

**ORGANIC WASTE**

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Energy Crop	Ryegrass	
Dry Matter Yield	12.7	tDM/ha/yr
Organic Dry Matter Yield	11.3	tODM/ha/yr
%TS	20.0	%
%VS	89.0	%
Area of land	100.0	hectares
<b>Ryegrass</b>		
Mass	122.1	tonnes/week
%TS	20.0	% TS
%VS	89.0	% VS
%VSD	64.5	% VSD
Dry Solids	24.4	tonnes/week
Volatile Solids	21.7	tonnes/week
Volatlie Solids Destroyed	14.0	tonnes/week
<b>Pig Slurry</b>		
Mass	141.0	tonnes/week
%TS	4.0	% TS
%VS	85.0	% VS
%VSD	40.0	% VSD
Dry Solids	5.6	tonnes/week
Volatile Solids	4.8	tonnes/week
Volatlie Solids Destroyed	1.9	tonnes/week
<b>Total Organic Waste</b>		
Mass of Organic Waste	263.1	tonnes/week
%TS of Organic Waste	11.4	% TS
%VS of Organic Waste	88.2	% VS
%VSD of Organic Waste	60.1	% VSD
Dry Solids of Organic Waste	30.1	tonnes/week
Volatile Solids of Organic Waste	26.5	tonnes/week
Volatile Solids Reduction of Organic Waste	15.9	tonnes/week

**Feedstock Conditioning & Storage**

Mass of Organic Waste	263.1 tonnes/week
%TS of Organic Waste	11.4 % TS
%VS of Organic Waste	88.2 % VS
Dry Solids of Organic Waste	30.1 tonnes/week
Volatile Solids of Organic Waste	26.5 tonnes/week
Volatile Solids Reduction of Organic Waste	15.9 tonnes/week
Mass of Digester Feedstock	263.1 tonnes/week
Dry Solids of Digester Feedstock	30.1 tonnes/week
Volatile Solids of Digester Feedstock	26.5 tonnes/week
Specific Gravity of Feedstock	1.04 tonnes/m <sup>3</sup>
Volume of Digester Feedstock	253.0 m <sup>3</sup> /week
Capacity of Conditioning Tank	0 m <sup>3</sup>
Storage Time Available in Conditioning Tank	0.0 days
Capacity of Raw Waste Buffer Tank	523 m <sup>3</sup>
Storage Time in Available in Raw Waste Buffer Tank	14.5 days

**Anaerobic Digestion**

Mass of Digester Feedstock	37.6 tonnes/day
Volume of Digester Feedstock	36.1 m <sup>3</sup> /day
%TS of Digester Feedstock	11.4 % TS
%VS of Digester Feedstock	88.2 % VS
Dry Solids of Digester Feedstock	4.3 tonnes TS/day
Volatile Solids of Digester Feedstock	3.8 tonnes VS/day
Capacity of Digester	1,065 m <sup>3</sup>
Volatile Solids Reduction	2.28 tonnes VSD/day
Specific Biogas Production	1.02 m <sup>3</sup> /kg VSD
Volume of Biogas	2,322 m <sup>3</sup> /d
% Methane	58 % CH <sub>4</sub>
Specific Gravity of Biogas	1.24 kg/m <sup>3</sup>
Mass of Biogas	2,878 kg/d
Mass of Digester Output	34.7 tonnes/day
%TS of Digester Output	4.1 % TS
%VS of Digester Output	64.4 % VS
Dry Solids of Digester Output	1.4 tonnes/day
Volatile Solids of Digester Output	0.9 tonnes/day
Specific Gravity of Digester Output	1.02 tonnes/m <sup>3</sup>
Volume of Digester Output	34.0 m <sup>3</sup> /day
<b>Hydraulic Retention Time</b>	<b>29.5 days</b>
<b>%TS of Digester Feedstock</b>	<b>11.4 % TS</b>
<b>Specific Loading Rate</b>	<b>3.6 kg VS/m<sup>3</sup>/day</b>
<b>Biogas Production per day : Digester Capacity</b>	<b>2.2 m<sup>3</sup>/d/m<sup>3</sup></b>
<b>Biogas Production : m<sup>3</sup> Digester Feed</b>	<b>64.3 m<sup>3</sup>/m<sup>3</sup></b>
<b>Biogas Production : Tonnes of Organic Waste</b>	<b>61.8 m<sup>3</sup>/tonne</b>
<b>Methane Production : Tonnes Organic Waste Organic Dry Matter</b>	<b>355 m<sup>3</sup>/tonneODM</b>

## ENERGY

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**Biogas**

Biogas Production	2,322 m3/day
Biogas Flow	97 m3/hour
% Methane	58 % CH4
Calorific Value of Biogas (LCV)	20.7 MJ/m3
Fuel Value of Biogas	48,086 MJ/day
Fuel Value of Biogas	557 kWf

**Combined Heat & Power**

Fuel Value of Biogas	557 kWf
Electrical Efficiency	33.0 %
Thermal Efficiency	52.0 %
Electricity Output	184 kWe
Heat Output	289 kWth
Availability of CHP Unit	95 %
Annual Electricity Output	1,528 MWh/yr
Annual Heat Output	2,408 MWh/yr

**Gas Boiler**

Fuel Value of Biogas	557 kWf
Thermal Efficiency	85.0 %
Heat Output	473 kWth
Gas Boiler Operating Time	5 %
Annual Heat Output	207 MWh/yr

**Heat Requirement**

Volume of Digester Feedstock	36 m3/day
Temperature of Digester Feedstock	10 °C
Temperature of Digester	37 °C
Temperature of Outside Air	10 °C
Heat Input to Digester Feedstock	4,089 MJ/day
Total Surface Area of Digester	487 m2
Thickness of Insulation	100 mm
Average Thermal Conductivity of Insulation	0.034 W/m.°C
Digester Heat Loss	387 MJ/day
Total Digester Heat Requirement	4,475 MJ/day
Total Digester Heat Requirement	51.8 kWth
Volume of Pasteurisation Feedstock	34 m3/day
Temperature of Pasteurisation Feedstock	37 °C
Temperature of Pasteurisation Tank	71 °C
Temperature of Outside Air	10 °C
Heat Input to Pasteurisation Feedstock	4,848 MJ/day
Total Surface Area of Pasteurisation Tank	0 m2
Thickness of Insulation	100 mm
Average Thermal Conductivity of Insulation	0.034 W/m.°C
Pasteurisation Tank Heat Loss	0 MJ/day
Total Pasteurisation Heat Requirement	4,848 MJ/day
Total Pasteurisation Heat Requirement	56.1 kWth
Total Heat Requirement	9,323 MJ/day
Total Heat Requirement	945 MWh/yr

**Electricity Balance**

Electricity Output	1,528 MWh/yr
% Parasitic Electricity	3 %
Electricity Consumption of Plant	39 MWh/yr

**Net Electricity Output****1,489 MWh/yr****Heat Balance**

Heat Output	2,616 MWh/yr
% Parasitic Heat	36 %
Heat Consumption of Plant	945 MWh/yr

**Net Heat Output****1,670 MWh/yr**

