

JLEN Waste & Wastewater 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 waste & wastewater portfolio. The portfolio consists of a total of 2 assets, a waste processing facility in East London and a wastewater treatment plant in South East Scotland.

Asset Introduction

The JLEN Waste & Wastewater Portfolio is distributed in the south east of England and in Scotland and comprises of two primary assets. The assets within the portfolio are a waste processing facility, East London Waste Authority (ELWA), which processes upwards of 430,000 tonnes of household waste per annum and the Tay Wastewater Treatment Plant, which treats up to 150,000m³ of wastewater per day.

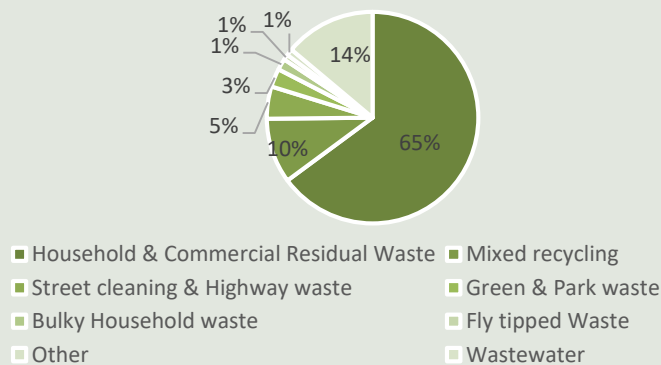
This portfolio of assets avoids CO₂ emissions in two ways. The first is diversion of waste from landfill which avoids significant GhG emissions being produced through the recycling and reprocessing of household wastes. The second way GhG emissions are avoided is through on site energy generation at the Tay plant by using the residual sludge from the treatment of wastewater to fuel an on site anaerobic digestion plant.



Input materials

The waste and wastewater portfolio processes a range of input materials comprising of an estimated annual tonnage of 596,494 tonnes. The bulk of this material is treated by ELWA which processes 75% of the total portfolio inputs. The remaining 25% of input material comprises of wastewater which is processed at the Tay facility. Waste types processed are shown below.

Annual Input Tonnage



How are CO₂ savings achieved?

The processing of wastes by the ELWA project sees on average 93% of the annual input material successfully diverted from Landfill. This enables a significant amount of greenhouse gases to be prevented from being emitted to atmosphere. Municipal waste disposed of via Landfill produces 586.5313 kg CO₂e per tonne of waste. Those same wastes when recycled or processed as Refuse Derived Fuel (RDF) avoid a large proportion of these emissions producing just 21.3842 kg CO₂e per tonne. Based on the analysis of waste types received by the ELWA, it is possible to determine the quantity of greenhouse gas emissions avoided through the recycling and reprocessing activities.

The Tay Plant achieves CO₂ savings through the production of electricity from anaerobic digestion of the sludge removed as part of the waste water treatment process. This is used to displace grid imported electricity.

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How are CO₂ savings achieved?

The CO₂ savings achieved by ELWA through diversion of wastes from landfill are shown below.

Waste Type	Annual Tonnage	Emissions for disposal at Landfill (kg CO ₂ e)	Emissions for recycled or re-processed waste (kg CO ₂ e)	net kg CO ₂ e avoided
Household, Commercial & CA Site Residual Waste	336,394	197,305,610	7,193,517	190,112,094
Mixed recycling	51,614	464,526	1,103,724	-639,198
Street cleaning & Highway waste	25,536	32,609	26,026	6,583
Green & Park waste	14,520	8,407,909	148,955	8,258,954
Bulky Household waste	8,897	147,512	190,255	-42,743
Fly tipped Waste	4,259	70,614	91,075	-20,461
Other	5,274	87,443	112,780	-25,337
All Waste received by ELWA	446,494	206,516,224	8,866,333	197,649,891

The CO₂ savings achieved by the Tay plant have also been calculated and are based on the emissions avoided through the provision of electricity from the on-site anaerobic digestion plant. The table below shows the total energy used by the Tay plant and the proportion of this which is displaced through on-site generation, some 60% on average.

Supply Type	Emissions Factor	Total Energy Use/Supply (kWh)	CO ₂ Emissions (tonnes CO ₂ e)
UK Grid Supplied Electricity	0.28307	4,588,647	1,299
AD Supplied Electricity	0	2,771,073	0
Balance of Grid Supplied Electricity	0.28307	1,817,574	515
Emissions Avoided			784

CO₂ Forecast

Based on the CO₂ emissions calculated above, it is estimated that 198,434 tonnes CO₂e per annum will be avoided compared to the emissions which would otherwise have been produced without these facilities. It is expected that during the course of the waste & wastewater portfolio's remaining operational life, a further 2,575,332 tonnes CO₂e will be saved.

What do these savings mean?

The forecast annual CO₂ savings the JLEN Waste & Wastewater Portfolio will achieve based on the current annual volumes processed is equivalent to:

- Removing the combined emissions of 91,096 medium sized diesel cars every year from UK roads.
- The emissions produced by a mid range electric vehicle when driven 2,090,758,523 miles a year – equivalent to driving 83,963 times around the circumference of the earth

Where does all the waste go?

An average of 93% of waste received by ELWA is successfully diverted from landfill. The diversion of waste from landfill is achieved by reduction through Mechanical Biological Treatment, further refinement and sorting and segregation of the remaining waste which is then mainly used as Refuse Derived Fuel or recycled. Just 7% cannot be processed further and ends up in Landfill. In the last 6 months the plant has been achieving a 99% diversion rate with only asbestos being sent to Landfill due to there being no alternative means of recycling or reprocessing of this material.

The Tay facility processes all of the water received removing a small fraction of debris and grit which is disposed of offsite. The sludge removed during the treatment process, once used to create electricity via anaerobic digestion, is turned in to a valuable biofertilizer which can be spread to land and is independently certified as fully processed and safe for use. The remaining liquid is either returned to the River Tay as clean and treated water.

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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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