

**Case Study: The Green Farm – bioQUBE  
 with 3.2kW powerQUBE  
 Installed: 15<sup>th</sup> March 2012  
 Commissioned: 4<sup>th</sup> April 2012**



**Contents of QUBE system:**

- Reception chamber with mono flow pump with maceration
- One bioQUBE digester
- 3.2kW powerQUBE CHP plant
- Heat exchangers
- Control panel
- Biogas storage bladder
- Connection points for export of heat and power – both island and grid tie
- Digestate Store
- PLC linked to GSM



**Feedstock Specification:**

Biodegradable wastes – equine manure with rape straw bedding, spent yeast, low MONG glycerol, crimped maize and household fruit and veg waste

**System Type:**

bioQUBE

**Digester Dimensions:**

powerQUBE – 3.2kW electrical  
 H; 2,500mm x W; 2,100mm x L; 6,100mm  
 (Standard 20ft Shipping container)  
 Plus area for gas store

**Digester Space nominal capacity**

One 16m<sup>3</sup> module

**Units:**

1 no.

**Weight:**

5,000 Kg as shipped  
 21,000 Kg when filled

**Engine (CHP):**

Petter with Bowman heat exchanger

**CHP generator size:**

Peak power: 3.2kW<sub>e</sub>

Peak Heat: 8.8kW<sub>th</sub>

**Electrical energy output:**

16,668 kWh (Electricity 29%) approx. 6000 hours per year

**Heat Output:**

32,101 kWh (Heat 80% (as hot water at 60 – 80°C)) approx. 6000 hours per year

**Efficiency:**

Electrical 29%

Combined 80%

**Parasitic energy use:**

Approx. 8%

**Grid Export Requirement:**

Grid Tie G83 connection

**Grid Connection:**

Single Phase

<b>Nominal Voltage:</b>	240VAC
<b>Safety features:</b>	G83 grid connection with earth tying/bonding HS2 and CH4 sensor for leakage detection and automated shut down Fault notification setting – GSM and web based relay
<b>Gas output:</b>	Biogas (approx. 54% CH4 and 40% CO2)
<b>Design flow rate:</b>	1.3m <sup>3</sup> /hr
<b>Gas Store Capacity:</b>	18m <sup>3</sup> bladder standard
<b>Bladder materials:</b>	HPDE
<b>CHP Fuel Consumption:</b>	0.8-1m <sup>3</sup> per hour per kW
<b>Permit requirements (UK):</b>	T24 exemption and an exemption for digestate spreading from the Environment Agency (UK only)
<b>Routine Service:</b>	Monthly (H2S and Moisture filter cartridge change) Engine oil check
<b>Service Interval:</b>	Engine oil change every 500 hours, spark plug, tappets. Full service every 3000 hours, timing, gaskets, head removal
<b>CHP Operating Temp, min to max:</b>	45 to 75 degrees C
<b>Sound Level:</b>	56 dBLeq at 10m.
<b>Installation and delivery:</b>	100% self-contained; placed directly from off-loading lorry (6 wheeler with HIAB crane for easy access) Digester and other tanks installed on concrete.
<b>Net Carbon Balance:</b>	Production and embedded carbon 88 tonnes Carbon payback from electricity and heat production 14 months
<b>Warranty:</b>	12 months on CHP, 5 years on digester Annual contract available but excluded from the quotation
<b>Technical Support:</b>	Provided for the first 12 months of operation
<b>Design Criteria:</b>	Designed to meet ATEX and DSEAR safety regulations and compliant with current UK biogas regulations.



For further information please contact:  
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**BROWN MUCK TO GREEN MONEY**