AWO – 11 Resource Management Plan 2021

AWO Recycling Ltd
Bury Lane Farm Composting Facility

Site Address:
Bury Lane Farm
Ramsey Heights
Ramsey
Huntingdon
Cambridgeshire
PE26 2RU

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1.0 Resource Management at the A.W.O. Recylcing Ltd Bury Lane Farm Site

In line with the draft appropriate measures for the biological treatment of waste AWO will monitor and review the annual consumption of water, energy and raw materials as well as the annual generation of residues and waste water for the BLF facility at least once a year. Residues includes the generation of waste and non-waste classified composts and digestates.

2.0 Process Energy Usage Register

Based on the current process as described in the EMS (AWO-02), the energy used within the processes may comprise levels as shown in the following Tables 1-5. The Tables show the flow of material and the specific energy use at each activity and also take into account the effect on the mass of material through the process.

Table 1: Open Windrow Green Waste Composting Process

Process Step	***Specific energy Used per tonne of typical green waste (KWh)**
Pushing up green waste	12.9
Shredding	85.3
Loading shredder	14.6
Forming windrow	12.9
Turns for Sanitisation	25.8
Turn for Stabilisation	23.2
Screening	13.8
Loading screener	12.9
Moving compost	6.5
Moving oversize	1.3
Total kWh per t	58
Total waste in per year	50000T
Total MJ/t intake	209.3 MJ/t
Total GJ per year	**10466**
Total MWh per year	**2908**

*Will vary with feedstock type, air temperature and moisture content.

2.1 Process Energy Usage Summary

Table 2: Summary of Energy Inputs

	Tonnes of green waste per year	**Total Energy Input GJ / year**	**Total Energy Input MWh / year**	Of which x MWh is factored from national grid electricity supply
Open Windrow Composting	**50000**	**10466**	**2908**	0

Table 3. Table of CO2 Equivalences (Extracted from H2 Guidance see Appendix 2)

Fuel	Emission Factor CO2 kg per unit energy	
	kg/MWh	kg/GJ
Electricity*	166	46.2
Gas Oil	250	69.3
LPG	230	63.8
Petrol	240	66.7

*Emissions factor for public supply, based on primary energy consumption. The Operator should specify appropriate emissions factor for other supplies, e.g. direct supplies or "green" tariffs.

2.2 Energy By Source (to enabled 'factored CO2' value calculation)

Table 4: Summary Energy use by Source with Conversion to approximate CO2 equivalents

Process Type	Tonnes input per year	Total Energy Input MWh / year	Fuel Oil MWh / year	Electricity MWh / year	Electricity Grid Factored x2.4 MWh / year
Open Windrow Composting	**50000**	**2908**			
Total MWh/yr		**2908**	**2218**	***690**	
Total Tonnes CO2/yr			**554**	**114**	

* The BLF composting site uses renewable electricity that is generated by both their own on farm 165KW anaerobic digestion (AD) plant and 45KW solar array.

3.0 Product Potential Energy Generation

3.1 General

This facility is designed to receive wastes and convert them to products or similarly useful materials that will benefit the environment. Products and useful materials resulting from the processes shall include the following:

Table 5: Summary of Product Outputs and Exportable Energy

Process Type	Tonnes Input per year	Type of output	Tonnes Production per year		Environmental Benefit
Open Windrow Composting	**50000**	PAS100 Compost	25000	The organic material reduces due to respiration and evaporative losses	The compost nutrients can offset the use of fossil fuel fertilisers; and the organic material helps conserve soil as well as providing ecological benefits

3.2 Energy Exported in the form of Compost

The basis of the calculation is the nutrient analysis and the fossil fuel expenditure by alternative manufactured (artificial) fertilisers.

Fossil Fuel Based Fertilisers entail the following energy Inputs in production:

Table 6: Energy Implicit in the Manufacture of 'Artificial' Fertilisers

	Nitrogen	Phosphate	Potash
Approximate energy requirement MJ/kg	**72**	**13**	**10**

Compost Analyses and Energy Equivalence Values on a per tonne (compost fresh weight) basis

Table 7: Energy Equivalence of the Nutrients in Compost and Biofertiliser (artificial fertiliser basis - Table 6)

	PAS100 Compost		
	N	**P2O5**	**K2O**
Typical Analysis Kg/tonne	8	4	6
Energy Equivalences MJ/kg nutrient	72	13	10
Energy Equivalences MJ/tonne compost	578	52	60
Total Energy eq/tonne MJ/t compost	690 MJ/tonne		
Export to farm(s)/yr	15000		
Exportable Energy equivalent GJ/yr	10000 GJ/annum		

4.0 Water Resources

Water usage has been estimated as **<1cu.m/day** in the composting process. External operations may require the damping of dust (e.g. on roadways/concreted yards etc.) or unusually, the wetting of the material in process. This is provided by using surface water pumped from the site lagoon

5.0 Energy Efficiency Plan

- Assess the energy consumption of all individual items of plant and machinery by monitoring and recording fuel/electricity used.
- Avoid wasteful operation of machines and equipment (switching off when not in use etc)
- Improve efficiency of machines (e.g., compare electrical operation of static machines, with fuel oil driven versions)

6.0 Other Resources – Raw Material Inputs

- Hydraulic oil and lubricants and other fluids, grease and anti-freeze for the mobile machinery.
- There is the need for spare parts as service items and wearing parts.

Table 8: Resource Efficiency Action Plan

		Efficiency Measure	
1.	Hydraulic Oils	Operational care to avoid rupture of pipes or joints	Saves ground contamination
		Operational care to avoid overloading ram seals	
2.	Engine cooling	Service checks on fan belts, engine hoses and water pump to avoid loss of coolant water/ anti freeze	Save engine damage

Appendix 1. Compliance with Typical IED Permit Requirements

Basic energy requirements

1. Prepare a list/diagram of where the energy is used in your process.

2. Provide the information in Table 1.2.1 below, annually.

Table 1.2.1 – Example breakdown of delivered and primary energy consumption

Energy Source delivered	Energy Consumption Primary MWh	MWh% of total
Electricity*		
Gas		
Oil		
Other (operator to specify)		
Exported energy	MWh	Source

3. Provide the Specific Energy Consumption (SEC) for your main activity or activities based on primary energy consumption for the products or raw material inputs that most closely match the main purpose or production capacity of the installation. For example MWh/tonne of product. Compare this against any benchmarks for your sector.
4. Regularly review your energy use and provide an energy efficiency plan that identifies CO2 savings of each potential measure.

   We ask for the energy efficiency plan to ensure that you have considered all relevant techniques. Where a CCA is in place we will only enforce implementation of measures 1-3 above. If you are not in a CCA turn this into an action plan.

   An example format for the energy efficiency plan is shown in Table 1.2.2 below.

An example format for the energy efficiency plan is shown in Table 1.2.2 below.

Table 1.2.2 – Example format for energy efficiency plan

All applicants				Only applicants without CCA
Energy efficiency measure	CO2 savings (tonnes)	Equivalent Annual Cost (EAC) £k	EAC/CO2 saved £/tonne	Date for implementation

H2 energy efficiency guidance provides an appraisal methodology. If you use a different methodology you must explain in your application how you have done the appraisal, and provide evidence that you have used appropriate discount rates, asset life and expenditure (£/t) criteria.

5. Use operating, maintenance and housekeeping measures in the following areas, wherever this will have a significant impact on the efficient use of energy at the installation:

H2 describes measures in section 2.7.2 and gives indicative checklists of appropriate measures in Appendix 2.

6. Use energy-efficient building services to deliver the requirements of the Building Services section of H2.

7. Monitor energy flows and target areas for reductions.

Box A1. Efficient use of raw materials and water

Typical permit condition or rule 1.3.1

The operator shall: take appropriate measures to ensure that raw materials and water are used efficiently in the activities maintain records of raw materials and water used in the activities review and record at least every 4 years whether there are suitable alternative materials that could reduce environmental impact or opportunities to improve the efficiency of raw material and water use; and take any further appropriate measures identified by a review.

Appendix 2. H2 Energy Efficiency- Conversions to CO2 equivalent

A2 – Extracted from H2 Guidance as Table 3.2 Emissions factors for various fuels

Fuel	Emission factor: carbon		Emission factor: carbon dioxide	
	kg/MWh	kg/GJ	kg/MWh	kg/GJ
Electricity*	45.3	12.6	166	46.2
Coal	81.7	22.7	300	83.2
Coke	117	32.5	430	119.2
Gas oil	68	18.9	250	69.3
Heavy fuel oil	70.9	19.7	260	72.2
Petrol	65.5	18.2	240	66.7
Liquid petroleum gas	62.7	17.4	230	63.8
Jet kerosene	65.5	18.2	240	66.7
Ethane	54.5	15.2	200	55.7
Naphtha	70.9	19.7	260	72.2
Refinery gas	54.5	15.2	200	19.1
Petroleum coke	92.7	25.8	340	94.6
Natural gas	51.8	14.4	190	52.8

1 tonne carbon = 44/12 tonnes of CO_2 **1 MWh = 3.6 GJ**

* Emissions factor for public supply, based on primary energy consumption. The Operator should specify appropriate emissions factor for other supplies, e.g. direct supplies or “green” tariffs.
(Oxygen ‘O’ mass of 16 and Carbon ‘C’ mass of 12 – CO2 mass ‘44’)

A3 – Carbon Trust Guide - 'Conversion Factors' - Tables 5 and 6.

Heat content of fuels

Gross calorific values for liquid fuels

Liquid fuels	kWh/tonne	litres/tonne	kWh/litre
Fuel oil	12,032	1,015	11.9
LPG	13,707	1,957	7.0
Diesel	12,690	1,195	10.6
Gas oil	12,579	1,170	10.8
Burning oil	12,830	1,247	10.3
Petrol	13,096	1,368	9.6

Gross calorific values for gaseous fuels

Gaseous fuels	kWh/tonne	litres/tonne	kWh/m^3
Natural gas	14,747	-	11.0

Appendix 3. A.W.O Recycling Ltd Resource Efficiency Policy

A.W.O. Recycling Ltd operate the Bury Lane Farm Open Windrow Composting Facility (BLF) with the primary objective of manufacturing high quality compost products. Compost products are supplied to the horticultural sector as a peat alternative and to the agricultural sector to replace soil organic matter and inorganic fertiliser.

Our aim is to improve environmental sustainability by seeking and implementing systems that reduce the environmental impact of our own organisation.

At BLF our Resource Efficiency Policy is as follows;

- Maintain best practice whilst minimising energy consumption.
- Adopting new technology to reduce energy consumption and waste produced.
- To optimise the manufacture of high-quality compost products.
- Wherever possible to commit to energy efficiency measures including the use of electricity generated on site whenever possible.
- An ongoing commitment to waste reduction
- To establish procedures to improve our environmental performance
- To promote resource efficiency to our employees, customers and the wider population wherever possible.
- To demonstrate our commitment to employee involvement through training and environmental awareness raising.

Signed: Thomas Bedford
Date: *June 2021*

Appendix 4. A.W.O BLF Energy Strategy

1. Produce Estimates and Bench Marking
2. Undertake Monitoring
3. Undertake Significance testing
4. Undertake Targeting
5. Carry Out Training
6. Implement Efficiency Measures
7. Undertake Monitoring
8. Review

A.W.O BLF uses < 100MWh/year at the composting Site, and is below the threshold for CRC.