Energy Efficiency Plan

AS REQUIRED BY BAT 23

James Cooper | Head of Compliance | 25/07/2022

Policy

There is strong consensus within the scientific community that climate change is occurring and is caused by human activity. Envar and associated companies are therefore taking steps to reduce its own carbon emissions. This makes good sense environmentally and economically.

Energy costs money and is one of the most significant expenses of most businesses which handle physical products. It is therefore a given that the reduction in this cost is an all-round benefit to Envar and its customers financially and environmentally to reduce energy usage. To this end Envar is committed to:

- Achieving Net Zero by 2050 at the latest
- Provision on Scope 1 2 and 3 emissions accounting and reporting in line with the greenhouse gasses covered by the Kyoto Protocol
- Detailing and updating regularly the schemes and measures being taken to reduce GHG emissions to achieve these objectives
- Publishing the outcomes of the carbon reduction planning where appropriate

Andy Sibley

Managing Director

Procedure

Cambridge Composting Facility Site Permit requires as part of improvement condition IC 1 that the business shall show compliance to various BAT conclusions. This is inclusive of BAT 29 – Energy Efficiency.

Energy efficiency has a strong financial as well as environmental footing and is widely adopted across many businesses with the primary motivator being the reduction in costs rather than any environmental credential. That said it is also important to consider how we can examine, assess, and justify future changes as pert of the sites management systems. The IMS (integrated Management System) already includes functions to assess and justify energy efficiency within the system. The aim of this document is to provide a clear procedure on how this works within the system. Refer to how objectives and targets are set and reviewed and how the data is recorded for review by relevant bodies if required.

BAT has a separate document which covers energy efficiency for non-carbon trading scheme participants such as Envar Composting Limited. This is set out in the BREF for energy efficiency section 4. This document will use the measures and processes as suggested explaining how they are met within Envars' management system in compliance with BAT 23. This document also concerns BAT 11 which is about monitoring of energy and water. For the purposes of ease BAT 29 and BAT 11 are treated as one issue covered in this procedure.

BAT 23 requires the operator to produce:

- Energy Efficiency Plan including
    - Calculations of specific energy consumption of activities
    - Performance Indicators
    - Objectives and targets regarding efficiency
    - Energy consumption and exportation balance

Envar shall maintain a management system which provides for this through:

- The planning of energy efficiency improvements
- The completion of them by providing cost benefit analysis and budget
- The monitoring of the effectiveness of the improvements and recording of such
- Review of the improvements and new technology to look at ways in which the overall process may be further improved. Achieving "*Continual Improvement"*
- Provision of Information, Instruction, Knowledge, and training on efficiency, operating and behaving efficiently and relevant use of systems and procedures
- Providing annual review of energy efficiency for management review

This plan shall become a procedural document for Envar's wider system. The outputs of this procedure shall be contained within the onsite and electronic management system and records. These shall include

- Energy Efficiency Policy – included in the environmental policy
- Top management commitment – evidenced by policy
- Objectives and Targets as produced and updated quarterly
- Benchmarking where available in the annual management review
- Continual improvement

Energy Efficiency Review

CURRENT ENERGY USAGE

Electricity

Overview

The site currently uses electricity in various processes across the site. These are detailed in figure 1 which is a high-level schematic of supplies and their various functions. The main consumption of electrical energy is for the running of electronic motors. These motors power air handling and conveying systems. Most of the energy is used to convey air for the purposes of waste treatment to a legislated standard and pollution prevention.

FIGURE 1 Electrical Use Schematic

Sources of Electricity

The site is powered by mainly electrical energy. In the summer this is heavily supplemented by solar energy generated on site. Please see details below

Name/location of Incoming Meter	MPAN/meter Number/SPID	Meter ID	Meter Type	Setup	KVA
Central Sub Station	1014571915199	K12TB00976	Industrial Electricity	3-Phase	500
Heath Road/Pig Shed	1023465666288	E11BG38224	Industrial Electricity	3-Phase	125
Heathtops House	1012433730310	E10BG55451	Domestic Electricity	Single Phase	16

The energy delivered to site in 2021-2023 is supplied from British Gas Plc and in on the 70% renewable 30% Nuclear Tariff. The company considers this tariff to be a sensible long-term climate and energy efficiency strategy with nuclear providing base load capacity whilst more innovative ways of supplying base load are worked upon. Nuclear energy is one of the safest and least carbon intensive forms of energy production available.

Usage, Objectives and Targets

Electricity is used for:

- Odour abatement
- Process Control
- Internal lighting
- Door operation
- Office and domestic uses
- Air conditioning/heating through air source heat pump (reverse aircon)
- Conveyors and screw conveyors (biomass)

Energy Usage details averages at current

Energy Source	Usage	Unit
Electric	1,927,816	Kilowatt Hours
Gas	2600/30,000	Meters Cubed/Kilowatt H
Diesel	620,000	Litres
Water	16,000	Meters Cubed

Energy Production

Energy Source	Production	Unit
Solar PV	284,000	Kilowatt Hours

ANALYSIS

Tonnage Throughput All Activities – 16100. Which equates to a total usage as below:

N.B. – solar PV excluded from the below as the energy is not dependent on external supply. Standing charges have been excluded but for reference are averaging £25 per day

Energy Source	Used per ton	Unit	Cost Per Unit	Cost Per Ton
Electric	12	Kwh	£0.19	£2.28
Gas	0.18	Kwh	£0.07	£0.01
Diesel	3.85	Liters	£1.52	£5.85
Water	0.1	M^3	£1.02	£0.10

1 liter of diesel at normal combustion efficiency of 30% contains roughly 38 megajoules. This is about 10Kwh. Therefore, in considering conformance of units for understanding the largest targets for efficiency we can see that for every one ton of material the following applies –

Energy Source	Percentage Efficiency	Kwh Wasted due to efficiency loss per ton material handled	Percentage of treatment energy requirement
Electric	75	3	23
Gas	90	0.02	<1
Diesel	30	25	76

In this case table 5 shows the main source of inefficiency to be the use of diesel in internal combustion engines. this is losing 25kwh as waste in the process of energy extraction and is also the highest percentage of treatment demand.

Gas use is minimal as it is only used for the running of the site offices hot water and heating and is deemed negligible at current levels.

Electricity is significantly more efficient and is mainly used for the provision of treatment and odour abatement. For completeness the Solar PV reduces the demand for external energy supply by 15% annually.

The total energy requirement (Mean Average) per ton of material is 51 Kwh (Rounded)

CO_2 EQUIVALENCE

Electricity

Renewable – 19 g CO2eq/kWh

Diesel

1 liter of diesel weighs 835 grammes. Diesel consists for 86,2% of carbon, or 720 grammes of carbon per litre diesel. In order to combust this carbon to CO2, 1920 grammes of oxygen is needed. The sum is then 720 + 1920 = 2640 grammes of CO2/liter diesel. 1l of diesel gives about 10kwh therefore – 264g CO_2e Kwh

Source – Gov.Uk POSTNOTE 383 June 2011 Carbon Footprint of Electricity Generation https://www.rensmart.com/UKGeneration#mw

OBJECTIVES AND TARGETS

The company considers its energy efficiency and potential savings in the annual management review and O&T review. Copies of management review are available on request.

When considering savings, the business must consider wider compliance obligations as well as pure energy savings. Alternatives to efficiency (such as extra renewable generation capacity) may be considered to offset another requirement.

Objectives	Specifics
3 – CO2e monitoring	A full benchmark of the cO2e shall be available by the end of 2022 calendar year with monitoring and recording of usage beig key to continual improvement - diesel usage records to be accurate - import export monitoring to be accurate - energy effieicncy plans to be in place

Management Review was undertaken in April 2022. Business wide targets include the monitoring of machinery KPI's as the fleet is changed from old machinery to new.

Historically monitoring has only been undertaken with a view to isolate any large losses. However, considering diesel price increase to over double what it was in 2021 and diesel is the highest emitter of CO_2 with poor efficiency several decisions have been made across the business to ensure the maximum efficiency of diesel vehicle use.

Objectives

- Monitor diesel use
- Set targets per hour per machine
- Communicate the target with relevant employees
- Replace less efficient with more efficient machinery, starting with all of the Doosan loading shovels which use 13-14 Lph of diesel with larger capacity JCB 457 machines, these machines use 11lph and also have a larger capacity.
- Install solar onto Heathtops house with grid export if available
- Review the effect of improvements
- Review in Management Review with view to continual improvement

SUMMARY

Within the business management system there are processes and procedures in place to ensure that targets are set and monitored 2in regards energy efficiency. These procedures are summarized as the output of this document and the O&T's tracker which comes from management review.

In the year 2022/2023 the business is undertaking several efficiency improvements to reduce cost and decrease carbon footprint. These are the install of a further 10Kw Peak of electricity generation on the Heathtops house refurbishment project and the replacement of the less efficient diesel fleet with more efficient higher capacity machinery. This machinery shall be monitored, and further improvements considered.