

JLEN Investment 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 investment portfolio. The portfolio consists of a total of four asset classes, wind turbines, solar photovoltaic installations, anaerobic digestion plants and waste/wastewater facilities. The portfolio consists of 28 individual assets with a total capacity of 279.2 MW.

Asset Introduction

The JLEN Investment Portfolio is widely distributed across the UK with assets strategically located in order to benefit from the natural resources such as wind and solar irradiance. JLEN hold a 100% stake or majority stake in virtually all of the assets within the portfolio. All assets are managed under service contracts with specialist O&M providers.

The portfolio has produced a total of 3,169,680 MWh of renewable energy to date. During the course of the portfolio's total lifetime it is anticipated that up to 17,419,987 MWh of renewable energy will be produced. In addition to energy generation, the assets within the portfolio also treat wastewater and residual household and commercial waste. The waste processing facilities process an average of 446,494 tonnes of waste and 33,466,396m³ wastewater per annum.



CO₂ Savings

The CO₂ savings achieved by the JLEN Investment Portfolio are through the generation of renewable energy as well as through diverting waste from landfill. The types of renewable energy produced includes electricity and biomethane. An overall performance summary showing annual average generation or processed volumes for each asset class is shown below. The chart shows that the anaerobic digestion and waste/wastewater asset classes contribute to decarbonisation in multiple ways.



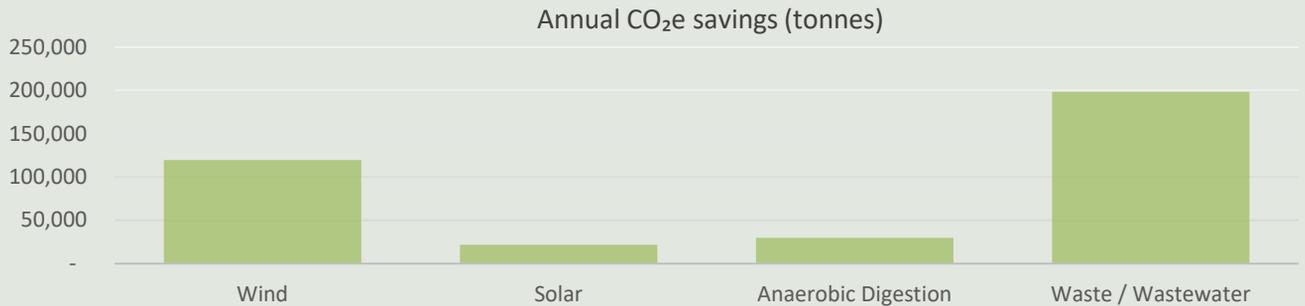
Energy production and waste volumes processed have been considered over the lifetime of the individual assets in order to quantify the contribution each asset will make over its operational lifetime.

Asset Class	Unit	Annual	Operation to date	Operational lifetime
Wind	MWh	421,769	1,701,226	10,407,306
Solar	MWh	76,420	368,174	1,684,466
Anaerobic Digestion	MWh	262,947	1,051,786	5,258,938
Wastewater	MWh	2,771	48,494	69,277
Waste / Wastewater	tonnes	596,494	7,754,422	14,912,350

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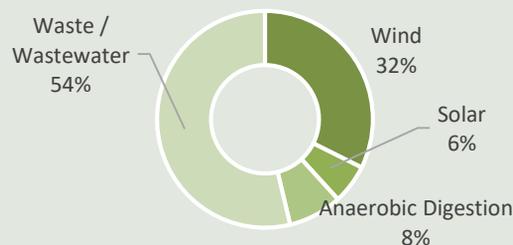
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The preceding renewable energy generation and waste processing data has been converted to show the tonnes of CO₂e per annum the various JLEN assets have avoided had the same amounts of fossil fuel derived energy been produced or the waste streams not processed.



From this data it is possible to illustrate by asset class the contribution made to overall CO₂e avoided. This data is shown as a percentage contribution below. It can be seen that the contribution of the waste/wastewater assets is significant towards the overall emissions avoided contributing some 54%. This is due to the fact that diverting waste from landfill has a greater impact on avoiding emissions to atmosphere than the avoidance of emissions from fossil fuel derived energy at the scale being achieved via the renewable energy assets in this portfolio.

Emissions avoided by asset class



CO₂ Forecast

Based on the quantity of energy the JLEN portfolio produces each year and waste processed, it is possible to quantify historic emissions avoided as well full operational lifetime emissions which will be avoided by asset class. For those assets producing renewable energy, this analysis is shown below with the waste asset shown at the bottom of the table. It is expected that over the remaining lifetime of the JLEN portfolio, a further 5,890,287 tonnes CO₂e will be avoided. Over the total operational life of the JLEN portfolio, a total of 8,978,352 tonnes CO₂e will be saved.

Asset Class	Generation to date MWh	Total Energy		Emissions avoided to date	t CO ₂ e		
		Avg Annual Generation MWh	Forecast generation MWh		Avg annual emissions avoided	Lifetime emissions avoided	Forecast emissions avoided
Wind	1,701,226	421,769	8,706,080	481,566	119,390	2,945,996	2,464,430
Solar	368,174	76,420	1,316,292	104,219	21,632	476,822	372,603
Anaerobic Digestion	1,051,786	262,947	4,207,152	116,754	29,734	594,677	477,923
Wastewater	48,494	2,771	20,783	13,727	784	19,610	5,883
		Waste			t CO ₂ e		
	Waste Type	Avg Annual Tonnage	Forecast Tonnage	Emissions avoided to date	Avg annual emissions avoided	Lifetime emissions avoided	Forecast emissions avoided
Waste	All Wastes	446,494	5,357,928	2,371,799	197,650	4,941,247	2,569,449

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What do these savings mean?

The forecast CO₂ savings the JLEN Investment 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 total portfolio, the above figures equate to:

- removing the combined emissions of 169,485 medium sized diesel cars every year from UK roads for the lifetime of the asset portfolio, or;
- power 140,055 residential properties based upon the national average electricity consumption statistics from the renewable electricity generated, or;
- provide enough renewable electricity to drive a Nissan Leaf 1,536,076,471 miles a year – equivalent to driving 61,687 times around the circumference of the earth, or;
- provide enough renewable electricity to boil enough water for 91,397,000,000 cups of tea

Community Benefits

As well as the various environmental benefits the JLEN Investment Portfolio delivers, the majority of individual assets also contribute directly to their respective local communities. The individual assets have in the last year contributed over £350,000 to local community funds managed by local parish councils or foundations with ongoing commitments to donate to these funds over the lifetime of the projects. In most cases the funding is index linked ensuring that it will not diminish with inflation and will continue to make a meaningful contribution at a local community level. The projects the funds are allocated to are for the betterment of the local community with preference for projects which promote sustainability.

A summary of individual asset community funding for the last payment year is shown below:

Asset Class	Community fund contribution per annum (£)
Wind	£ 330,847.00
Solar	£ 7,447.00
Anaerobic Digestion	£ 11,775.00
Waste/Wastewater	£ -

Summary

- The JLEN Investment Portfolio consists of 4 asset classes: Wind, solar, anaerobic digestion and waste/wastewater
- The portfolio contains a total of 28 assets with a combined capacity of 279.2MW
- On average, a total of 522,266MWh of electricity and 241,641MWh of biomethane is produced per annum
- An average of 446,494 tonnes of waste and 150,000m³ are processed per annum
- Approximately 54% of all emissions avoided by the portfolio are through diversion of waste from landfill. The remaining 46% of emissions avoided are from renewable energy generation
- It is forecast that the JLEN assets will avoid a total of 8,978,352 tonnes CO₂e over their operational lives
- Contributions towards community benefit schemes across the portfolio have amounted to over £350,000 per annum

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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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