

About Acorn Bioenergy

Acorn Bioenergy is committed to providing renewable, carbon negative energy by unlocking the full potential of biomethane and green CO2 production in the UK. We plan to make an immediate impact by reducing transport, industry and agricultural emissions commencing in 2023.

Acorn Bioenergy creates biogas from anaerobic digestion facilities in the UK and upgrades it to biomethane. The biomethane from this site will be injected into the gas grid to provide enough renewable heat energy for over 7,000 homes per year.

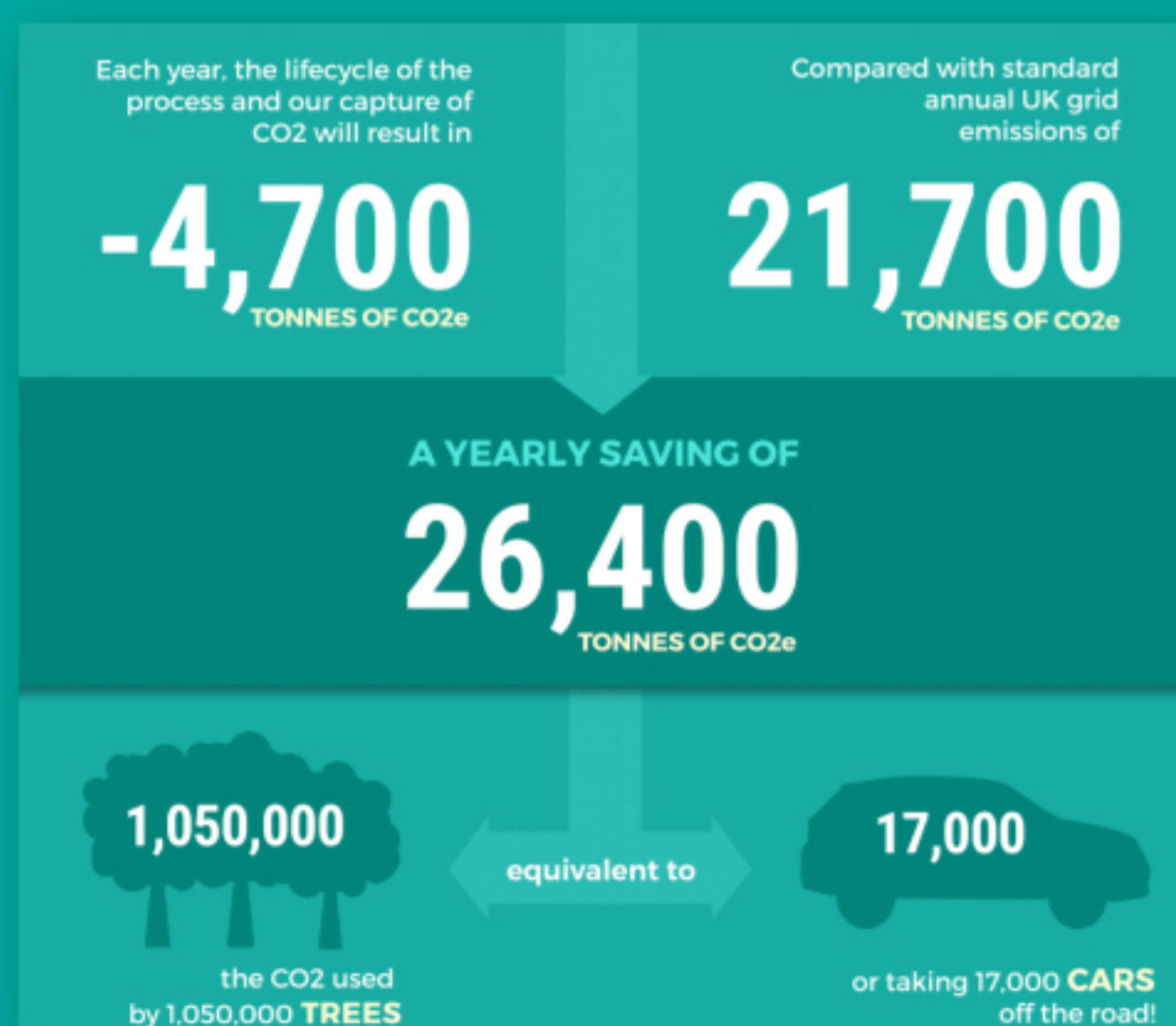
Biomethane is a mature renewable fuel that can be used in conjunction with electrification solutions. With spikes in energy prices due to Russia's invasion of Ukraine, we strive to provide one of the solutions to energy independence, whilst replacing natural gas in the transition to net-zero.

We do not require gas pipelines; instead, we use biomethane-fuelled trucks to transport the biomethane to central injection points. This provides distant farmers access to the National Grid.

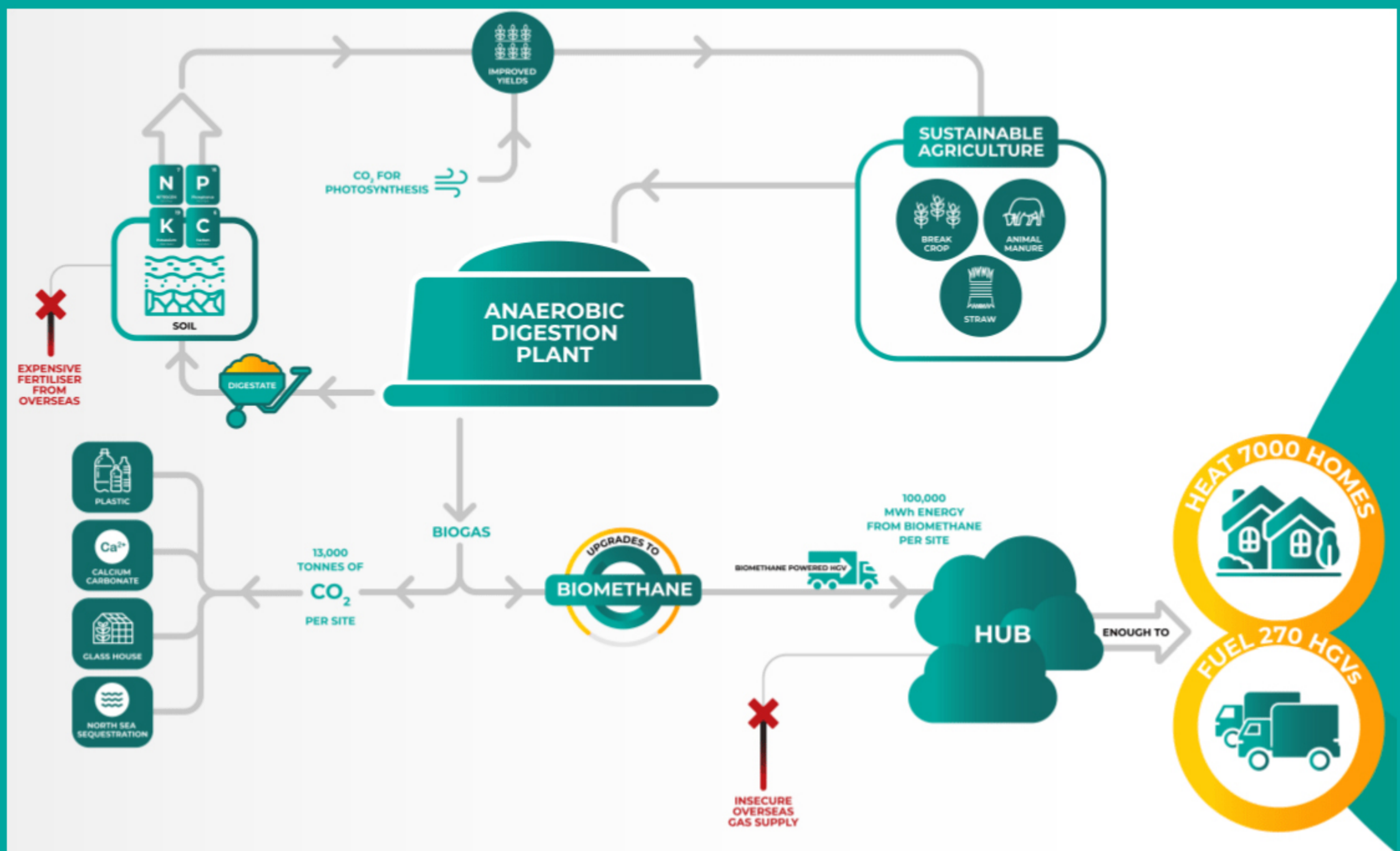
Biomethane is used in sectors that are harder to make carbon negative due to technological limitations and high costs. We will directly use biomethane as an alternative fuel to power our heavy goods vehicles (HGVs). In 2021, HGVs produced 18% of transport emissions, despite comprising 1% of vehicles 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.

Acorn Bioenergy predominately uses agricultural residues arising from break crops from a rotational cycle hence diversifying farmers' income and promoting sustainable agriculture by reducing monocropping. We take full responsibility for the whole lifecycle and will also own the plant after construction.

The Acorn Bioenergy team have extensive sectoral expertise, acquired by Qualitas Energy who are eager to accelerate the energy transition. We are committed to help deliver a greener, more secure future for West Oxfordshire and the UK.



What is Anaerobic Digestion?



Carbon dioxide is absorbed by our break crop and converted into sugars for the plant. This process is called photosynthesis.

The crop, as part of a sustainable, beneficial rotation, is fed into the digester, alongside other agricultural residues.

Anaerobic digestion is a naturally occurring biological process carried out by a mixture of microbes which break down agricultural materials to use as an energy source in an air-tight tank. The 'key' microbes are methanogenic bacteria which produce biogas from the intermediate products. In this process, gas that would've been emitted from degrading agricultural material is captured for energy.

Our AD facilities will then refine the biogas to extract biomethane and green CO₂.

The biomethane we produce is then used in HGVs, transported and injected into the grid to be used for heating homes. Biomethane will then displace fossil fuel gas in the grid and reduce our international dependency on fossil fuels.

The AD process produces two useful co-products; digestate, which will be used as fertiliser on farms, and green CO₂, which we capture for use in industries. Due to the closure of domestic fertiliser plants, both of these resources are in short supply.

The end-product of this process is digestate. This is the remaining organic material that cannot be further broken down by the microbes. It is a renewable fertiliser which is supplied back to farmers.

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

The Site

- **Smell:** We process agricultural waste, not food waste hence avoiding issues of smell. We will be strictly monitored to ensure minimal impact on local residents.
- **Lighting:** 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.
- **Visual Impact:** The site benefits from significant screening, owing to the abundance of mature trees and smaller trees on its north, west and south borders and the lack of roads and viewpoints in the surroundings.
- **Biodiversity:** New hedgerows and native trees will be planted contributing to a biodiversity net gain whilst mitigating visual impact.
- **Jobs:** This facility will create approximately 15 full-time jobs including 4-5 on-site workers.
- **Size:** The site area will be approximately 6 hectares in total.
- **Inputs and Outputs:** Feedstocks will enter the site and, digestate and gas will leave the site by HGVs and farmyard vehicles.



Location

The proposed site is located on agricultural land north of South Leigh Road, south of the A40 and 1.2km west of Witney.

Our current traffic forecast indicates that for the majority of the year (excluding the harvest season), the proposed access/egress from the site would require 33-37 HGV/Tractor trips per day. For reference, the A40 itself has an

average traffic flow of 24,500 movements per day.

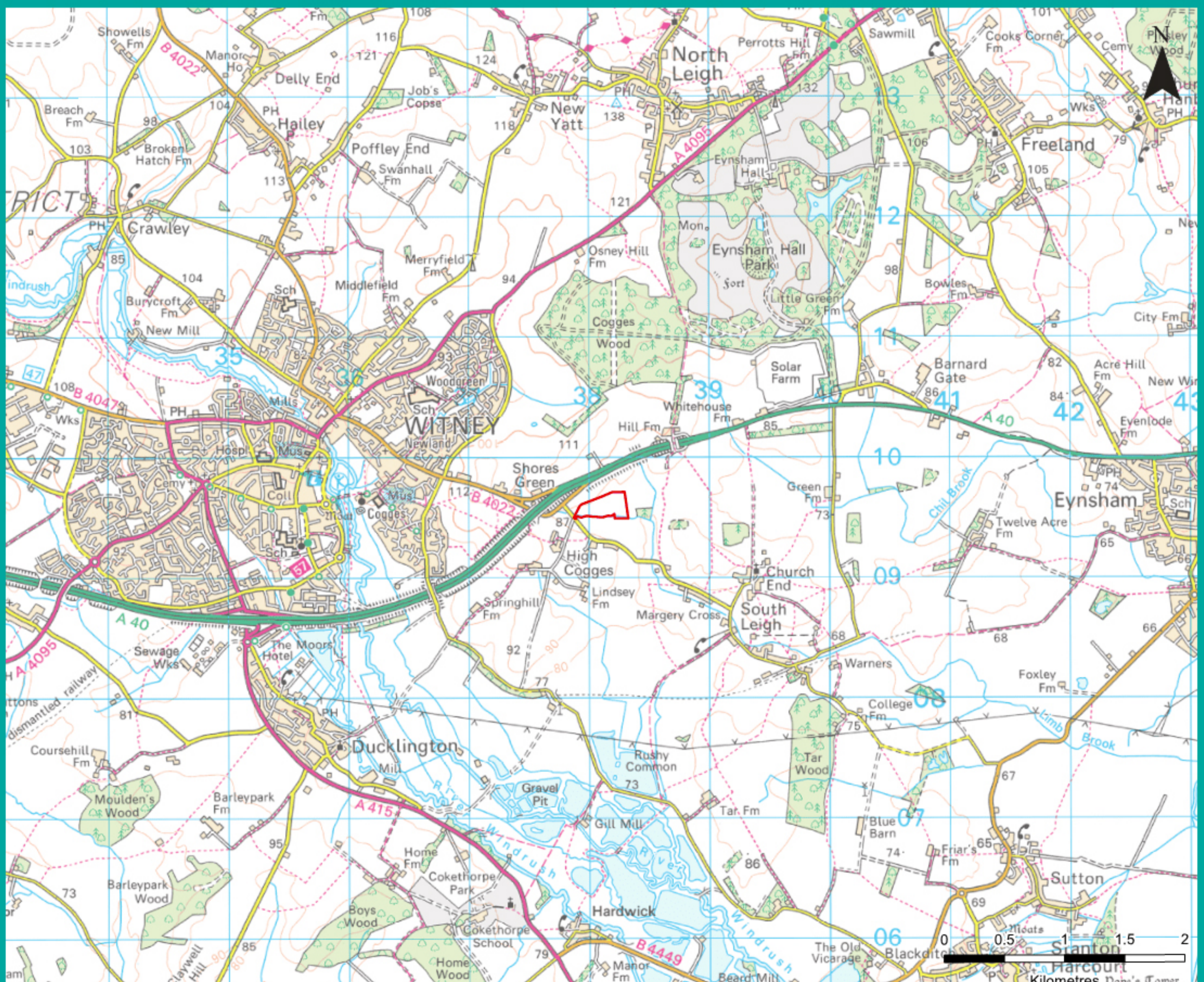
The access junction and surrounding highway has been reviewed and it is considered suitable to accommodate the proposals. A review of accident history indicates that there are no adverse highway safety concerns.

Feedstock related movements

contribute to existing agricultural operations so won't be new to the road network.

The location has been chosen as Acorn Bioenergy prioritise sites with good agricultural partners that can provide high quality crops and agricultural residues.

Acorn also choose sites that will have a minimal visual impact.



Site location in red

Key Benefits of Anaerobic Digestion

DELIVERING NET-ZERO:

AD will play a crucial role in decarbonising the national gas grid. AD is expected to deliver 2.8TWh of renewable heat per year in 2030/31 from biomethane.

At present, agriculture, and rural land-use account for 12% of annual greenhouse gas (GHG) emissions nationally. By using agricultural waste as a feedstock, gases like CO₂ and methane that would've naturally contributed to atmospheric GHGs are captured for renewable heat energy.

Our biomethane-powered HGVs are an excellent net-zero transport technology.

Green CO₂ will replace alternative energy-intensive sources of CO₂. Usable CO₂ is limited but is an absolute necessity in the medical and, food and beverage industry. Green CO₂ also has huge potential in the future of sustainable materials.

Overall, we are looking at carbon savings equivalent to planting over 1,000,000 trees!

IMPROVING SUSTAINABLE FARMING:

AD is pivotal to sustainable food production and farming.

Digestate contains a high quantity of organic matter, restoring soil quality and NPK nutrients to promote healthy crops whilst reducing the requirement of artificial fertiliser. Digestate makes the soil more resilient to climate change in drought or periods of water logging.

Use of agricultural **break crops**, a viable solution to tackle dwindling crop yields, will diversify farmers' incomes. Crop rotations prevent the

spread of endemic chemical resistant weeds like black grass and take-all.

Encouraging the use of break crops, in conjunction with the use of digestate, will increase crop yields and support food security

DEVELOPING NATIONAL ENERGY SECURITY:

With spikes in energy prices due to Russia's invasion of Ukraine, a supply of domestically produced biomethane to the grid will decrease dependence on uncertain international supply by securing supply chains and mitigating energy price volatility.

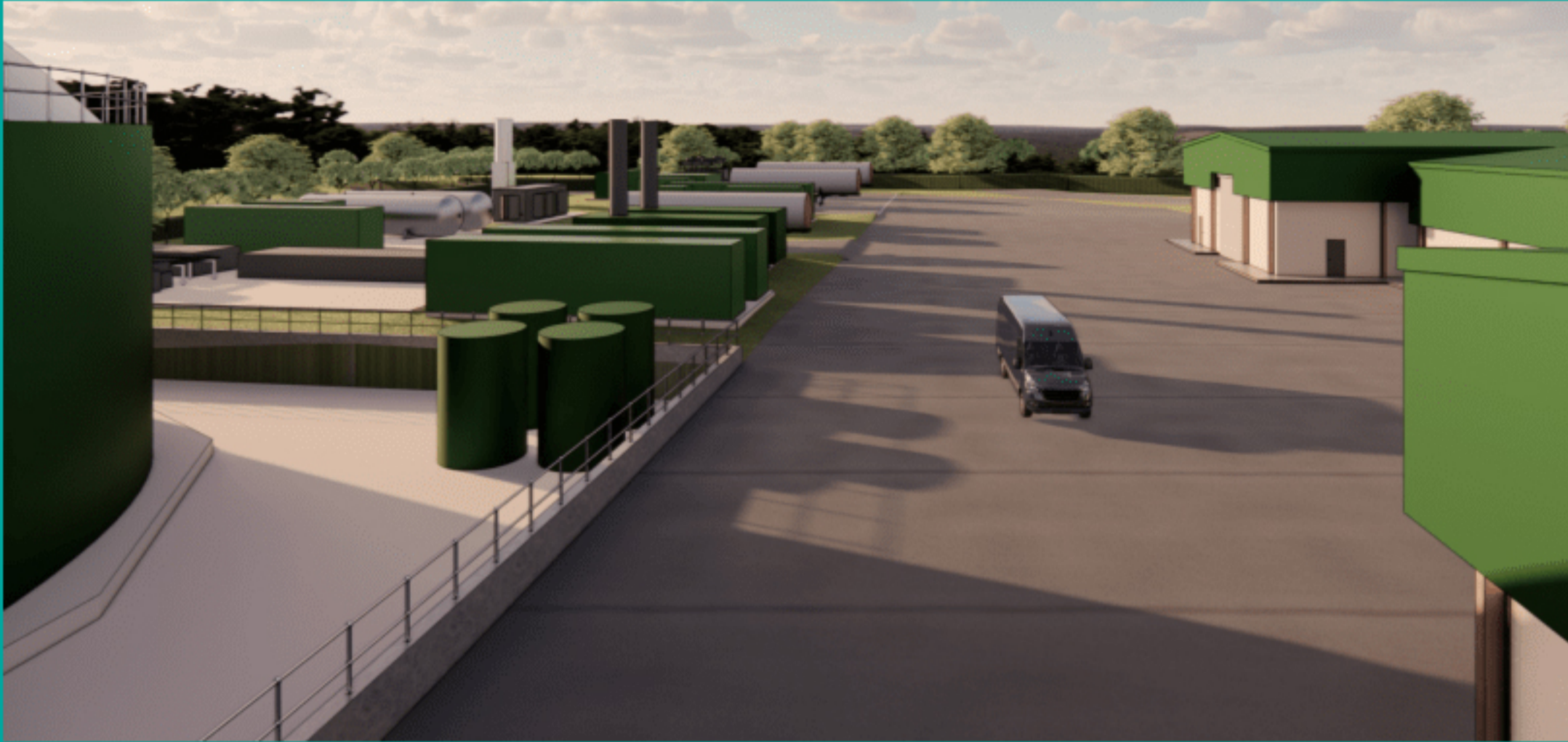
In fact, the UK's full potential of anaerobic digestion is 54.5 TWh which accounts for 11.4% of domestic energy needs.

Supply of fertiliser and CO₂ is limited due to the closure of domestic fertiliser plants and overseas imports being hampered by war. Digestate provides a cheaper, sustainable alternative, helping to reduce food price insecurity dictated by gas and fertiliser supply.

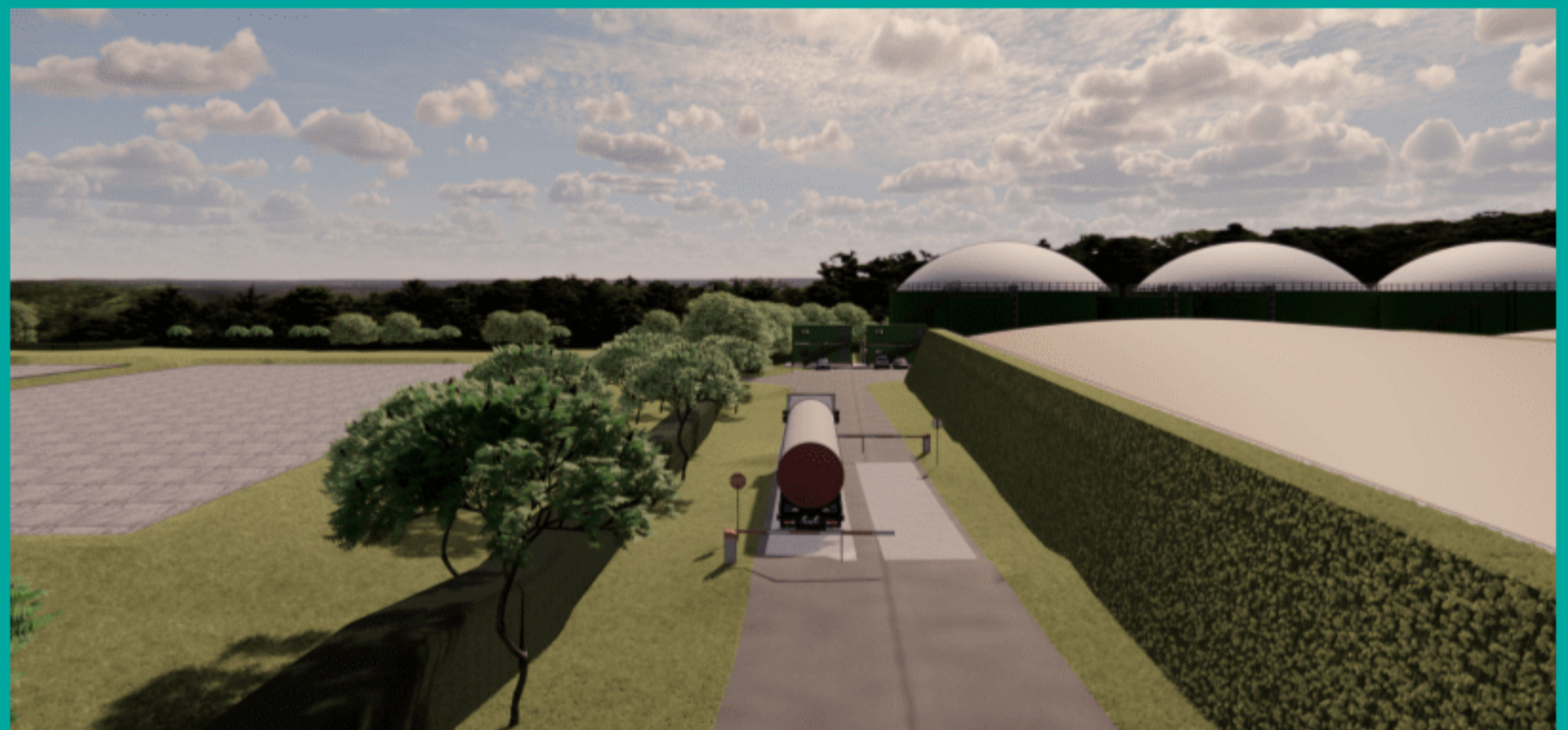


Image: Mineral fertiliser vs digestate applied to grass
Image courtesy of FGS Organics: www.fgsorganics.co.uk/digestate-supply-and-spreading/

Site Visuals



View towards the western area of the site



View towards the eastern area of the site



View towards the central area of the site

Next Steps

Planning Application:

We are currently preparing to submit a planning application, which we anticipate submitting in Q4 2022.

To this end, an Environmental Impact Assessment (EIA) of the proposed site has been carried out to assess the potential impacts on the following:

- Air quality
- Archaeology
- Ecology
- Noise
- Ground conditions
- Land Quality
- Visual Impact
- Traffic
- Water quality

Feedback:

Thank you for attending our drop-in event. Your feedback will be invaluable to our project. We are interested in **delivering a beneficial impact to your community**. Let us know how we can help you.



The Acorn Bioenergy Team

November 2022
Public consultation

End of 2022
Submission of planning application

Early 2023
Determination of planning application

Summer 2023
Start building on site if permitted

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.

Tell us what you think:

- Complete one of our feedback forms today, or send it back to us FREEPOST
- **Call the consultation team:** 0749 386 7448
- **Email us:** eastwitneyplans@instinctif.com
- **Visit our website:** www.eastwitneygreenpower.com

Thank you for attending our drop-in event.