

**Case Study: Howard Tenens Logistic Food Waste with Biomethane Upgrade**  
**Installed: 23<sup>rd</sup> September 2013**  
**Commissioned: 18<sup>th</sup> November 2013**



#### Contents of QUBE system:

- Meltg depackaging system
- Reception chamber with mono flow pump
- Two bioQUBE digesters
- 7.5kW powerQUBE CHP plant
- Heat exchangers
- Control panel
- Biogas storage bladder
- Connection points for export of heat and power with grid tie
- Digestate store
- PLC linked to GSM
- Vehicle biomethane upgrade station with compressor to 300bar and vehicle fuel dispensing pack



#### Feedstock Specification:

#### Feedstock Quantity:

#### System Type:

#### Digester Dimensions:

#### Digester Space nominal capacity

#### Units:

#### Weight:

#### Overall Footprint:

#### Engine (CHP):

#### CHP generator size:

#### Electrical energy output:

#### Heat Output:

#### Efficiency:

#### Parasitic energy use:

#### As biomethane upgrade:

#### Grid Export Requirement:

#### Grid Connection:

Various de-packaged food waste stream (non-meat)

Approx 900kg per day, 325 tonnes per year (yielding 190m<sup>3</sup> biogas per tonne

bioQUBE – 2 stage

powerQUBE – 7.5kW electrical

Biomethane upgrade pod to 300bar

H; 2,500mm x W; 2,100mm x L; 6,100mm

(Standard 20ft Shipping container)

Modules of 18m<sup>3</sup>

2 no.

6,000 Kg as shipped

24,000 Kg when filled

10m x 10m to include gas store and associated tanks

Cummins with Bowman heat exchanger

Peak Power: 7.5kWe

Peak Heat: 14.1kWth

45,000 kWh per year (Electricity 29%) approx 6000 hours per year

84,600 kWh per year (Heat 80% (as hot water at 60 – 80oC)) approx 6000 hours per year

Electrical 29%

Combined 80%

Approx. 8%

Approx. 20%

Grid Tie G59/2 connection

3 Phase

<b>Nominal Voltage:</b>	415VAC
<b>Safety features:</b>	G59/2 grid connection with earth tying/bonding HS2 and CH4 sensor for leakage detection and automated shut down Fault notification setting – GSM Gas over pressure feature on compression plant
<b>Gas output:</b>	Biogas (approx 54% CH4 and 40% CO2) Biomethane (97% pure)
<b>Design flow rate:</b>	6m <sup>3</sup> /hr
<b>Gas Store Capacity:</b>	18m <sup>3</sup> bladder – bioQUBE container roof storage
<b>Bladder materials:</b>	PVC fabric
<b>CHP Fuel Consumption:</b>	0.8-1m3 per hour per kWh
<b>Permit requirements (UK):</b>	T25 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 Biomethane plant: gas fixtures and fittings, water seals, compressors check every 100 hrs. Major service every 3000 hrs
<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) Tanks installed on level hard core base.
<b>Net Carbon Balance:</b>	Production and embedded carbon 114 tonnes Carbon payback from electricity and heat production 16 months
<b>Warranty:</b>	12 months on CHP, 5 years on digester
<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:*

AGE Renewables

Unit 1, Whitegates, Burneston, North Yorkshire, DL8 2HX

[www.agecltd.co.uk](http://www.agecltd.co.uk) / [green@agecltd.co.uk](mailto:green@agecltd.co.uk)

Tel: +44 (0) 1677 427 614



**BROWN MUCK TO GREEN MONEY**