AD Pathfinder Project

Informing a Regional Biomethane Economy

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Background

KPMG has been engaged by Action Renewables to develop this position paper to draw focus towards the policy options for stimulating momentum in the biomethane sector in the short-term to aid and compliment the development of a regional biomethane economy.

This position paper calls on the NI Executive to help accelerate the development of the NI biomethane sector by supporting a number of local, near-term "Pathfinder" projects which can build on current market momentum while longer-term policy and support mechanisms are developed by Executive departments. Through supporting these projects and accelerating their development, the Executive can create a clear pathway for a viable biomethane industry in NI, with far-reaching benefits.

...demonstrate the benefits of biomethane in Northern Ireland

The ask of this position paper is to call for NI Executive approval for a specific amount of capital support through the provision of a grant to be provided to a limited number of Pathfinder projects to demonstrate the benefits of biomethane in Northern Ireland.

£30m
Of capital support

120GWH P.A
Of biomethane supported

18,000
tonnes of fewer CO_2e emissions

£20/MWh
reduction in the price of biomethane[1]

Enhanced water quality

Sustainable management of nutrients

Remaining competitive in a global marketplace

Promoting a viable circular economy

Rural economy stimulus, particularly in the **West of the Province**

Good Job creation

Energy security

Export potential

1 Capital support of 50% is estimated to reduce the price AD plants require to make them financially viable by £20 for each MWh of biomethane produced. The valorisation of CO2 and digestate has the potential to further reduce this by up to a further £20/MWh.

Macro Context

Over recent years, biomethane has moved from being a niche technology with limited policy support into a major decarbonisation pathway for corporates and nations across Europe.

In particular, the EU has introduced a very ambitious target for biomethane production under RePower EU which is seeking a ten-times increase in indigenous biomethane production to 2030 of c.341TWh (35bcm)[2]. This is equivalent to 10% of the current natural gas demand in the EU and 40% of the current natural gas demand in the United Kingdom.

In response the majority of European countries have now adopted formal biomethane policies to stimulate domestic production volumes including Denmark, France, Italy, Spain and Germany. Most recently in May 2024, Ireland launched its own biomethane strategy targeting 5.7TWh of indigenous biomethane production by 2030, equivalent to 11% of the current natural gas demand in Ireland[3].

With the benefits of biomethane now so widely accepted, the debate has moved beyond whether a biomethane sector is desirable or required, and onto how it should be implemented and supported.

... in May 2024 Ireland launched its own biomethane strategy targeting 5.7TWh of indigenous biomethane...

Northern Ireland Context

Northern Ireland very successfully developed a sizable anaerobic digestion (AD) sector between 2010 and 2017, deploying c.90 AD plants ranging from small-scale farm-based plant to large-scale food waste plants. The majority of these plants continue to operate very successfully to this day. Northern Ireland has however failed to build on this early success, just as was the case with renewable electricity generation[4], and is now one of the few jurisdictions across Europe without an active biomethane policy.

NI Executive policy is supportive of biomethane, with the 2021 Energy Strategy recognising the need for domestic biomethane, noting that an expanded, biomethane-focused, AD industry in NI will directly support the Energy Strategy objective to "Double the size of our low carbon and renewable energy economy to a turnover of more than £2 billion by 2030". NI already benefits from a regulatory framework which allows biomethane to be injected into the existing NI gas network.

There is currently a growing level of NI Executive and Ministerial support for biomethane, with it also having been referenced in the Draft Programme for Government 2024-27 as well as speeches by both the Minister for the Economy and the Minister of Agriculture, Environment and Rural Affairs. The greater the level of political support and community engagement by elected officials, the greater the chances of successfully implementing policy and achieving cross-departmental objectives.

The environmental case for biomethane is more pronounced in NI than in many other regions across Europe. Recent focus on the issues regarding Lough Neagh have highlighted the problems caused by agricultural run-off and waste-water discharge into water courses. Biomethane, and the circular economy which it supports, can help with these issues as well as help stimulate the wider economy, create sustainable employment and help develop new export markets and can play a contributing part to addressing the challenges set out in the recently published Environmental Improvement Plan.

The Department for the Economy (DfE) recently closed a Biomethane Call for Evidence which sought stakeholder views on the development of a sustainable NI biomethane sector. This Call for Evidence was welcomed as a key preliminary workstream to inform the development of an Executive biomethane policy and a clear NI Biomethane Action Plan. At this stage of biomethane policy development, Pathfinder projects could provide a range of beneficial outcomes and ensure the successful implementation of NI Executive policies.

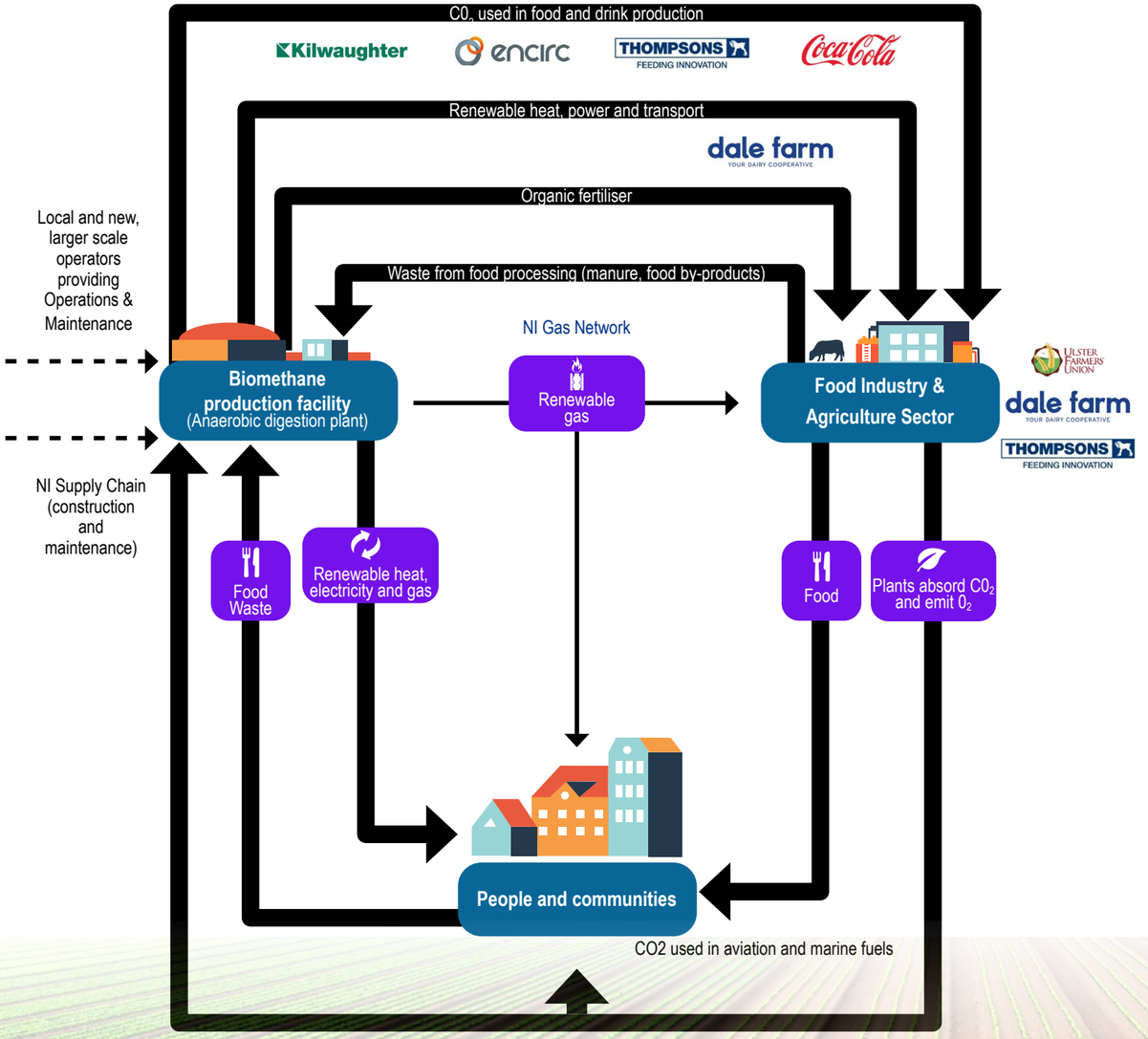
While the focus of the Pathfinder is to demonstrate the benefits of early support for a biomethane sector in NI, the consequences of not supporting it are much further reaching. Biomethane offers a way to deal with excess nutrients produced by the agri-food and waste-water sectors, thereby contributing to the future restoration of our water quality and the continued supply of food for export to GB. It also will enable businesses to remain competitive against global competition, preserving employment in those sectors and generating good jobs and developing skills in NI.

2 Total natural gas demand in the EU (excluding the United Kingdom) was 3,533TWh in 2023. Total natural gas demand in the United Kingdom was 872TWh in 2023.
3 Total natural gas demand in Ireland was 53TWh in 2023. This includes 24TWh used for the generation of electricity. Excluding natural gas for electricity, the 5.7TWh V target is equivalent to 17% of natural gas used primarily for heat.
4 RenewableNI: Accelerating Renewables in Northern Ireland – in 2016, NI developed 400MW of renewable generation capacity but in the four years to 2023, a total of 70MW was developed.

Opposite is a pictorial representation of the wide-ranging circular economy benefits which a biomethane sector could bring to NI. In a recent circular economy consultation, DAERA stated that it regards "the move to Anaerobic Digestion for the treatment of separately collected food waste as an integral part of growing NI's Circular Economy and contributing to the greening of NI's energy infrastructure"[5]. The key features of the circular economy are further discussed on the following page.

5 DAERA, Rethinking our Resources: Measures for Climate Action and a Circular Economy in NI, March 2024

Key benefits of AD in NI



Potential for an Agri-centric biomethane sector

The agricultural sector will be integral to developing a successful biomethane sector at scale in NI. NI has a competitive advantage in terms of its substantial grassland resource and the ability to use grass and animal manures as feedstocks for AD. Most plants in NI currently use agri-focused feedstocks and these are the most readily scalable. According to a Queen's University Belfast authored report NI has the potential to produce up to 6.3TWh of biomethane using agricultural-led feedstocks, with the majority of this potential located in rural communities, west of Lough Neagh. Ireland's National Biomethane Strategy is also an 'Agri-centric' strategy, given the comparatively small volume of waste feedstocks available. NI farmers, agri-processors, co-ops, animal feed suppliers and fertiliser suppliers can all play a significant role in a circular biomethane economy, which also has wider benefits to the UK as the NI agri-food industry sells 47% of total output to Great Britain[6], approximately double what the sector sells in NI.

6 NISRA, Northern Ireland Food and Drinks Processing Report 2021, July 2023

Rural economy stimulus

Biomethane production will act as a stimulus to the rural economy and provide NI farmers with many benefits including supporting good rural economy jobs, diversifying income streams, financial stability through long-term feedstock supply contracts, sustainability of the farm in terms of succession and overall carbon emission reductions. The ability to produce feedstock incrementally without impact on current crop rotation, land use or grazing also means biomethane may reduce the need for material destocking as a key route to decarbonisation for the agricultural sector. A report commissioned by Action Renewables in 2022 estimated that 1,400 jobs could be supported by an indigenous biomethane industry by 2030.

Improved water quality

It is estimated that 6,000 tonnes of excess phosphorus is land spread annually in NI. The recent growth of blue-green algae in Lough Neagh has been linked to, but not exclusively, to excess phosphorus entering NI waterways from farms. Using bio-fertiliser in NI as part of best practice nutrient management plans could reduce surface run-off and leachate, reducing the amount of excess nutrient entering NI's water supplies. In 2023, the Small Business Research Initiative (SBRI) ran its Sustainable Utilisation of Livestock Slurry competition to identify practical solutions for managing excess livestock slurry. The competition saw six companies demonstrate how biomethane production in conjunction with nutrient stripping technologies can support the sustainable management of livestock slurry. Applications for a second phase of this, to run for up to 3 years, recently closed.

Digestate is a by-product of AD which can be used as a replacement for artificial fertilisers (which also have a large carbon footprint). Digestate can be turned into a value-add product, by being processed to produce a bio-fertiliser which can also be exported to nutrient-depleted areas outside of NI, reducing the amount of nutrients to be managed within NI. The Pathfinder projects could work with the successful applicants to show the real-world benefits and NI-specific reference points for these initiatives, helping to establish routes to market for the surplus nutrients and contribute to the Environmental Improvement Plan currently being developed as part of the response to the issues at Lough Neagh.

Carbon reduction

Injecting 1.5TWh[7] of biomethane annually into the NI gas network would displace a significant volume of natural gas and consequently materially reduce carbon emissions by c.225,000 tonnes of CO_2e per annum.[8] This represents c.10% of the emission reductions which the Committee for Climate Change (CCC) project the NI Business & Industrial Processes Sector must achieve by 2030.[9] This renewable energy, with a lower carbon footprint, will be required by corporates in NI to help them achieve their own sustainability targets and remain competitive on the global stage, as well as help NI meet mandated climate goals. NI also has a material gas demand from the public sector which will also need to decarbonise in order to meet climate policy targets.

Further CO2 displacement will take place with the deployment of biofertilisers across agriculture (7 tonnes of CO2 is abated for every 1 tonne of artificial fertiliser replaced with digestate) and biomethane plants also have the capability to capture CO2. During the upgrading process from biogas to biomethane, a highly concentrated stream of biogenic CO2 is present. This CO2, if captured, can be sold to the food and beverage industry, fertiliser industry or there are projects piloting permenant underground storage in the UK. Over the medium term, this CO2 will also become an important input for the transport sector as it can be blended with hydrogen to produce sustainble aviation and marine fuels. CO2 capture enhances the sustainability of the overall process and ensures that the facilities meet future, potentially stricter, sustainability criteria. With CO2 capture installed at a facility, the facility may even have a negative carbon intensity score i.e. generate negative emissions, depending on its feedstock.

7 This is a proposed 2030 target for biomethane production in Northern Ireland. The Pathfinder aims to stimulate the injection of approx. 10% of this target.
8 Calculation relying on Carbon Emission Values supplied by the SEAI National Heat Study
9 KPMG, Supporting a renewable gas sector in Northern Ireland, October 2022

Security of energy supply

As biomethane is a direct replacement for natural gas, domestic production of biomethane can increase NI's security of energy supply through reduced reliance on imported natural gas and reduce exposure to unstable gas pricing in international markets. Locally produced biomethane can be blended into the existing NI grid network, supporting price stability for energy users and requires no changes to heating systems which is not the case for all other retro-fit solutions.

Drivers for a Pathfinder Scheme to develop biomethane

Since 2019 industry, regulatory and policy representatives have made significant strides to develop the regulatory framework to allow biomethane to be injected into the existing NI gas network. However, to retain pace with other European regions, we must advance the necessary marketplace enablers to encourage the development of a biomethane industry in NI at scale.

An accelerator programme, supporting 3 plants or up to 120GWh, would act as a policy and industry pathfinder investment that would enable near-term carbon reductions and critically support the development of the policy frameworks necessary to establish a sustainable biomethane industry in NI.

There are a number of compelling drivers that support the development of a Pathfinder Project at this point, as summarised below:

Urgency	**There is a significant risk that unless NI mobilises quickly it will fall further behind other countries**, leaving it uncompetitive in the agriculture and industrials sectors, and without access to a required decarbonisation pathway for the 2030 targets. The Pathfinder will fund projects, ensuring that NI remains competitive and creates good jobs.
Proven Sector	Accelerating the deployment of biomethane in NI does not require the Executive to take radical or new steps. **NI already has a proven network of operational AD plants** to learn from, an established and functional ecosystem of developers and support services, existing environmental and planning policies and has already injected biomethane into the gas network. Furthermore, there is proven feedstock capacity and industrial demand. **The policy therefore needs to focus on closing the small number of residual gaps which are holding back the sector (primarily economics).**
Industrial Demand	There is real industrial demand for biomethane in NI, particularly from sectors which have no other practical or economic options to decarbonise their high temperature thermal processes, such as the dairy sector, or glass and cement manufacturing. **Without access to biomethane, these sectors will become increasingly uncompetitive compared to their international competitors and be unable to deliver on net zero pathways**.
Economics	**NI needs to introduce active policy measures to reduce the green premium needed to buy biomethane and support the valorisation of biomethane co-products such as nutrients and CO2**. These policy measures could also place an economic value on actions taken through the agri-food chain which benefit wider society. Every jurisdiction which has implemented a biomethane sector has introduced economic support schemes, ranging from Feed-in Tariffs, Contracts for Difference and capital grants to biomethane obligation schemes[10]. Without such schemes, **all domestic biomethane production will have no option but to seek economic outlets overseas**, leaving NI based demand without access to the gas and without the benefits being counted towards NI targets.
Cross-sectoral benefits	The development of a Pathfinder support package and further biomethane related policies is an ask from across NI industry sectors. **Biomethane can provide wide ranging societal and environmental benefits and support a broad range of policy objectives** in NI across multiple Executive departments and agencies.

10 Obligation schemes create demand for biomethane from certain sectors and carry financial penalties for non-compliance, as a motivation to meet the obligation and stimulate biomethane production. Ireland (and other European jurisdictions) have chosen to support its sector with capital grants and a Renewable Heat Obligation scheme.

A high-level design of a Pathfinder scheme should be developed by the NI Executive, led by DfE and DAERA, with support from key stakeholders including the Utility Regulator and in collaboration with the gas distribution network operators to ensure objectives are fully aligned.

However, the key elements noted below present a high-level summary of the elements which the Pathfinder should include:

Realistic scale

We propose the Pathfinder seeks to secure annual biomethane production of up to **c.120 GWh** (equivalent to **decarbonising the gas demand of 10,000 homes**). The number of AD plants supported by the Pathfinder would be dependent on the size of plants which apply for support. Many developers in Ireland and those expressing interest in grid connection sizes in NI are planning to construct plant of an average size between 40-60 GWh, with some larger plants also under consideration.

CapEx funding

Simplicity of design and clarity of total cost commitments are key considerations in a Pathfinder scheme. We therefore propose that participating plants receive **significant CapEx grant support** rather than production support.

This approach has been adopted in other countries, most recently in Ireland where the scheme is being processed by the Department for Agriculture, Food and the Marine (DAFM) and is allocating a first tranche of €40m of capital grant funding across a number of biomethane production plants.

The ask of the Executive is to allocate **capital funding of up to £30m** to allow 120GWh (approx. 3 plants) to receive a **capital grant of 50% of the build costs** (total build costs are estimated at £20m per plant). Based on current planning applications for plants of sufficient scale, it is likely that the capital grant could be deployed over a **2-year period** to fund construction.

Competitive process

It is envisaged that Pathfinder support will be awarded through a **competitive process** that recognises applications that provide the most value based on cost of production, emission reduction and nutrient management. Parameters may also be set based on location, timelines for commissioning, sustainability requirements, valorisation plans and minimum size.

Informing Policy

The NI Executive will have **full transparency** regarding Pathfinder project's cost of production to help inform DfE's future biomethane policy. The NI Executive would also have the flexibility to set the Pathfinder criteria, potentially reserving certain funding allocations for different sizes of AD plants – for example, funding can be allocated in varying amounts across both commercial and farm scale plants and provided based on a percentage of CapEx.

Supporting industrial decarbonisation

Subject to state aid controls, the entirety, or a large proportion, of biomethane produced by Pathfinder projects would ideally be reserved for consumers – likely **industrial users with difficult to decarbonise high thermal demands** – located in Northern Ireland. Increasing pressure is mounting on industry to decarbonise operations, particularly as businesses seek to reduce Scope 3 emissions associated with their value chains, such as the large grocery retailers currently working to reduce emissions across their supply chains.

The testimonials from a cross-section of NI businesses shows that demand for sustainable biomethane exists today.

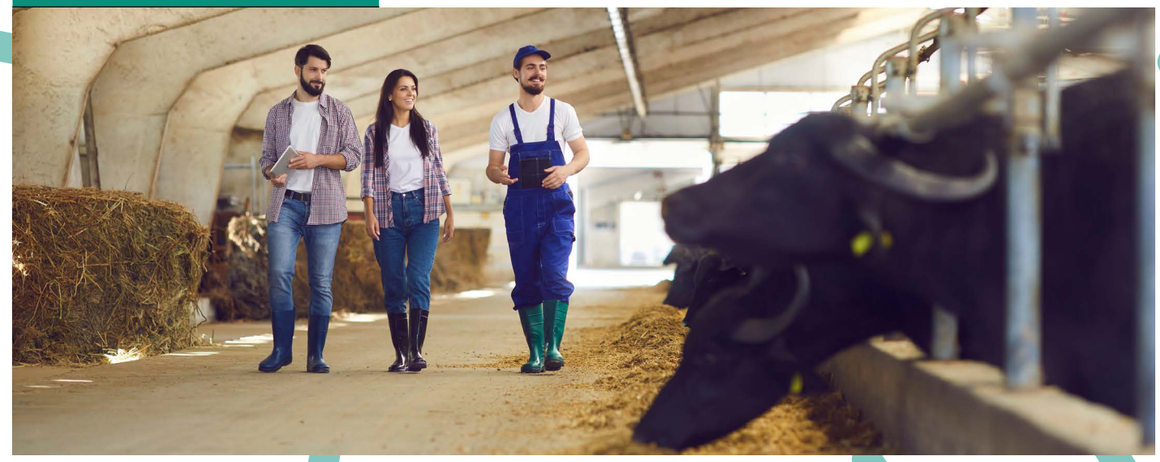
Regional benefit

The displacement of natural gas with biomethane through the Pathfinder will have several regional benefits including reducing regional carbon emissions, enhancing biodiversity and water quality, supporting the green economy, encouraging the sustainable utilisation of nutrients, supporting employment in the rural economy, improving regional gas security, and providing a source of biogenic CO2 to facilitate the development of an e-fuel industry.

Of all of these benefits, **the potential to enhance water quality through the sustainable utilisation of nutrients is of particular importance, not only to the local environment and the agri-food sector but also to the wider population**.

Communication

One of the key items of feedback from the consultation exercise carried out on the recent Draft National Biomethane Strategy in Ireland was **the requirement for high levels of community engagement and transparent communication** on all aspects of proposed projects, to include location factors, methods of operation, proposed feedstock strategies and sustainability metrics, including air and water quality monitoring, traffic movements and biodiversity impacts.



Next Steps

	Action	Timescales
Step 1	**Pathfinder Approval:** Seek NI Executive Support for the AD Pathfinder Concept	October/November 2024
Step 2	**Pathfinder Scope of Works:** The NI Executive, led by DfE and DAERA will work with other executive departments and key industry bodies to shape the design of a Pathfinder project and identify the most appropriate project funding streams	Completed by February 2025
Step 3	**Pathfinder Launch** - there will be a lead-in time to deployment of the capital funds as there will be few projects of scale which are currently construction-ready, given the historic lack of policy support for the sector. The announcement of a Pathfinder funding program will give developers confidence to incur costs on planning, permitting etc, such as been the case in Ireland where signposts towards government policy stimulated development activity in the sector.	Q1/Q2 2025
Step 4	**Pathfinder Implementation** - Phase 1 of the Pathfinder projects (1-2 years of production of biomethane) will provide NI Executive with relevant, NI-specific information in relation to the costs of production of biomethane and begin to explore options for the valorisation of co-products such as CO2 and nutrients. This may involve working alongside the second phase of the SBRI funding allocation and will require both cross-department input (DfI, DfC, etc. and other stakeholders).	2025/2026
Step 5	**Pathfinder Review and Assessment** – The pathfinder results will be reported across an agreed framework and timescales. There may be opportunities for a second phase of the project to inform policy development in areas such as the valorisation of nutrients and how the societal benefits of a sustainable biomethane sector in NI can be quantified and the costs appropriately socialised.	Ongoing

Testimonials

Anaerobic Digestion (all scales, modular and centralised) will contribute to the decoupling of agriculture output from the environmental constraint of greenhouse gas emissions and improve the overall position of our industry in regard to climate change. Subsequently, the **Ulster Farmers Union** have identified Biomethane production (and its various uses) as a means of additional income and a way to enhance integrated nutrient management in our farm businesses.

"Sustainability is a key priority for Coca-Cola HBC and is embedded into all our operations both internationally, and at a local level here in Northern Ireland. Our Mission 2025 strategy sets measurable targets on climate, packaging, water, ingredients, nutrition, people and communities, and we have made the commitment to reduce our emissions to net zero across the whole of our value chain by 2040.

Against this backdrop of ambitious sustainability targets and a desire to support a more circular economy locally, we fully support a dedicated strategy, and the development of a sustainable biomethane sector in Northern Ireland. Biomethane as a renewable energy source represents a huge opportunity for **Coca-Cola HBC** to reduce greenhouse gas emissions, minimise our carbon footprint, and support a circular economy by turning waste into valuable energy".

Encirc has been a long-time supporter of replacing fossil fuels with biomethane in the already established gas network infrastructure, fully recognising that we are an energy intensive business that has an obvious impact on the environment.

However, we are fully committed to changing this and our business mission is ZE30, which is to produce zero emission glass bottles by 2030. We see replacing gas with biomethane as a key component of that mission. As we continue to develop, using biomethane in the gas network will also protect the 500 jobs that we bring to rural Fermanagh by ensuring that we have a successful and sustainable business into the future. It will allow us to remain competitive and separate us from our competitors as a forward thinking, progressive, carbon conscious company at home and abroad.

This paper has the support of the Gas Network Operators for Northern Ireland:

Phoenix Energy

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dale farm YOUR DAIRY COOPERATIVE

Coca-Cola

encirc

Kilwaughter

THOMPSONS FEEDING INNOVATION

Ulster Farmers' Union

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