AARDVARK
Certification Ltd

Cramlington Biomass Plant

CO_2 Analysis Report

November 2021

Prepared for: JLEN Environmental Assets Group Ltd

Cramlington Biomass Plant
CO_2 Analysis Report

AARDVARK Certification Ltd.

Executive Summary

Aardvark Certification Ltd (ACL) has been instructed by JLEN Environmental Assets Group Ltd to assess and report against the carbon savings achieved by the 27.77MWe Cramlington Biomass Plant located north west of Cramlington in Northumberland, UK. This assessment considers the CO_2 emissions avoided as a result of this plant being in operation in this part of the United Kingdom.

Asset Introduction

The Cramlington Biomass Plant is capable of processing in excess of 244,000 tonnes per annum of biomass fuel. It makes us of a conventional grate style combustion chamber. The plant produces both electricity and heat. For the purposes of this report, the total energy figures reported are converted to electrical equivalents to calculate the overall carbon emissions avoided.

The plant was commissioned in mid-2018. Since commissioning, the plant has produced an average of 196,859 MWh (net) of renewable electricity (equivalent) per annum.

CO2 Savings from Renewable Electricity

Renewable electricity derived from biomass combustion plants avoids significant CO_2 emissions compared with fossil fuel derived electricity. Standard conversion factors for fossil fuel derived electricity are shown below:

UK Generated Electricity: 0.21233 kg CO_2e per kWh

The calculated CO_2 savings shown within this report are based on the actual savings achieved by the site using the UK conversion factors for consistency across the JLEN portfolio.

Greenhouse Gas Emissions

The Cramlington Biomass Plant uses 100% solid biomass fuels to produce energy. The plant makes use of a range of solid biomass types all of which must demonstrate compliance with the sustainability criteria as set out in the Renewable Energy Directive in order to demonstrate that they qualify as contributing towards emissions reductions. The energy created from the combustion of the biomass fuel can be converted to electrical energy thereby replacing fossil fuel derived electricity. The average carbon intensity of the energy produced by the plant is 0.04086 kg CO_2e per kWh

CO_2 Emissions Avoided

Based on the above data, it is possible to calculate the CO_2 savings the plant has achieved since commissioning had the equivalent quantity of energy been derived from fossil fuel sources. Total CO_2 emissions which would have come from an equivalent quantity of electricity produced from fossil fuel sources is shown below along with CO_2 savings made through energy production from the biomass plant. This shows a total of 33,755 tCO_2e is being been avoided per annum by the Cramlington Biomass Plant through it's total energy production compared with current grid derived electricity.

Total Energy Produced				UK Generated Electricity	Biomass Generated Electricity
			Conversion factors	0.21233	0.04086
Electricity	196,859,000	kWh	CO_2 Equivalient (kg CO_2e)	41,799,071	8,043,659
			CO_2 Difference (kg CO_2e)	33,755,413	

Cramlington Biomass Plant
CO_2 Analysis Report

CO_2 Savings & Lifetime Forecast

With the preceding analysis, it is possible to calculate the CO_2 emissions which will be avoided in the future based on the expected operational phase of the plant. The Cramlington Biomass plant is designed with a 30 year operational lifetime. In practice this may go on well beyond the planned 30 years. Based on the expected 30 year operational forecast, the biomass plant is expected to save a total of 1,012,662 tCO_2e over its lifetime at the current carbon intensity of grid derived electricity. This forecast is based on the current GHG emissions associated with the processing of the biomass fuel and operation of the plant. Future emissions avoided are expected to amount to 928,274 tCO_2e over the next 27.5 years of operations of the plant.

What do these savings mean?

The CO_2 savings achieved by the project can be difficult to comprehend and relate to real world understanding. We therefore equate the savings to every day scenarios such as vehicles, and homes to assist readers in interpreting the data.

The Cramlington Biomass Plant has to date avoided an estimated 84,389 tCO_2e since commissioning and is expected to avoid a further 928,274 tCO_2e over its operational lifetime at current conversion factors.

This equates to:

- Equivalent emissions produced by a mid-sized diesel car driving around Earth's equator 145,615 times over the lifetime of the plant
- Removing 426,145 mid-sized diesel cars from UK roads based on the lifetime CO_2 savings the plant will achieve whilst it has already offset equivalent emissions to 38,740 cars.
- Providing enough renewable electricity to power 48,404 average UK homes over the lifetime of the plant.

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 2021.

Energy usage statistics are taken from OfGEM - https://www.ofgem.gov.uk/gas/retail-market/monitoring-data-and-statistics/typical-domestic-consumption-values

Mileage travelled per vehicle in the UK was taken from the RAC Foundation.

Liability

AARDVARK
Certification Ltd.