



GP Biotec Permit Requirement Report

July 22nd 2019

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1 Introduction

This report is produced to fulfil the requirements stated in GP Biotec's environmental permit (Permit number EPR/AB3233DW):

- Section 1.2.1 Energy Efficiency,
- Section 1.3.1 Efficient Use of raw materials,
- Section 1.4.2 Avoidance, recovery and disposal of wastes produced by the activities.

The report details the Site's performance in relation to the above over the past 4 years.

2 Energy Efficiency

Overview

GP Biotec takes appropriate measures to ensure that energy is used efficiently in the activities undertaken on Site:

- Wherever possible the plant utilises the waste heat from the engines to heat the digester tanks and for pasteurisation;
- All parasitic loads of the plant are provided by the electricity generated by the anaerobic digester plant and therefore no net energy imports are required to power and operate the plant or Site Office (see chart below);
- All pipelines, heated tanks and thermal processes are lagged and insulated to ensure that heat loss is minimised and prevented;
- The CHP engines specified for the plant are considered to be best in class and have a quoted generator efficiency of 96.7% and total efficiency of 84% respectively;
- All ancillary plant (fans and motors) have been specified with high efficiency electrical motors and variable speed drives;
- The plant is controlled by PLC and optimised to ensure maximum efficiency and minimal operation of ancillary components where required;
- The Site is a net energy generator and is registered with OFGEM for the generation of electricity under the Feed in Tariff scheme (FITs);

- Where possible the Site has utilised lighting control sensors to minimise electricity wastage.

Energy Efficiency Review

The charts below illustrate the quarterly figures for electricity produced by the AD plant between Quarter 3 2015 – Quarter 1 2019, along with the parasitic load or plant usage.

Figure 1 Electricity Production and Parasitic Load

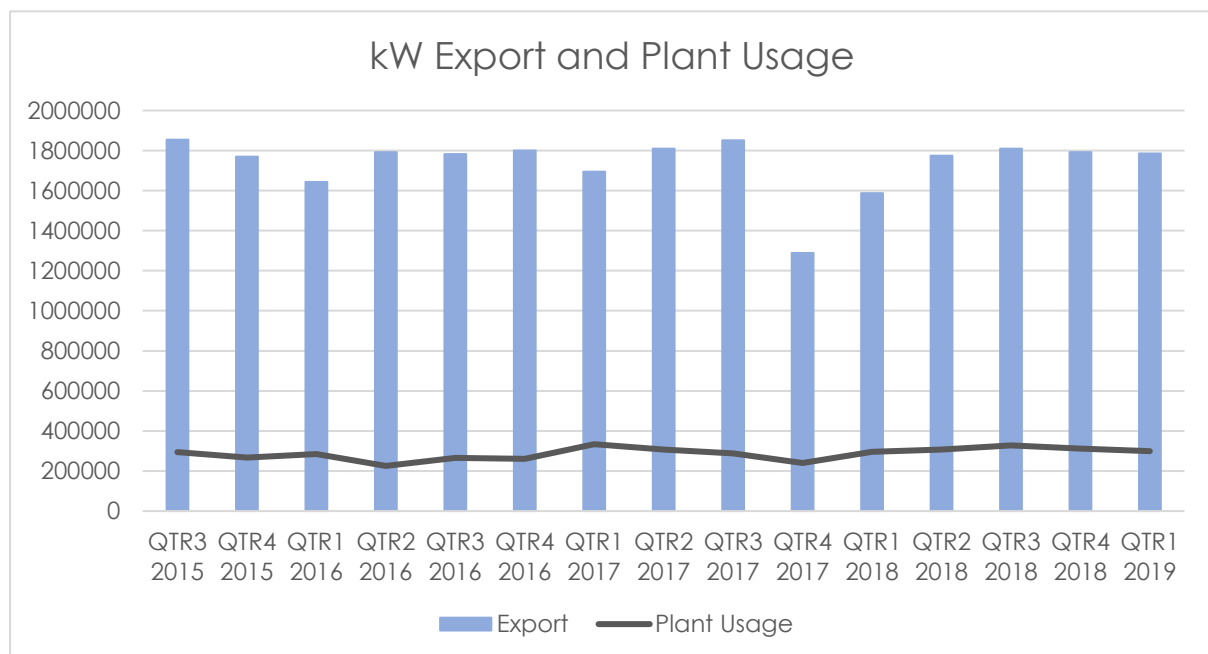


Figure 2 Parasitic Load % of Total Generation

The parasitic load for the plant has remained relatively stable for the past 4 years, the very slight upward trajectory is since the Site Office and various other buildings on Site have their electricity supplied by the plant as well as the actual plant itself.

In QTR 4 2017 CHP Engine 2 broke down and therefore impacted the export figures.

In May 2016 heat from the CHP engines was also utilised to heat the Site Office and other buildings around the farm, thereby increasing the overall efficiency of the plant.

Between 2014-2017 Environmental consultancy Aardvark produced an AD benchmarking dashboard to share with AD operators. The output of the tool was a benchmarking report that enabled individual operators to compare various measures of their plant's performance against other plants. It was hoped that through sharing this information it would lead to a better understanding of how best to maximise the efficiencies of AD plants.

Four such reports were published, in December 2014, January 2016, November 2016 and December 2017. GP Biotec is Plant 'E' within these reports (See Annex I).

Amongst other comparisons the report ranks each plant on a scale of 1 - 15 across three variables, income per kW installed, fuel to energy ratio and plant efficiency ratio. They then combine the scores for each of the criteria to give an overall benchmark score. Out of the 16 AD plants compared, GP Biotec was the 'best performing plant' in the 2014 and January 2016 reports.

In the November 2016 report GP Biotec was in fourth position in terms of energy efficiency since newer plants were utilising waste heat and therefore were more energy efficient. However, the last report that was published in December 2017 placed GP Biotec at number 3 out of 18 in terms of energy efficiency.

Unfortunately, Aardvark have not produced anymore reports, but up until approximately 18 months ago GP Biotec was proving to be competitive in the energy efficient stakes compared with other UK based AD plants.

Investigating Opportunities for Improving Energy Efficiency

GP Biotec is committed to investigating options for improving the plants' energy efficiency, utilising the Sites' waste heat is where the most improvement could be made, and options are being researched.

As part of the SMART Circle Project that GP Biotec is involved with, one of the consortium partners Heat Catcher, carried out a feasibility study into using Organic Rankine Cycling to utilise waste heat to produce electricity (see Annex II) however, the capital investment made the project unviable financially.

Other options that have been discussed at management level have been 'gas to grid'. These options continue to be investigated as part of a 'live' project, however due to commercial sensitivity further details cannot be reported at this stage.

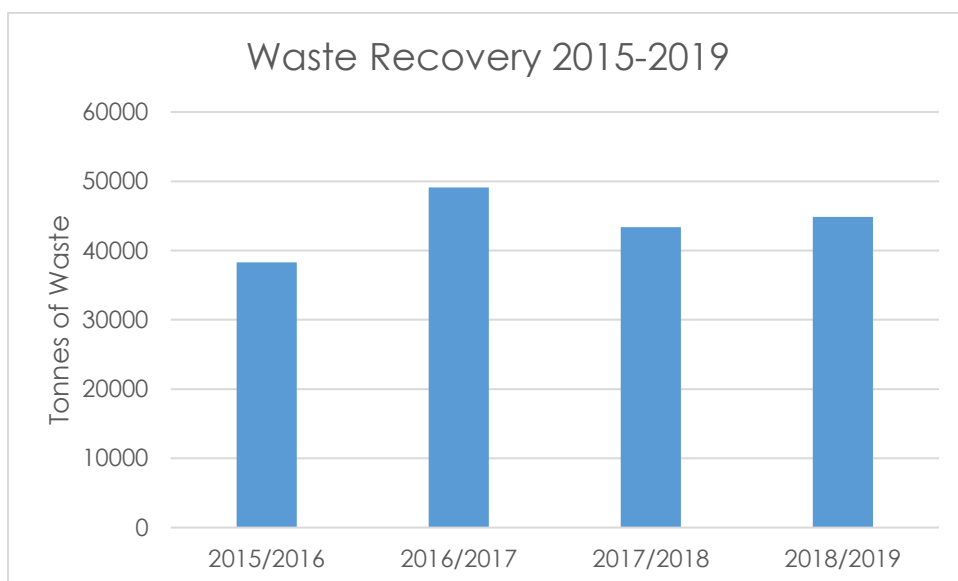
3 Efficient Use of Raw Materials

The Site uses a mixture of bulk wastes and farm derived crops as feedstocks for the anaerobic digester plant. Due to the nature of the business the wastes or raw materials that are accepted on a regular basis and for which Supply Agreements are in place (see Section 4.5.4) are listed in the Table 10.1 below, the regular farm derived feedstocks are also listed.

2.1 Waste Feedstocks

Waste Type	EW Code	ABP Category
Gut content	020202	Category 2
Lairage/Undercroft	020299	-
DAF/Wastewater	020204	-
Blood	020202	Category 3
Fruit/Vegetable Peelings	020304	-
Potato DAF	020305	-
Dairy Products unsuitable for consumption (e.g. whey	020501	Category 3

The chart below illustrates the amount of waste recovered via anaerobic digestion at GP Biotec. All of which has been spread to land in the form of Biofertiliser Certification Scheme compliant digestate products.



The table below illustrates the percentage of that waste that was generated within Wales and therefore processed and recovered in Wales.

Year	Percentage
2014/2015	75%
2015/2016	82%
2016/2017	81%

2017/2018	80%
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The Sites planning permission requires the amount of farm derived material used as feedstock by the Site to total 50% (by volume) of total input. Environmentally this is not considered to be the most efficient use of a raw material (considering the carbon footprint involved in producing the crop). However, the crops are produced using a nutrient management plan and therefore produced as efficiently and with as little environmental impact as possible.

It has been discussed at a management level whether or not the 50:50 planning condition could be revisited with the Brecon Beacon National Parks, but at present no decision on a way forward has been reached.

Water Usage

Current water usage is around 150 litres/day. The minimal amount of water is used on Site for washing down lorries, there are not really any areas where this can be reduced further, it is a requirement by APHA to clean the waste reception area and trailers/tankers thoroughly after loading, so the Site is limited in terms of options to reduce water usage.

4 Avoidance, recovery and disposal of wastes produced by the activities

Waste Generation

GP Biotec historically has had a trade waste contract with Powys County Council for the recycling of paper/cardboard, plastics and general waste; a two-weekly collection was in place for a 360 litre bin for cardboard/paper, 240 litre bin plastic/can recycling bin and 360 litre bin for general/mixed waste. This covered waste produced by the office and staff room. However, recently a new contract has been taken out with Thomas Waste Management who make a two-weekly collection of mixed recyclable and non-recyclable waste.

For larger amounts of plastics wrappings on new equipment etc generated by the Site are taken to Wye Valley Recycling, for which waste transfer notes are retained in the Site Office. Waste oil from the engines is collected by an Environment Agency registered company Oil Monster – details of which are held in the Site Office.

Waste generation is avoided in the main by the fact that parts are maintained well as part of a maintenance programme of daily, weekly, monthly etc checks, therefore reducing the need for replacement parts. Where possible parts are fixed rather than replaced which also minimises waste.