Sustainable Northern Ireland

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CALL FOR EVIDENCE:
Developing Biomethane Production in Northern Ireland

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Introduction

Sustainable NI is a non-profit membership organisation that is committed to driving sustainability in Northern Ireland by helping organisations adopt more sustainable practices. As an organisation principally concerned with sustainability, our submission focuses on high-level principles designed to improve the efficacy and sustainability of the proposed policy framework.

Overview

Sustainable NI recognises there is a potential role for biomethane in the path to net zero. The challenge is to develop a policy framework that accelerates progress in the biomethane sector without undermining Northern Ireland's climate and environment objectives.

While biomethane today is a more sustainable solution than natural gas and is an important transition fuel on the road to completely decarbonising our energy supply, under current industry practices biomethane is not an entirely clean fuel. Policy makers must recognise that the supply, distribution and combustion of biomethane still carries climate impacts and as such, requires careful safeguards to ensure it lives up to its green credentials.

Biomethane is "renewable" in the sense that humans and animals will keep producing waste – but the policy framework must be careful not to encourage waste generation for the sole purpose of creating more biomethane. After all, though capturing and using methane is better than allowing it to escape to the atmosphere, burning methane still has a climate impact.

By and large, Northern Ireland's energy strategy should prioritise zero-carbon sources like wind and solar to generate electricity, and then electrify as many end-uses (such as ground transport and buildings) as possible.

Not all biomethane is carbon neutral

The benefits of capturing and using biogenic CH_4 strongly depend on where the methane comes from and the infrastructure used to process and deliver it. Research has shown there is considerable leakage of methane in biomethane supply chains. A study by Imperial College London found that supply chains for biomethane release up to twice as much methane as the International Energy Agency (IEA)'s previous highest estimation.

As well as addressing leaks in the supply chain, the source of biogenic methane is critical. For example, while some leakage in the capture of current CH4 emissions sources still reduces net pollution, if new biogenic CH4 were generated from sources not currently producing it (for example wood product wastes or purpose grown crops), subsequent leakage of that new biogenic CH4 would increase atmospheric CH4 concentrations. Given the potency of CH4, any net increase in emissions would be counterproductive. Biomethane production also only generates climate benefits if it replaces fossil gas instead of adding to global production. In other words, it would not be suitable for new housing developments, as it would generate a net increase in greenhouse gas emissions.

A 2018 peer-reviewed paper by Alvarez et al (2018) estimates that a loss rate of about 3% in the supply chain negates the climate benefits of replacing fossil natural gas with biogenic CH4 generated from new sources for at least a couple of decades. This underlines the importance of minimising CH4 leakage. One example of this would be a landfill CH4 capture system that currently flares captured biomethane where subsequent diversion of the biomethane for processing, pipeline distribution and use results in higher CH4 emissions relative to flaring.

A framework for biomethane oversight

A 2018 paper from the World Resources Institute (WRI) proposes two key conditions to ensure biomethane is climate positive:

- First, biomethane must be produced from *waste*, and not other sources of organic material. Use of waste avoids competition with food production, timber, other human needs and ecosystem carbon storage.
- Secondly, biomethane must reduce net CH4 emissions to the atmosphere. As referenced earlier, net increases in emissions can occur when biomethane comes from *new* CH4 sources (methane that would not otherwise have entered the atmosphere), or existing biomethane sources whose capture systems result in higher net CH4 emissions.

Since biomethane must be sourced responsibly to be a true climate win and avoid creating more problems than it solves, regulators must be careful not to overestimate the volume of biomethane available to replace fossil fuels.

A final element to consider is the management of the remaining waste products from the anaerobic digestion of animal manure. The nutrient-rich solids and effluent remaining in the digester are typically applied to nearby crops, but appropriate care must be taken to avoid impacts to water, air, and nearby communities.

Biomethane sources that show the greatest potential

As previously stated, gasifying new organic sources, including agricultural crop residue and timber waste, would likely result in more net climate pollution due to methane leakage during production, processing and end-use applications. Therefore, the only sources considered appropriate for biomethane are organic waste arising from **existing activities** including livestock operations, landfills and municipal treatment plants that currently release methane directly into the atmosphere. Methane leaks along the supply chain should be controlled and other pollutants emitted by these operations also need to be addressed.

Conclusion

Replacing fossil fuels with biogenic CH4 only works for the climate if biomethane is responsibly sourced and emissions are tightly controlled. Otherwise, conditions could cause perverse climate impacts that undercut or even eliminate the value of biomethane. Biomethane must therefore be developed with appropriate safeguards and accounting methods that protect the climate and local environmental conditions.