

JLEN Anaerobic Digestion Portfolio CO₂ Analysis Report

May 2019

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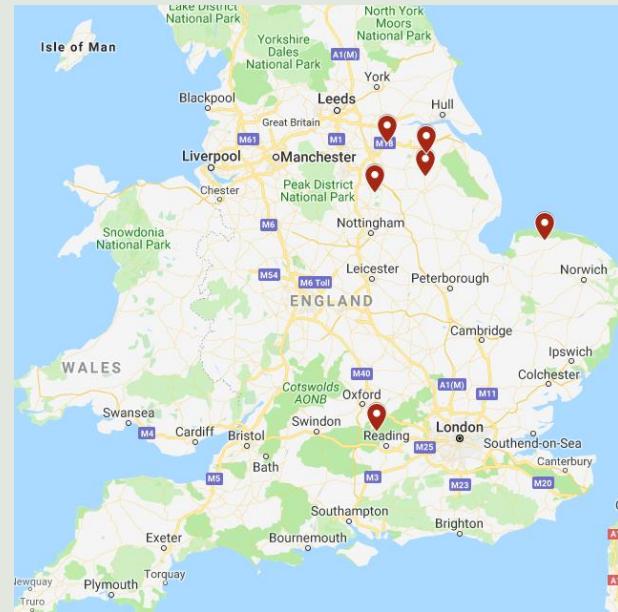
CO₂ Analysis Report

Executive Summary

Aardvark Certification Ltd (ACL) has been instructed by John Laing Environmental Assets Group Ltd to assess and report against the carbon savings achieved across their anaerobic digestion plant portfolio. The portfolio consists of a total of 6 individual assets, comprised of agricultural anaerobic digestion plants producing both biomethane and electricity. The total installed capacity of the JLEN anaerobic digestion portfolio amounts to 30MW with assets distributed across the country.

Asset Introduction

The JLEN Anaerobic Digestion Portfolio is concentrated in Lincolnshire and Nottinghamshire with two plants lying further afield in Norfolk and Oxfordshire. JLEN hold a majority stake in all of the anaerobic digestion assets they have invested in. The anaerobic digestion assets are accredited to both the RHI and FiT schemes and all are managed under service contracts with O&M providers. The anaerobic digestion portfolio produces an average of 241,641 MWh of biomethane and a further 21,306 MWh of electricity per annum. During the course of the portfolio's operational lifetime it is anticipated that up to 4,832,818 MWh of biomethane and 426,120MWh of electricity will be produced.



Energy Production & CO₂ Savings

As there are two forms of energy generation from the assets within the AD portfolio, electricity and biomethane, the associated carbon emissions avoided from each energy source for each asset have been calculated and then combined to give an overall emissions avoided figure. These figures take in to account the emissions associated with the production of energy crops used by the individual assets as well as the energy used by the AD plants themselves during the anaerobic digestion process.

Asset Name	Installed Capacity (m ³ /hr)	Installed Capacity (kWh)	Total Energy			t CO ₂ e			
			Generation to date MWh	Avg Annual Generation MWh	Forecast generation MWh	Emissions avoided to date	Avg annual emissions avoided	Lifetime emissions avoided	Forecast emissions avoided
Egmere	450.0	500.0	156,414	39,104	625,664	18,393	4,598	91,968	73,575
Grange Farm	450.0	500.0	162,928	40,732	651,712	17,697	4,422	88,440	70,743
Vulcan	450.0	500.0	200,000	50,000	800,000	19,084	4,771	95,420	76,336
Meden	450.0	360.0	162,008	40,502	648,032	11,405	4,008	80,151	68,746
Icknield	450.0	500.0	193,224	48,306	772,896	29,369	7,072	141,432	112,063
Merlin	450.0	500.0	177,212	44,303	708,848	20,805	4,863	97,265	76,460

CO₂ Forecast

Based on the quantity of biomethane and electricity the anaerobic digestion portfolio produces each year, an average of 29,734 tonnes CO₂e per annum will be avoided compared to the emissions associated with natural gas and electricity produced for UK consumption. It is expected that during the course of the anaerobic digestion portfolios remaining operational life, a further 477,923 tonnes CO₂e will be saved. This means that over the lifetime of the various AD plants some 594,677 tonnes CO₂e will be avoided through the energy produced by the anaerobic digestion plant portfolio.

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Other Emissions to Air Avoided

In addition to avoiding CO₂ emissions, other greenhouse gas emissions are also avoided including CH₄ and N₂O through the electricity produced by the AD assets. Based on the amount of biomethane and electricity produced by the JLEN anaerobic digestion Portfolio per annum, emissions of these gasses which have been avoided have been calculated and shown below. These values are included in the total CO₂ equivalent values used within this report.

CO ₂ e of CH ₄ emissions avoided kg/yr	CO ₂ e of N ₂ O emissions avoided kg/yr
72,056	56,762

What do these savings mean?

The forecast CO₂ savings the JLEN Anaerobic Digestion Portfolio will achieve over its lifetime can be difficult to fully appreciate when stated in tonnes. We therefore convert these figures to real-life equivalents to assist the reader in interpreting the reporting. For the anaerobic digestion portfolio, the above figures equate to:

- removing the combined emissions of 13,651 medium sized diesel cars every year from UK roads for the lifetime of the asset portfolio.
- the same quantity of emissions produced through providing electricity for 28,440 UK homes over 20 years based on average consumption statistics.
- the same quantity of emissions produced through providing natural gas for heating and cooking in 12,709 UK homes for twenty years

Other Environmental & Community Benefits

As well as the specific CO₂ savings the JLEN anaerobic digestion portfolio delivers, several of the individual assets also contribute directly to their respective local communities. The combined contributions from the various AD assets to local community benefit funds amount to £11,775 per annum. These funds have been used to support a wide range of local causes such as community magazines and notice boards and are commonly focussed on other sustainability based projects at a local level.

In addition to supporting local community schemes, AD has another often overlooked environmental benefit which also avoids further CO₂ emissions to atmosphere. The digestate produced by the AD process is used as a direct replacement for traditional fertilisers enabling the plants to avoid further carbon emissions than would otherwise have been produced.

A summary of CO₂ emissions avoided through use of digestate as a replacement for traditional fertilisers is shown below:

Asset Name	Digestate CO ₂ e per annum
Egmere	472
Grange Farm	472
Vulcan	472
Meden	314
Icknield	444
Merlin	390
Total	2,564

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Methodology

This report has been prepared in good faith by Aardvark Certification Ltd based on data obtained from the owner/operator of the asset reviewed. Our calculations of CO₂ savings are based on IFI Approach to GHG Accounting for Renewable Energy Projects. Baseline Emission Factors used in this analysis are taken directly from the Department for Business, Energy & Industrial Strategy Greenhouse gas reporting: conversion factors 2018.

Liability

This document contains information and may contain conclusions and recommendations. Every effort has been made to ensure that the information is accurate and that the opinions expressed are sound. However, Aardvark Certification Limited cannot be made liable for any errors or omissions or for any losses or consequential losses resulting from decisions based on the information.



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