NFU Consultation Response

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Dept for Energy Security and Net Zero call for evidence: Future policy framework for biomethane production

The National Farmers' Union of England and Wales (NFU) would like to make the following key points in response to this consultation:

- **Biomethane has a broad range of current and future applications in achieving both energy security and net zero.**
- **Stop-start policy support must now be replaced with a long-term, consistent strategic commitment to the anaerobic digestion (AD) sector, including access to the required infrastructure.**
- **We welcome government recognition of the role that biomethane production can play in the net zero transition, including through AD-BECCS.**
- **A UK-wide biomethane roadmap should set out an ambitious volume target for 2040 and/or 2050, together with 5-yearly interim milestones.**
- **A range of incentive mechanisms is expected to be required in the future, in order to cover all potential scales of AD and biomethane production.**
- **We do not agree with setting a waste feedstock threshold, preferring instead a balanced combination of primary bioenergy feedstocks with secondary agricultural residues.**

The NFU represents over 45,000 farmer and grower businesses across England and Wales. In addition, we have 20,000 NFU Countryside members with an interest in farming and rural life.

Our trade association is the largest farming organisation in the UK, providing a strong and respected voice for the industry and employing hundreds of staff to support the needs of NFU members locally, nationally and internationally. We are engaged with government departments covering agriculture, rural affairs, environment, energy, climate change, employment, infrastructure and transport issues, directing policy into real economic opportunities for rural diversification and job creation. The NFU champions British agriculture and horticulture, to campaign for a stable and sustainable future for our farmers and growers.

With 75 per cent of national land area in the agricultural sector, NFU members have a significant interest in land-based renewable energy production, where they can benefit directly as energy producers themselves or as hosts for energy plant developed by others. Our own market research, as well as that of other organisations, suggests that nearly two-fifths of farmers and growers have already invested in some form of renewable energy production for self-supply or export to other users. We estimate that farmers own or host about 70% of Britain's solar power capacity, over half of anaerobic digestion (AD) capacity and the majority of wind power, while playing a significant role in the supply or fuelling of renewable heat.

General comments

The NFU notes that the current Green Gas Support Scheme for anaerobic digestion (AD) has had a slow start, with just a single project currently registered for support, and that the government is considering further potential incentive mechanisms for both AD and non-AD routes to producing bio-based methane, with the expectation that the industry should become financially self-sustaining. We agree with other industry stakeholders that stop-start policy support must now be replaced with a long-term, consistent strategic commitment to the sector. This includes investment in, and access to, the requisite supporting infrastructure.

The NFU endorses government recognition of the role that biomethane production can play in the net zero transition, including by coupling AD to greenhouse gas removal (AD-BECCS) – noting that the Scottish Government has also recently highlighted the potential role of AD-BECCS among negative emissions technologies[1]. Biogenic carbon dioxide is already routinely captured at a number of British AD plants and sold via road tanker distribution for various food industry purposes. The NFU is aware of a new generation of technology providers actively developing plants on the basis of revenues from both biomethane sales and the sale of biogenic CO_2, as a low-carbon chemical feedstock or for geological storage. A large AD plant of this type would generate carbon removals of 15-20,000 tCO_2/year, so an expanding fleet of such installations could deliver at least 1-2 $MtCO_2$/year of greenhouse gas removals in the future using UK domestic feedstocks.

We acknowledge the government's ambition set out in the 2023 Biomass Strategy to produce 30-40 TWh/year of biomethane by 2050, noting that many in the AD industry believe a more stretching figure of 50-100 TWh/year should be both attainable and necessary in a net zero economy. Considering that agriculture has better long-term control of future feedstock costs than other sectors like waste management, the NFU believes this is most likely to be achieved using a balanced combination of primary bioenergy feedstocks (e.g. energy crops) and secondary agricultural residues (e.g. straw, manures and slurries).

The above figures are consistent with the estimated UK potential (5.5 billion m^3 by 2040) contained within a recent Europe-wide AD-biomethane assessment[2] of 74 billion m^3 by 2040 and about 110 billion m^3 by 2050.

The NFU advocated previously for greenhouse gas removal through AD pathways in our response to the June 2021 consultation on 'Role of Biomass in Achieving Net Zero' and February 2021 on 'Greenhouse Gas Removals'. We also emphasised the future potential of AD in our July 2020 consultation response on 'Future support for low carbon heat'.

Responses to selected consultation questions

Q2. Are there any other important current or future barriers to market growth not mentioned in Chapter 1 and what actions could the government or industry take to address them?

Yes. From our engagement with industry, the NFU understands that promised revisions to the Gas Safety (Management) Regulations 1996, governing permissible content of hydrogen, oxygen, carbon dioxide and water vapour, continue to hold back development of the AD sector. The technical case for such overdue reforms has been made repeatedly, and it is within the government's power to implement them. Planning consent for AD and associated infrastructure also remains a risk, which could be mitigated through revised planning guidance. To overcome financial barriers and encourage capital investment, the NFU would like to see unincorporated farming enterprises and SMEs eligible for more

[1] https://www.gov.scot/publications/negative-emissions-technologies-nets-feasibility-study/
[2] https://www.europeanbiogas.eu/report-reveals-111-bcm-of-sustainable-biomethane-potential-for-2040/

generous tax allowances on a broad range of low-carbon energy items relevant to AD, including plant, equipment, buildings and infrastructure.

Q3. In your view, what are the most important barriers to market growth that need to be addressed and why?

Noting that these issues may also be addressed directly (by other stakeholders) in response to Q41-45, the NFU's understanding is that the additional operating costs imposed by the continued requirement for propanation, and location-based constraints due to grid capacity and the need for reverse compression, are probably the most important impediments to future growth – both of which must be tackled as a matter of urgency.

Q5. Please provide evidence related to the outlined assessment criteria for any of the production technologies listed in Chapter 1 (or for any additional technologies not included).

The NFU agrees with the government's assessment in Chapter 1, and firmly believes there is a long-term role for small-scale on-farm AD technology, although extended policy support and guidance (e.g. on permitted development, and exemption from environmental permitting) may be required in the future for small modular combined heat and power units. Advanced slurry management technologies also merit support, such as the emerging opportunity in small-scale biomethane upgrading for vehicle use. Through both DESNZ and Defra, the government needs to revisit rewarding smaller-scale AD plants for avoided methane emissions and other desirable environmental outcomes, including their role in good nutrient management practice, control of diffuse water pollution, enhanced soil health and soil carbon storage. A biofertilizer standard in the Environmental Land Management Scheme, to support the use of digestate, would be a good starting point (see also Q27 below).

Q6. What are the most important end-uses for biomethane in the transition to net zero by 2050, and what are the implications for the framework?

Like many forms of bioenergy, biomethane has a broad range of current and future applications in achieving both energy security and net zero:

1. displacing fossil natural gas for domestic and industrial heat
2. as a transport fuel for large goods vehicles and large non-road mobile machinery
3. as an agile small/medium scale pathway to deliver carbon capture, utilisation and storage.
4. as a potential resource for long-term inter-seasonal energy storage (via pipeline compression and underground gas storage)

Alternative small-scale BECCS/BECCUS pathways may also be possible, according to a study conducted recently under the Supergen Bioenergy programme (Dr K. Chong et al., Aston University), who investigated the feasibility and economics of producing carbon black and a hydrogen-rich fuel gas by pyrolysis of biomethane.

The closely-related technology of thermal plasma electrolysis of methane or biomethane is under industrial development at Brigg in north Lincolnshire by Hiiroc[3] with support from Centrica. Their plasma torch technology can produce different grades of carbon black, graphite or graphene. The NFU is also aware of the similar Levidian LOOP microwave plasma[4] technology, which may offer a particularly energy efficient and compact AD-BECCS system, currently being trialled on biomethane from wastewater treatment with United Utilities in Manchester.

Q7. What might be the impact on the UK biomethane market if government were to set a form of biomethane volume target?

[3] https://hiiroc.com/carbon-capture-technology-for-a-clearer-future-2/
[4] https://www.levidian.com/loop

Q8. What are the benefits and risks associated with the different approaches (to Time Horizon, Scope and Volume) listed under the production targets section?

Within the broader context of the Biomass Strategy and the multiple applications of AD listed above (Q6), the NFU's view is that a UK-wide biomethane roadmap, setting out an ambitious volume target for 2040 and/or 2050 with 5-yearly milestones, would engender investor confidence and boost sustained growth, benefiting all stakeholders from feedstock providers (including farmers) to technology developers. Such a target (which should exceed the existing aim of 30-40 TWh/year by 2050) needs to account for the full range of business models and end uses, both those 'unsubsidised' and those receiving explicit policy support. The risk of setting too modest a target is that investment may choose to relocate, e.g. within the EU (which already has an ambitious REPowerEU goal[5] for 2030). Setting too long-term a time horizon may be partly mitigated by having interim milestones.

Q13. What are the most significant barriers to store and transport the CO_2 to sequestration sites? Where possible, please answer with reference for a range of different sizes and types of biomethane plants.
Q14. What is currently preventing the industry from maximising the revenue from selling CO_2, for example to the food and drinks industries? Do you expect opportunities for revenue from this bio-CO_2 market to change over time? If so, how?

The NFU understands from other industry stakeholders that, at this early stage of market development for GHG removals, the principal opportunity for CO_2 sales lies in the food and beverage sector, with additional possibilities as a low-carbon feedstock (e.g. recycled aggregates, bio-based materials). As the larger volume market for geological sequestration opens up (potentially dominated by large producers of both fossil and biogenic captured CO_2), the government should prioritise the capture of biogenic over fossil carbon, supported by a clear technical definition, and ensure that market access to geological stores for non-pipeline transport of biogenic CO_2 from smaller point sources is not impeded.

Q18. How could the UK ETS account for biomethane in the gas grid to make biomethane production more financially sustainable?
Q19. How might UK ETS recognition of biomethane in the gas grid affect UK ETS markets?

It will be important in future that biomethane blended in the gas grid is treated differently to fossil natural gas – it should not be unfairly taxed under UK ETS rules and thereby disincentivised. The NFU's understanding from discussions with other stakeholders is that some kind of free allowances for biomethane would be appropriate, following the example of the EU ETS approach.

Q20. Which mechanisms are most likely to ensure we meet our strategic aims in Chapter 2, and why?
Q21. Which mechanisms are most likely to comply with all the principles listed in Chapter 1, and why?
Q22. Which mechanisms are most likely to assist with overcoming the barriers to market growth listed above, and why?

A range of incentive mechanisms is expected to be required in the future, in order to cover all potential scales of AD and biomethane production. On-farm AD plants would most likely benefit from access to enhanced tax allowances (open to unincorporated SMEs) for a broad category of low-carbon equipment designed to capture fugitive methane emissions (e.g. slurry stores and infrastructure with gas capture; small anaerobic digesters) – such incentives would be preferable to (and arguably more cost-efficient than) more administratively burdensome grants and loan schemes.

The NFU understands from other stakeholders that medium-to-large AD projects would prefer a Contracts for Difference scheme (consistent with other current renewable energy incentives) over a

[5] https://energy.ec.europa.eu/topics/renewable-energy/bioenergy/biomethane_en

Supplier Obligation (SO) – although there is scope for a 'banded' SO along the lines of the former Renewables Obligation.

Q23. a) What are your views on the criteria set out in Chapter 4 for assessing feedstocks? b) Are there any additional criteria that we should consider?

The NFU does not agree with the government's proposals in the Bioenergy Strategy for a cross-sectoral cap on crop usage. The maximum benefit in terms of energy security, net zero and sustaining diverse rural employment would be obtained using a balanced combination of primary bioenergy feedstocks as well as secondary agricultural residues, which can nevertheless follow the biomass priority use principles.

Q24. With reference to the feedstock sustainability assessment criteria in Chapter 4 (or any other suggested criteria), please provide any data on AD feedstocks that you think we should consider in future policy.

We note the absence of non-manure agricultural residues from the list of current feedstocks; these include cereal straw, vegetable packhouse and field discards, and sugar beet pulp, all of which offer added-value prospects with low opportunity costs in terms of land and water use. Other more marginal (and potentially costly) feedstocks include grass silage from environmental leys, parks, sports fields and roadside verges. Note also that the current low uptake of manures and slurries is indicative of policy failure to incentivise their utilisation.

Q25. With reference to the feedstock sustainability assessment criteria in Chapter 4 (or any other suggested criteria), please provide any data on feedstocks that are specifically used by non-AD biomethane production methods (outlined in Chapter 1).

The NFU recognises that non-AD biomethane production (bioSNG) is likely to face competition for solid biomass feedstocks in the future from medium and large-scale BECCS combustion plants, as well as demand for production of Sustainable Aviation Fuels.

Additionally, we note that small-scale on-site e-methane production (alongside sale of biomethane) offers a potential alternative added-value use for biogenic CO_2 where transport and logistics costs might make its direct sale uneconomic.

Q26. What are your views on the approaches set out in Chapter 4 for prioritising feedstocks? Are there any alternative approaches that we should consider for future policy?

The NFU does not agree with setting a waste feedstock threshold. The large quantities of feedstock required for AD-BECCS and other end uses (see Q6) are likely to favour annual break crops such as hybrid rye, maize and herb-rich grass leys, grown within extended and more diverse arable rotations, benefiting soil health and storing additional soil carbon through digestate return. Other likely agricultural feedstocks include residues like beet pulp, straw, manures, etc. Government policy should likewise avoid a prescriptive approach to feedstocks or setting feedstock sustainability targets. It would be preferable to allow the market to 'discover' optimal pathways within a framework of greenhouse gas savings goals and land criteria.

For example, AD plants that are optimised for net GHG removal would necessarily minimise the land-use impact of crop feedstock by well-planned agronomy, e.g. with sequential cropping, and would maximise the use of both biomethane and biogenic CO_2. Such optimised AD plants are also most likely to make maximal use of the by-product digestate to recycle crop nutrients to the land and sequester additional soil carbon, following the example of the Italian 'BiogasDoneRight' farming system.

Q27. What is the current and potential scale of digestate revenue? To what extent can this revenue enable future biomethane deployment, and how could the future framework support this?

The market for digestate remains poorly developed, despite the rising cost of manufactured fertiliser. As is recognised in organic farming practice, the cost of transport and spreading nutrients with high bulk and water content generally exceeds that of purchasing and spreading manufactured fertiliser, so the NFU strongly recommends policy incentives to encourage the utilisation of quality digestate. Ideally, goals and estimates of annual digestate deployment should be a part of the overall biomethane roadmap to 2040/2050 (see Q7).

The NFU has long recognised that digestate can be a valuable source of plant nutrients and a partial substitute for manufactured fertiliser under good nutrient management practice. However, digestate management is rarely an additional revenue stream (except where costs are internalised within a single farm business) and under many circumstances this remains a cost to AD operators. Despite the existence of quality standards, farmer and grower concerns remain about the provenance of input material, presence of viable weed seeds or fungal pathogens, and more recently plastic contamination, all of which have held back the development of commercial demand. More stringent limits on non-biodegradable plastic inputs to biowaste processing are needed (e.g. a reduction to 0.5% inclusion) – we believe this should be possible by collaborative working throughout the waste chain.

The NFU has previously argued for better alignment of DESNZ and Defra policy. For example, if Defra were to include digestate utilisation standards within the Environmental Land Management Scheme, they could stimulate the market for digestate and also apply a regulatory 'control point', requiring that best available low-emissions spreading technology were used in order to qualify for support (Q28 below). Likewise, Defra's Countryside Productivity (rural development) large and small grant schemes have been open to improved spreading equipment, although in order to reach the largest possible number of farmers, the grant conditions should not be too prescriptive and continue to allow second-hand equipment or refurbishment of existing slurry tankers.

Q28. What are the barriers, if any, preventing UK AD sites and farmers/landowners from implementing additional ammonia abatement methods, such as the ones identified in the 2023 WRAP study for DESNZ?

The capital and operational costs of various advanced digestate management techniques, including treatment of digestate, post-processing/separation into solid/liquid fractions, and low-emissions spreading equipment, are all barriers to uptake of ammonia abatement technology. The NFU's farmer and grower members would greatly prefer support measures (e.g. tax allowances, grants) to encourage increased utilisation of digestate with appropriate capital equipment, rather than tighter regulations that may discourage innovation and investment.

Q29. How do you consider nutrient balancing in relation to your handling and use of digestate?
Q30. What are the practicalities, costs, and potential environmental impacts associated with transporting digestate to areas with a nutrient deficit?

Our members do not typically think in terms of nutrient balancing but rather nutrient management, using nutrients as efficiently as possible on crops and pastures to minimise costs and limit pollution. The NFU sees AD as having great potential to process farm-produced manures with a view to encouraging export of nutrients from areas with over-supply (the recent Wye Action Plan proposes to pilot this with small-scale AD plants). However, the handling cost of transporting and spreading organic nutrients (whether from manures or digestate) is often prohibitive over more than short distances, exceeding the value of the nutrients themselves. We understand that Defra has discussed the concept of regional hubs for collecting, trading, and distributing manures/digestate. The NFU has previously agreed with the Association for Renewable Energy and Clean Technology (REA) that post-processing or enhancement of digestate (e.g. pelletising, enrichment) should be allowed under a revised Quality Protocol, in order to enlarge and strengthen the digestate market, enabling more concentrated nutrients to be transported over longer distances.