

# Biocycle

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## Technology type: Anaerobic Digestion



### Project Description

Based in Ludlow, Shropshire, this project uses anaerobic digestion to treat source separated organic waste. The Demonstrator plant is designed to process 5,000 tonnes of waste annually.

### Technology Background

The key components of the process for recycling organic kitchen and garden waste are:

- Waste reception, which is inside a building with air emissions controlled by a biofilter;
- Mechanical waste conditioning, with primary shredding;
- Digester feedstock homogenisation, with secondary shredding;
- Digester feedstock buffer storage, to allow for 5-day delivery of feedstock;
- Mesophilic anaerobic digestion (37°C), a continuous process in a fully-mixed tank;
- Pasteurisation (70°C for one hour), a strictly batch process with zero by-pass;
- Fibre separation, to separate particles larger than 1500µm;
- Liquid biofertiliser storage, in a sealed tank awaiting transport to a local farm;
- Biogas storage;
- Combined heat and power (CHP) unit, to produce renewable electricity for the grid;
- Heat exchange units, to provide heating for the tanks;
- Pumping systems;
- Biofilter system; and
- Instrumentation and controls.



## Inputs / Outputs

A weekly food waste collection has recently been introduced and this waste stream now forms the bulk of the input waste. This is supplemented by green waste such as grass cuttings from Council properties.

The process produces liquid and solid digestate for use on local farms. The biogas is combusted in a CHP unit and supplies electricity to the grid. Some of the power generated is used to run the plant and also to charge the electric collection vehicle.

## Energy Balance

The gross annual electricity production is designed to give up to 1,440,000 kWh dependent upon waste feedstock, with process plant consumption of 125,000 kWh, thus a net output of 1,315,000 kWh. The electricity qualifies for Renewable Obligation Certificates (ROCs). The gross annual heat production is estimated to be up to 2,400,000 kWh with process plant consumption of 800,000 kWh which is circulated through two heat exchangers to provide heating for the tanks. The process has a potential net output of 1,600,000 kWh that could be used as part of a local district heating system. The options for exporting this heat to a neighbouring ecopark are being investigated.

## Mass Balance

The designed mass balance of the project is the conversion of 5,000 tonnes per year of biowaste plus 200 tonnes per year of washwater into 4,320 tonnes per year of biofertiliser and 880 tonnes per year of biogas.

## Emissions

The only air emissions are the exhaust gas from the CHP unit and the filtered air from the biofilter.

## Status

The plant has been fully operational since Spring 2007.



## Project Contact Details:

Michael Chesshire  
Greenfinch Ltd  
The Business Park  
Coder Road  
Ludlow  
Shropshire  
SY8 1XE  
Tel: 01584 877687  
Fax: 01584 878131  
Email: [biogas@greenfinch.co.uk](mailto:biogas@greenfinch.co.uk)  
Web: [www.greenfinch.co.uk](http://www.greenfinch.co.uk)

Information on the Biocycle Anaerobic Digestion Demonstrator and visits to the plant can be obtained through the Programme by emailing [Wastetech@enviros.com](mailto:Wastetech@enviros.com) or visiting [www.defra.gov.uk/environment/waste/wip/newtech/dem-programme/index.htm](http://www.defra.gov.uk/environment/waste/wip/newtech/dem-programme/index.htm)