

# About Acorn Bioenergy

Acorn Bioenergy is committed to providing renewable, carbon negative energy by unlocking the full potential of biomethane production in the Scotland and the UK. We plan to make an immediate impact by reducing transport, industry and agriculture CO<sub>2</sub> commencing in 2023.

Acorn Bioenergy creates & procures biogas from anaerobic digestion facilities in the UK and upgrades it to biomethane. We transport biomethane from an anaerobic digestion facility to an entry point in the gas grid, utilising biomethane-powered trucks. This low carbon fuel will be directly used as an alternative to traditional fossil fuel to power heavy goods vehicles (HGVs) and create renewable heat.

In 2021 HGVs produced 18% of transport emissions, despite comprising 1% of vehicles on the road; it has been shown that running an HGV on biomethane delivers a reduction of equivalent carbon emissions of more than 70% compared against diesel-fuelled HGVs.

The production of biomethane provides diversification opportunities in sectors that are generally harder to make carbon negative due to technological limitations and high costs, such as agriculture. It is a mature and well understood fuel that can be used today while hydrogen and electrification solutions are developed.

Acorn does not require gas pipelines at its sites; instead, we use biomethane-fuelled trucks to transport our biomethane to injection points into the National Grid. Acorn's facilities use crops and agricultural residues rather than food and household waste, limiting odours and supporting farmers with income and best agricultural practice.

We take full responsibility for the whole project lifecycle - sourcing feedstock, construction of the plant, running the virtual pipeline and injection points. Acorn will own and operate the plant after construction.

Acorn Bioenergy was established by its founders to help tackle the climate emergency, one of the greatest issues of our time. By using their sectoral expertise, Acorn is committed to helping deliver a greener, more secure future for the Highlands, Scotland and the UK. Our plants could increase total biomethane production in Scotland by 36%\*, and therefore constitutes a critical step in the journey towards net zero.

## What is biomethane?

Biomethane is a green, non-fossil fuel source of energy. It is produced through a natural biological process where plant and animal materials are broken down by bacteria and micro-organisms in an air-tight tank to produce biogas. Biogas is a mixture of around 60% methane, 40% carbon dioxide and traces of other contaminant gases, which is then refined to biomethane gas and carbon dioxide.

\* Based on Scottish Government's 2019 figures, which put Scotland's biomethane production at 716GWh; Acorn's Scottish plants will have a combined product of 400Gwh, increasing total biomethane production in Scotland by 36% (<https://www.gov.scot/publications/bioenergy-update-march-2021/pages/3/>).

# What is Anaerobic Digestion?

Anaerobic digestion (AD) is a natural biological process by which organic materials, including agricultural waste, residues and cereal crops, are broken down and converted into gas for heating and transport.

Our AD facilities break down plant and animal materials in air-tight tanks (digesters) to produce biogas. We will then refine this gas to biomethane and CO<sub>2</sub>.

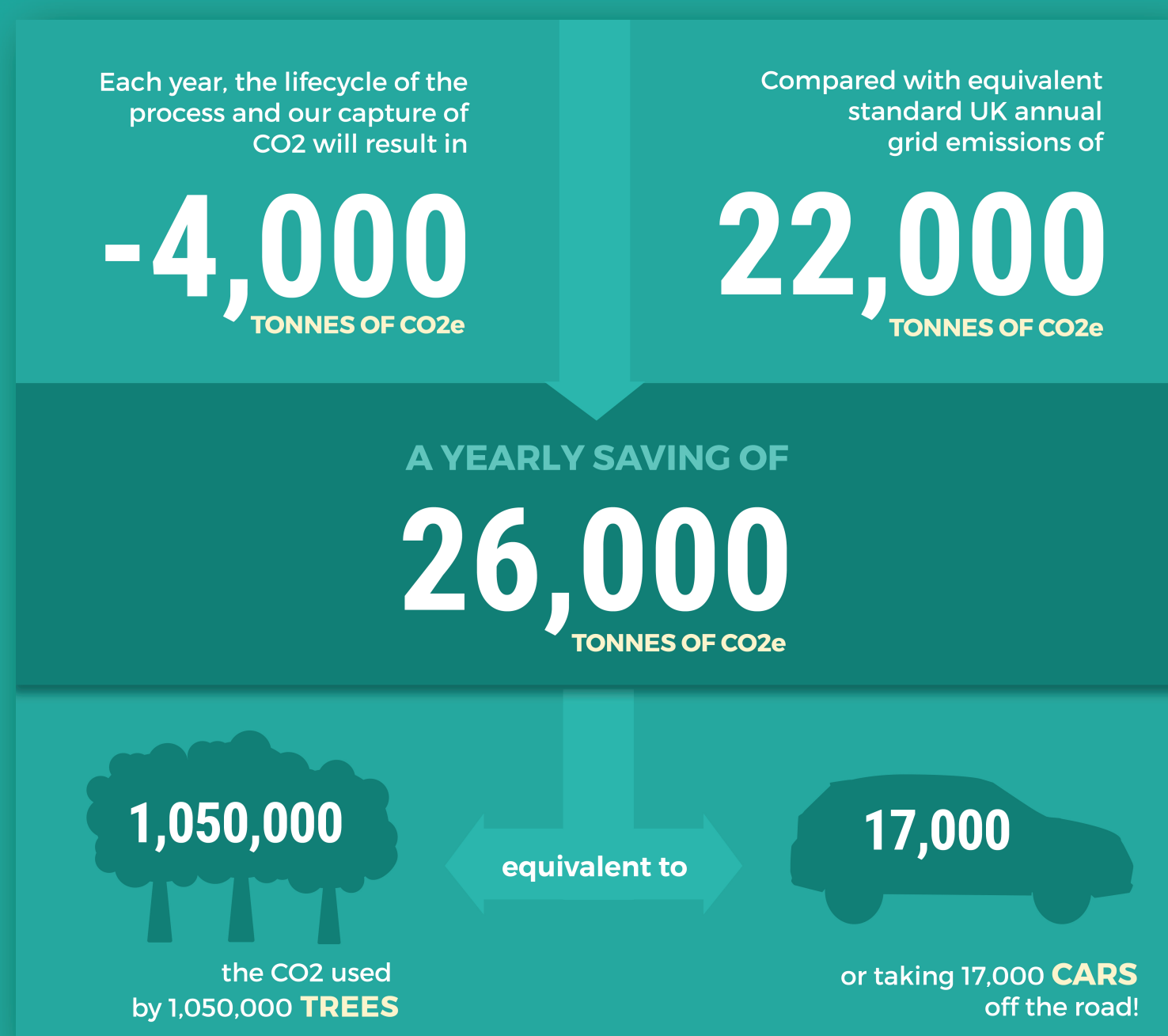
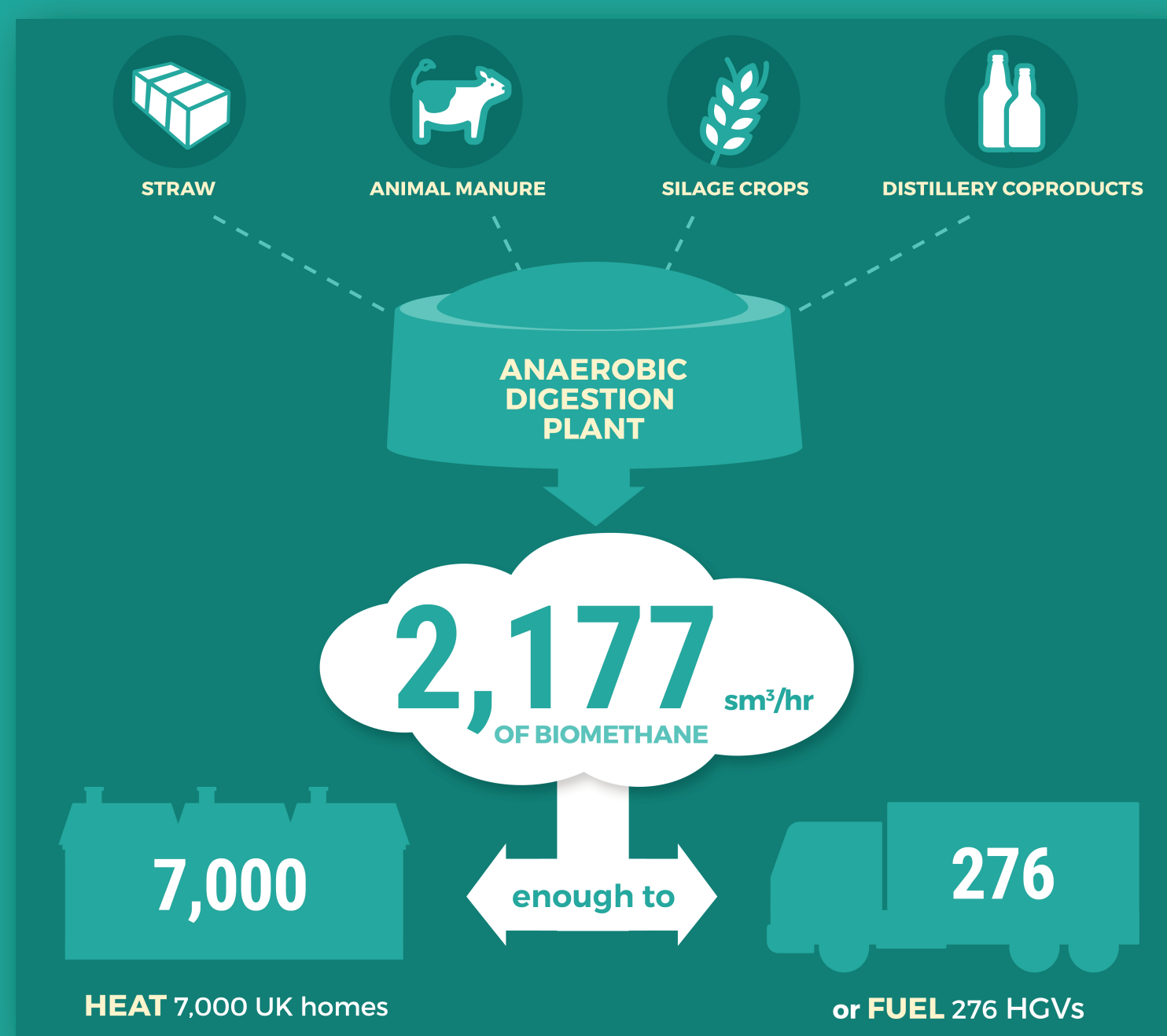
The biomethane we produce is then used as eco-friendly fuel for HGVs or transported and injected into the grid via our virtual pipeline, to be used for heating. Biomethane will then displace fossil fuel gas in the grid, reducing our national dependency on fossil fuels.

The AD process produces two useful by-products; digestate, which will be used as fertiliser on farms, and CO<sub>2</sub>, which we capture for use in industrial purposes.

Biogas has been used in the UK since 1895, when it was first used to power street lamps across the city of Exeter.

The UK could generate around 10-20 TWh of heat and power from anaerobic digestion. This could represent 3.8% to 7.5% of the renewable energy mix required in the 2050s.

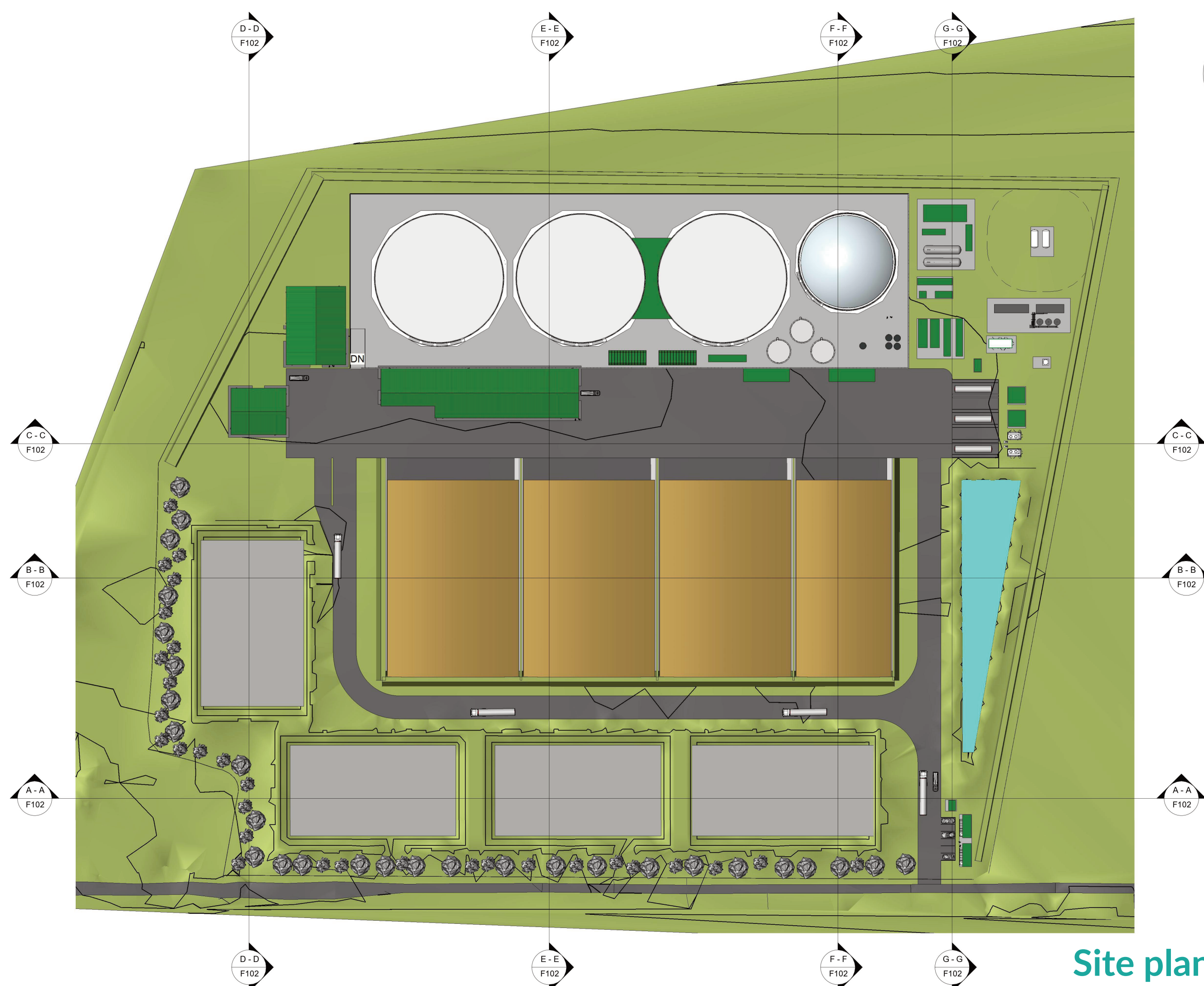
There are currently around 650 anaerobic digestion facilities in the UK.





# The Site

- The site area will be 7.1 hectares in total.
- There will be significant screening around the site boundary to limit any visual impact. This will take the form of planting of hedgerows and well-established native trees.
- The facility will be staffed by 4 people during the hours 07:00-19:00 Monday to Friday with reduced hours on weekends, except during peak harvest periods when working hours would be extended as deemed necessary.
- Local firms will be used throughout the facility's construction and lifecycle.
- Feedstocks will be sourced from local farms.
- Digestate lagoons will be covered, in keeping with SEPA standards.
- A SEPA compliant wildlife management plan will be put in place.
- Domes and structures will be cladded to blend in to the landscape, limiting visual impact and preventing glint and glare.
- Site lighting will not be required outside working hours. The site will be designed to avoid light spill outside the site, with lighting directed away from hedgerows and trees.



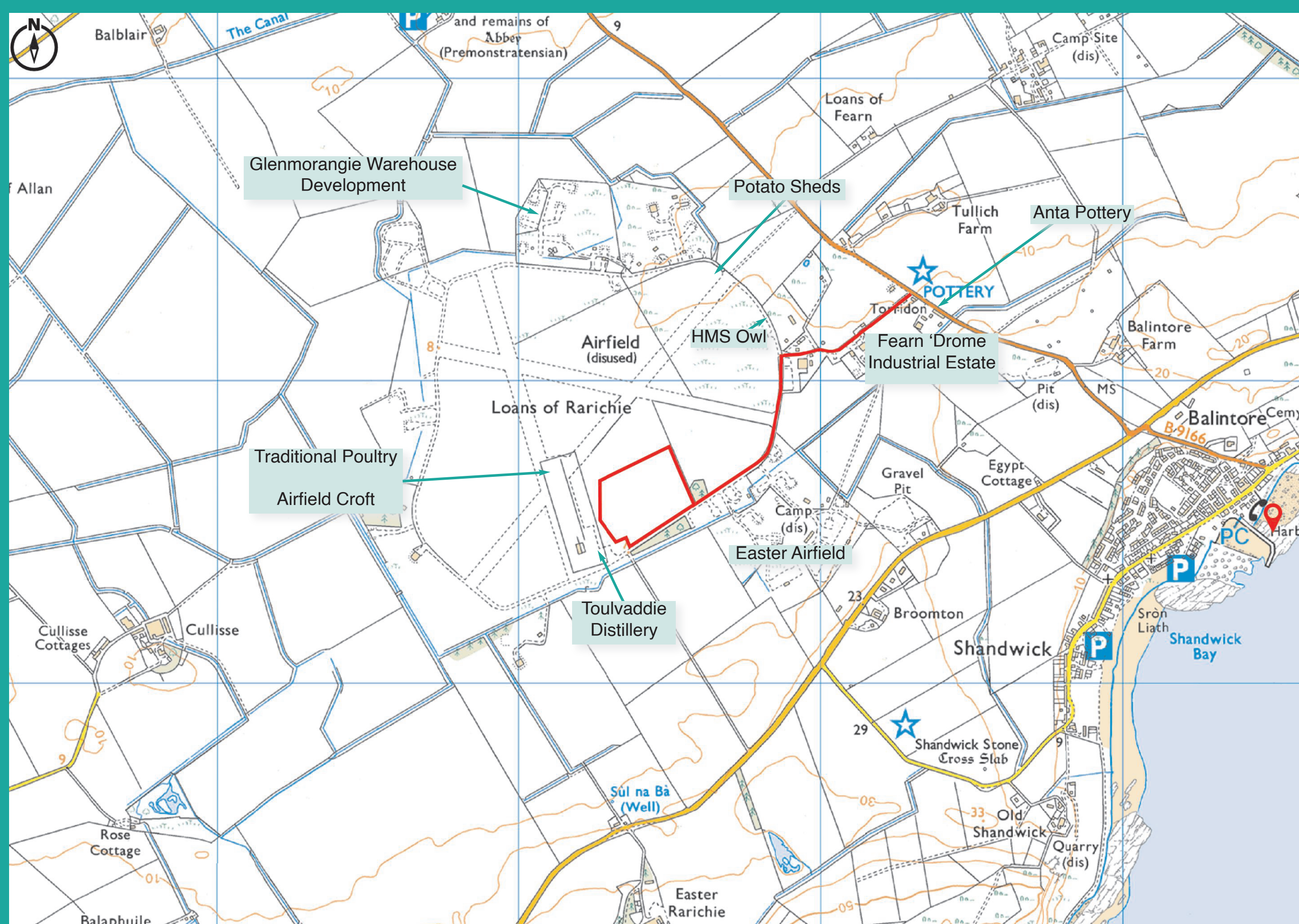
Site plan



# Location

The site is located in the former Fearn Airfield, due west of the Seaboard Villages. The location has been chosen as Acorn Bioenergy prioritise sites with good access to farms and distilleries that can provide high quality crops and residues.

The site falls within Easter Ross, a strategically important part of the Inner Moray Firth referred to as the Ross-shire Growth Area within the Inner Moray Firth Local Development Plan 2015 (IMFLDP 2015). The sites within this area have been allocated as they have the potential to provide nationally important hubs for renewable development.



Site location in red



# Key benefits of Anaerobic Digestion

The plant at Fearn will help the Highlands transition towards a net zero future by reducing its carbon emissions, and realise the Highland Council's ambitions of becoming carbon neutral by 2025 and having the lowest carbon footprint of any local authority in Scotland.

During its operational lifetime, the plant will have an average carbon saving equivalent of taking more than 17,000 cars off the road or planting 1,000,000 trees.

The plant will help Scotland by ensuring energy security, and help the diesel-dependent HGV industry go green by providing a ready fuel solution for HGVs.

The plant will produce green CO<sub>2</sub>, which Acorn will sell locally to food and drink manufacturers, glass houses and other customers. This will benefit local businesses by adding a more local choice in the region.

It will also produce digestate, a high quality organic biofertilizer, which is both less odorous than animal manures/slurries and more environmentally friendly

than expensive mineral fertilisers. Their production requires the use of large quantities of fossil fuels alongside the mining of limited resources like phosphate and potash.

Digestate fertilisers comprise a diverse blend of nutrients, which benefit soil health, resulting in high-quality agricultural land that will significantly enhance crop yields.

Use of agricultural break crops like hybrid rye in the anaerobic digestion process gives local farmers another income stream at a time when their margins are under pressure due to the reductions in EU agricultural supports. It also allows farmers to rotate their crops, which will increase subsequent crop yields by replenishing nutrients in the soil and reducing the occurrence of soil borne diseases like take-all and herbicide-resistant weeds like black grass.

The Fearn site will use slurries from the local area. This will reduce agricultural odours associated with the storage and land spreading of slurries and manures, without additional traffic movements.

Image showing the difference in quality in grass fed with mineral and digestate fertiliser.



Image courtesy of FGS Organics: [www.fgsorganics.co.uk/digestate-supply-and-spreading/](http://www.fgsorganics.co.uk/digestate-supply-and-spreading/)

## Key benefits to recap

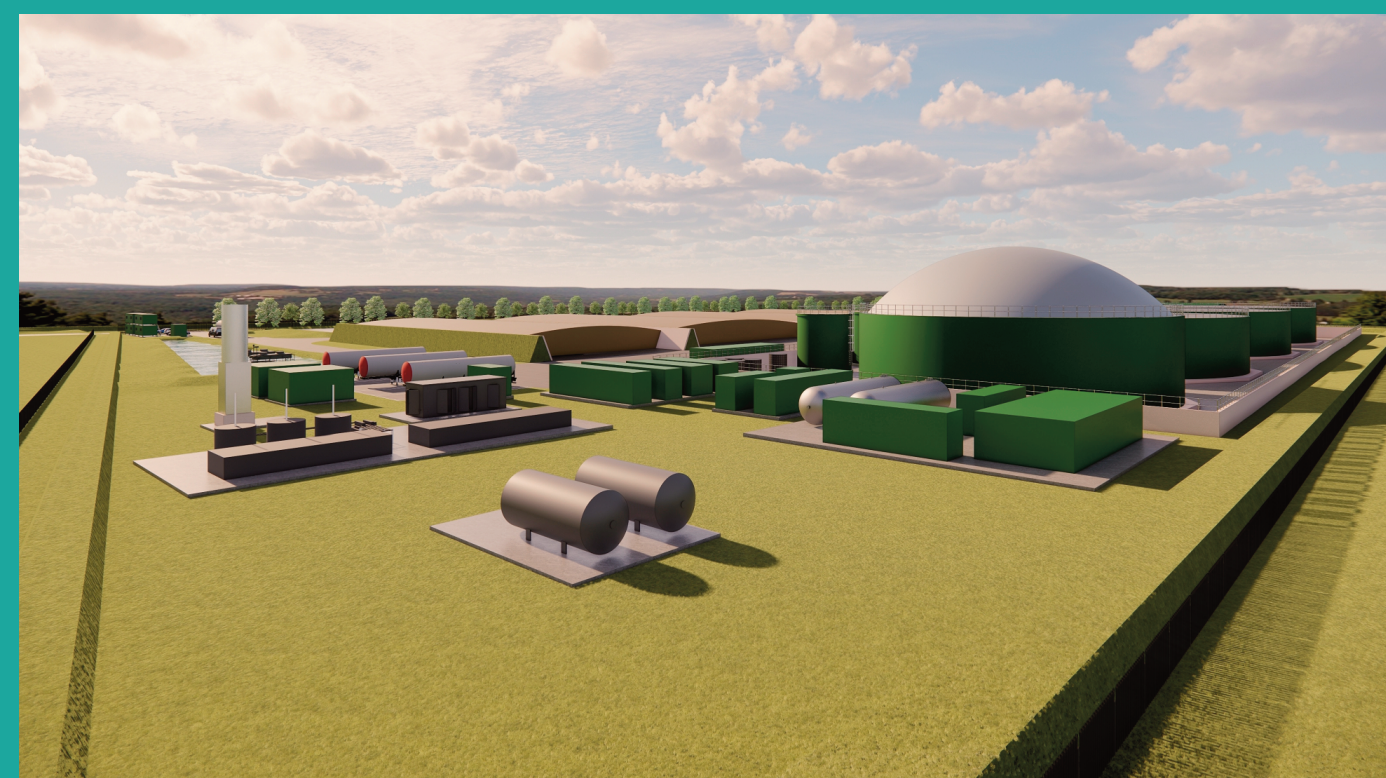
- ✓ Helping tackle the climate emergency
- ✓ Secure long term diversity and income of local farms
- ✓ Ensure energy security
- ✓ Healthier soils = higher quality agricultural land
- ✓ Providing environmentally friendly fuel for HGVs, a sector facing challenges in reducing its carbon emissions



# Images of the Proposal



Site view facing east



Site view facing south



Site view facing north east



Site view facing north west



Site view facing north



# Next Steps

## Planning Application

We are currently preparing to submit a planning application, which we anticipate submitting in September.

We have already started to assess the impact of the following, which will be published with the planning application:

- Air quality
- Archaeology
- Ecology
- Noise
- Ground conditions
- Traffic
- Water quality

## Feedback

Thank you for attending our drop-in event.

Your feedback will be invaluable to our project. We are keen to work with and be a good neighbour to the local communities around Fearn.

If you can, please take a few minutes to fill out a feedback form. We hope you have found this drop-in event useful. If you have any questions, feel free to ask members of the project team here today.

**June 2022**  
Public consultation

**September 2022**  
Submission of planning application

**Winter 2022**  
Determination of planning application

**Spring 2023**  
Start on site if permitted

## Tell us what you think

- Complete one of our feedback forms today, or send it back to us
- Email us at: [admin@ghjohnston.co.uk](mailto:admin@ghjohnston.co.uk) Visit
- our website: [www.ghjohnston.co.uk](http://www.ghjohnston.co.uk)

Thank you for attending our drop-in event.