biomethane independent of gas market fluctuations. This predictability helps manage the scheme's costs and its impact on consumer bills, similar to the Green Gas Levy funding the GGSS. Biomethane producers would face market volatility, benefiting when prices are high but earning less when prices drop. To mitigate this risk, producers might engage in hedging, as seen in the electricity market.

In contrast, a CfD ties subsidies to gas market prices, stabilising producers' total income by adjusting the subsidy based on market fluctuations. This approach can stabilise consumer prices—when gas prices are low, subsidies rise, but consumers pay less or even receive rebates when prices are high. However, this makes the policy's total cost less predictable.

For most of the industry, either mechanism could work. If an SO is chosen, it should be modelled after the successful Renewables Obligation rather than the weaker RTFO. If a CfD approach is preferred, efforts should be made to streamline the policy and contracts to suit the scale of typical biomethane plants.

Regardless of the chosen mechanism, it is important to maintain the flexibility offered by the RHI and GGSS to access the RTFO (and the future SAF mandate), with the understanding that a unit of energy can only receive support from one scheme. This flexibility would allow projects to adapt to changing renewable fuel demands and optimise decarbonisation efforts.

As noted in response to Question 21, smaller-scale and on-farm sites are unlikely to be attracted to a CfD or SO mechanism. Their participation is crucial for a new framework to be adaptable, compatible with broader policies, and supportive of a diverse domestic energy mix. Additionally,

these smaller projects offer significant sustainability benefits, such as localised feedstock and digestate management, and play a key role in decarbonising the agricultural sector.

Chapter Four

Question 24: What are your views on how connection-related costs should be allocated in respect of single injection site connections and hubs?

As a trade association, we are concerned that producing cost estimates within the limited timeframe provided for this Call for Evidence may lead to inaccuracies that could affect financial decision-making. Given this, we believe that the Department for Energy (DfE), having directly consulted with the industry and receiving responses from various stakeholders, is in a better position to compile a more accurate and comprehensive picture. Additionally, consulting directly with project developers and suppliers would provide a more reliable source of cost information.

Question 25: What are your views on how costs, and the associated risks, should be allocated for strategic network investment (i.e. investment designed to facilitate greater volumes of biomethane on the network and enhance security of supply and robustness of the network)?

As a trade association, we are concerned that producing cost estimates within the limited timeframe provided for this Call for Evidence may lead to inaccuracies that could affect financial decision-making. Given this, we believe that the Department for Energy (DfE), having directly consulted with the industry and receiving responses from various stakeholders, is in a better position to compile a more accurate and comprehensive picture. Additionally, consulting directly with project developers and suppliers would provide a more reliable source of cost information.

Question 26: In your opinion, should the Department consider the possibility of socialising some connection-related costs? If so, what options should be considered and why?

We are aware that one Gas Distribution Network (GDN) is currently planning to socialise the costs of connections and is pursuing this as a reopener with Ofgem under the RIIO-2 framework. This GDN has engaged with other GB GDNs, though it has ultimately decided to pursue this alone. The REA, in partnership with another trade association (ADBA), was asked to engage with our members on this matter, and the proposed approach to socialise costs was broadly agreed upon as the most suitable option.

Question 27: In so far as costs are to be borne by producers, what are your views on how such costs should be fairly allocated between different active producers/users of a hub?

As a trade association, we are concerned that producing cost estimates within the limited timeframe provided for this Call for Evidence may lead to inaccuracies that could affect financial decision-making. Given this, we believe that the Department for Energy (DfE), having directly consulted with the industry and receiving responses from various stakeholders, is in a better position to compile a more accurate and comprehensive picture. Additionally, consulting directly with project developers and suppliers would provide a more reliable source of cost information.

Question 28: Are there any other issues associated with allocation of connection-related costs which need to be considered as part of the development of a policy framework for biomethane production?

There are several associated costs that need to be examined to determine their necessity. Producers have reported issues such as:

- **Access to the Grid**: Especially problematic in low-pressure areas.
- **Connection Costs and Delays**: High costs and delays in connecting to the grid.
- **Inconsistent GDN Charges**: Some GDNs require full upfront payment, while others offer staggered payments.
- **Seasonal Pressures**: Seasonal fluctuations can limit consistent access.
- **CV Quality**: Propanation issues, which are not a requirement in some European regions.
- **Sudden CV Quality Changes**: Variations that can interrupt grid access and cause flaring.

To address these issues, several solutions have been proposed:

- **Connection to the Transmission Grid**: This could be a viable option where local pressures are low.
- **Reverse Compression**: A pilot project is underway between Wales & West Utilities and CNG Services.
- **Eliminate Propane Use**: Removing the need for propane, which introduces a fossil-derived element, could be beneficial. A review of the billing mechanism may be needed.

By removing unnecessary barriers and related costs, connection expenses could become more manageable, reducing the need for cost allocation or socialisation.

Chapter Five

Question 29: What other key issues should the Department consider in developing a policy framework for biomethane?

A single support framework may not suit all plant scales. Large-scale plants can rapidly meet production targets and deliver significant biomethane volumes, but they may require a broader feedstock supply and manage a larger volume of digestate, which can complicate sustainability efforts.

Smaller, on-farm plants offer local benefits by using feedstock and managing digestate within a close proximity, addressing key environmental issues more effectively. However, barriers to farm AD, particularly financial constraints, need addressing. Further information can be found here.[29]

Investigating alternative support mechanisms, such as targeted tax incentives or schemes tailored to agricultural and environmental benefits, could better support small-scale and on-farm AD. This would ensure that both large-scale and smaller plants are incentivized appropriately, balancing rapid production growth with local sustainability benefits.

Question 30: Are there any changes to the regulatory framework which government should consider enabling the development of a sustainable biomethane sector? If so, what might these be?

The complexities of the AD sector often stem from conflicting policies and legislation across different government departments. Delays or issues in one department can have ripple effects in others, leading to inconsistent or conflicting messages. Using waste materials as feedstock can create regulatory and market challenges, while using feedstocks from agriculture causes producers to be regulated by both environmental and energy departments, leading to potential counterproductive measures rather than effective policy alignment. To support the AD sector

[29] https://www.ifeaa.com/2024/06/03/angie-bywater-farm-ad-barriers-and-enablers/

effectively, greater alignment and coordination between government departments are necessary.