CCU Technologies Speaking note
28th January 2022

Speakers: Roger Clarke & Tim Charters (BEIS), Roger Clarke (Defra) and Howard Leberman (EA)

Situational overview (BEIS)

- General overview of the CO2 market currently, where we see it going in terms of the number of suppliers to end users and the need for a diverse and sustainable supply.

Technological capabilities (BEIS)

- Overview of the technological capabilities to extract CO2 from AD, and the relative ease with which we can do so; the production of concentrated and relatively pure CO2 (and biomethane) from biogas passed through a membrane system and 11 plants with current capabilities to do so. Acknowledge that there are financial barriers around upgrading plant infrastructure, which may require government support.

Food-grade CO2 and AD (Defra):

We have received some questions regarding the regulatory position when it comes to using CO2 in the food industry.

The first thing to say is that the Government supports the safe use of CO2 in the food industry. This is a maturing, but relatively light-touch, regulatory environment, on which government is happy to engage over the coming months and years. We are also aware that CO2 from crop and residue fed AD plants is currently already being used in the food and beverage sector in the UK, and across the world, CO2 from waste-fed AD is also used (for example, in countries such as Italy).

There are broadly four regulatory angles to consider when embarking on the recycling of CO2 for food-related purposes (including slaughtering)

1. **Compliance with the FSA's food additive specifications (Defra)**

The Food Standards Agency clearly define the classification of food-grade CO2 via reference to the food additive specification in retained Commission Regulation (EU) 231/2012. Created in the wake of a previous CO2 shortage, the FSA also undertook a risk assessment on the gas use of CO2 which outlines the necessary purity levels acceptable for use in food and food production (which is 99%) and looked additionally at lead, carbon monoxide and mineral oil content. If new chemicals or contaminants were identified in the gas form, the FSA would consider the need for an updated risk assessment.

The risk assessment breaks down the quality of CO2 into nine grades, within which food-grade is third highest. Based on this, any CO2 which meets the classification of being "food-grade" is suitable for use in the food sector, due to its uniform purity levels, regardless of the source.

The purity level required for use of CO2 as a food additive differs slightly from that of gas-usage (for instance, in stunning poultry), these are defined clearly in the respective specification and risk assessment.

The Food Standards Agency, therefore, do not have any regulatory or legislative concerns with the use of CO2 generated from waste or sewage management, so long as it meets or exceeds the purity criteria.

Two alternative specifications, issued by the International Society of Beverage Technologies (ISBT) and European Industrial Gases Association (EIGA), are similarly aligned and require analysis for over twenty contaminants. Both allow for CO2 produced from anaerobic digestion plants to be used where it meets that specification.

Within the EIGA specification, there appears some ambiguity as to the "extra care" required in sourcing CO2 from waste-based plants

The specifications within the food additive legislation taken alongside the FSA Risk assessment on CO2, provides a clear basis to address confusion by providing specific parameters for meeting a classification for being 'food grade'.

2. **Compliance with the Environment Agency's End of Waste requirements (EA)**

In line with the Environment Agency's "end of waste" requirements, which are A) being for a specific purpose, B) a market for use existing, C) filling technical requirements and D) not leading to overall adverse impacts, if CO2 recovered from biogas met the FSA food-grade specifications, it would also in principle meet "end of waste status". It would therefore in principle no longer be defined as waste.

Companies can make this decision themselves, and are currently doing so. However, if they want to be fully protected from the very low legal risks of doing so they can:

a) At a site-by-site scale, make use of the Environment Agency's End of Waste service, which will review whether the decision is correct;
b) At an industry scale, put in place a Resource Framework to confirm the process will always meet end of waste requirements. The easiest way to do this would be to look at revising the existing Resource Framework underway relating to the recovery of biomethane from biogas. Alternatively a separate Quality protocol could be developed. While this Resource Framework is being developed a Regulatory Position Statement would be set out to provide similar levels of regulatory assurance.

3. **Compliance with the Environment Agency's industrial permitting process**

The process for recovering CO2 must not present a risk to the environment or human health. The recovery from waste-derived biogas will require permitting (or an extension of an existing permit) from the Environment Agency, due to the potential risks during the recovery process relating to the compression and storage of the gas. Breweries over a certain threshold are regulated by the Environment Agency and the associated AD will be picked up as a part of that permitting. Businesses should seek advice from the Environment Agency as to whether they require a permit once the decision has been made to invest in CO2 capture.

4. **Compliance with relevant Health and Safety Executive laws**

The storage of compressed gas carried obvious risks, so companies will need to make sure they are complying with relevant health and safety legislation.

Key takeaways

- *You can legally use CO2 (of a certain specification) derived from biogas upgrade in anerobic digestion for food-related activities.*
- *BEIS' funding is available to support this transition: IETF https://www.gov.uk/government/publications/industrial-energy-transformation-fund-ietf-phase-2-spring-2022*
- *We would welcome feedback on how we can make the regulatory environment clearer and simpler for you.*