NFU Energy Anaerobic Digestion

WHAT IS ANAEROBIC DIGESTION?

Anaerobic digestion is the process in which organic materials such as food or animal waste are broken down by microorganisms, in an ananerobic (oxygen free) environment – the digestor. This process produces biogas for combustion in a Combined Heat and Power (CHP) unit or boiler or can be enriched with propane to produce biomethane. As a by-product of digestion, digestate is also produced which is a natural biofertilizer and can be spread back onto the land as it is rich in nutrients.

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HOW DOES IT WORK?

Organic matter is kept in a sealed, oxygen free environment. In here, a complex microbial community live and feed on the organic matter that is fed into the digestor. It is these microbes that produce biogas as a product of their digestion. Biogas is a mixture of methane, CO2 and small quantities of other gases – the exact composition is dependent on the feedstocks used in the digestor – due to the variation in the methane %, the energy content of the gas also varies.

This gas is then captured and cleaned using various methods. It can then be stored or used as a fuel. Most commonly the gas is used as a fuel for CHP units, these are essentially a big engine connected to a generator to produce electricity for onsite use or by other end-users via private network or enters the national electricity network. Heat is also captured from the combustion process and can be used on site or utilised elsewhere through a heat transfer network. Alternatively, heat can be generated by biogas boilers, in the same way as a conventional natural gas boiler.

If biomethane is produced, you have three main options as can be injected directly into the gas grid network. To do this, not only does the gas need to be cleaned up to a high standard, but also upgraded with propane to increase the energy content of the gas. To inject directly into the gas grid, there are strict quality standards that must be met as set by the highly regulated gas network to ensure there are no issues for end users.

Gas can be stored and transported to a virtual gas pipeline using tankers that take gas to a centralised upgrading facility and grid injection point. Otherwise it can be used by vehicles as Compressed Natural Gas (CNG) or Liquefied Natural Gas (LNG). The governments Road Transport Fuel Obligation is helping to drive this.

WHAT ARE THE BENEFITS?

AD plants first and foremost are able to produce energy from waste. The methane captured and used is not released to atmosphere, and it also replaces any fossil fuel energy use. Methane is 23 times as potent compared to carbon dioxide, and so by not releasing this to the atmosphere, it can help to reduce GHG emissions.

ARE THERE SUBSIDIES OR INCENTIVES AVAILABLE?

The government has laid out plans for the new Green Gas Support Scheme (GGSS). The scheme is to help increase the proportion of green gas in the grid, though final details have not yet been announced, it is likely green gas producers will be paid for injecting gas into the gas grid.

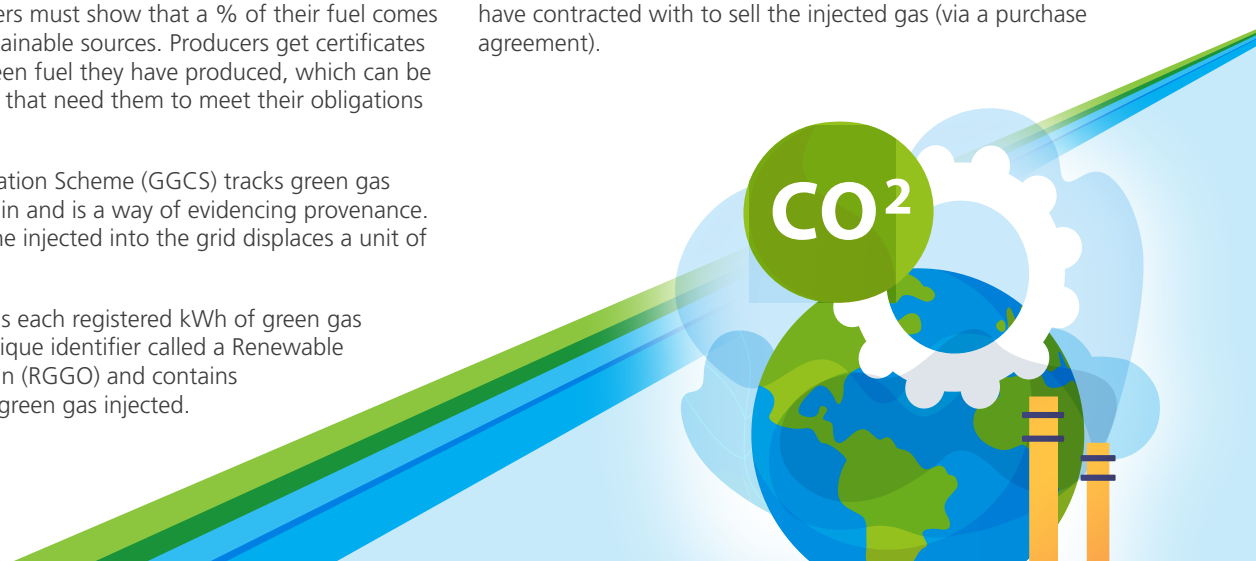
The Road Transport Fuel Obligation (RTFO) supports the governments push to increase the production of green transport fuels. Large fuel suppliers must show that a % of their fuel comes from renewable or sustainable sources. Producers get certificates to show how much green fuel they have produced, which can be traded with companies that need them to meet their obligations under the RTFO.

The Green Gas Certification Scheme (GGCS) tracks green gas through the supply chain and is a way of evidencing provenance. Each unit of biomethane injected into the grid displaces a unit of natural gas (fossil fuel).

The GGCS system labels each registered kWh of green gas electronically with a unique identifier called a Renewable Gas Guarantee of Origin (RGGO) and contains information about the green gas injected.

Green gas producers register the amount of biomethane they've injected into the grid on a quarterly basis based on the actual volume and calorific value (energy content) of green gas that flowed. An electronic Green Gas Certificate is issued once a supplier registers sale of gas to an end-use consumer. It also carries the relevant range of RGGOs attached to it.

Each producer registers the details of the supplier/trader they have contracted with to sell the injected gas (via a purchase agreement).



FAQs

Is anaerobic digestion sustainable?

Yes, AD is a renewable technology and helps us move towards a circular economy.

How is energy released from organic materials?

The biggest challenge for any AD plant is optimising the digester environment so anaerobic bacteria can thrive. They break down organic matter and produce methane as a by-product of their metabolism.

What feedstocks can be used in an AD?

Waste is preferable to strive for a circular economy, but other organic matter could be used. You will need to hold the relevant permits. If accredited on government subsidy schemes, to remain compliant the correct permits must be held, and you will need to report the types of feedstocks used (including GHG emissions and have evidence of meeting the Land Criteria where applicable).

How much energy can you get from waste?

Agricultural wastes such as farmyard manures and slurries are a good source of waste feedstock for AD. However, the dry matter will influence the energy value, so it is highly variable. Straw-based manures may need pre-treatment to help liberate energy. Stored manure will decompose over time so some biogas potential may be lost prior to digestion.

Is digestate the same as compost?

No. Digestate is not compost, although they have some similar properties. Compost is produced by aerobic (with air) decomposition of biological material and digestate is produced by anaerobic (without air) decomposition of biological material. They can both be used as fertiliser under specific regulations. Please note, waste-fed and farm-fed ADs are different and produce different kinds of digestate.

Does AD smell?

Odour is associated with the organic material that goes into a digester; however, AD can reduce some odours as the digestion process takes place in a sealed tank.

If you are unsure, give the NFU Energy team a call who will be happy to advise.

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www.nfuenergy.co.uk

Phone: **024 7669 6512** | Email: **info@nfuenergy.co.uk**

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