# Case Study

## Type of waste:
Municipal solid waste/ organic fines.

## Client/ Location:
Biffa Group, Broxburn, Edinburgh, Scotland. (December 2015 to March 2016)

## The project:
Biffa Group are one of Europe's largest waste handling and processing facilities which collect and sort waste from households and businesses. They are reviewing their waste disposal options for their organic waste streams due to strain on space for composting and high landfill costs. Biffa Group identified the Advetec XO as a potential solution to assist in cost reduction and rented an evaluation unit to determine output volume and consistency.


## Objectives:
Advetec aimed to provide Biffa staff with operational support and give them the opportunity to observe the XO digester technology in a live production environment. The main purpose of the demonstration was to showcase the ability of the XO at processing their waste, both municipal solid waste and organic fines. This displays the technologies efficiency and gives an estimation of what waste reduction percentage they could expect. Additionally, the trial was undertaken to determine any operational issues so that these could be addressed with a full scale unit. The reduction on Biffa's waste was anticipated to be approximately a 50% reduction in mass and/or volume. The client expected a reduction percentage that would still yield monetary savings compared to their current waste disposal.

## Implementation:
An XO digester with the capacity of 3 tonnes a day was used for the trial period which lasted 10 weeks. The XO had to be powered down over the Christmas period to comply with fire regulations which ultimately lengthened the commissioning period. Biffa staff were loading the waste into the storage hopper however the waste had a lower organic content than expected which affected the hopper feeding systems ability. As a result the machine was loaded with considerably less material. The pictures on the left show the waste before and after going through the XO digester which shows the significant change in the materials constancy.

## Results:
During the trial 2.8 tonnes of waste was loaded into the XO, which gave a steady outfield of around 400kg a day. Based on the total material loaded against the material recovered there was a 38% net reduction in volume. This was lower than expected, as the waste was composed of materials that had a lower organic content than the samples sent to be tested at the Advetec Laboratory. If you remove the processing days when either no material was loaded but material was discharged or vice versa then the figure rises to a more representative value of 45% net reduction. During the whole demonstration there were several days of uninterrupted processing where reductions of 60-70% occurred which may be due to improved organic consistency in the feed stock. From Advetec's perspective the trial was to prove to Biffa that the XO is able to change the consistency of the material; this offers a reduction in the disposal costs. The analysis results show that the material at AT4 has recorded as low as 6.5, so this material can be utilised as solid recovered fuel (SRF) for further financial savings.

## Summary:
Some initial tweaks to the XO allowed the reactor to run continuously with no operational or mechanical problems. Although the waste reduction percentage was lower than anticipated the trial was successful in changing the consistency of the material and did provide a reduction in the waste volume; this would result in significant financial savings for the client.

MATT WARNOCK
ADVETEC HOLDINGS LTD
UPPER LENTLEY FARM
BUILDING
WRITHLINGTON
SOMERSET BA3 5SL

M316

Please quote above code for all enquiries

BIFFA

OUTFEED

# OUTFEED ANALYSIS RESULTS

Sample Reference :

OUTFEED 180116

Sample Matrix : OUTFEED

| Laboratory References | |
|---|---|
| Report Number | 94142 |
| Sample Number | 69149 |

| | |
|---|---|
| Date Received | 22-JAN-2016 |
| Date Reported | 25-JAN-2016 |

The sample submitted was of adequate size to complete all analysis requested.

The sample will be kept as the dry ground sample for at least 1 month.

## ANALYTICAL RESULTS *on 'dry matter' basis.*

| Determinand | Value | Units |
|---|---|---|
| Oven Dry Matter | 84.4 | % |
| Organic Matter LOI | 55.9 | % w/w |

Released by *Darren Whitbread* Date *25/01/16*

**NRM** Coopers Bridge, Braziers Lane, Bracknell, Berkshire RG42 6NS
**Tel:** +44 (0) 1344 886338 **Fax:** +44 (0) 1344 890972 **Email:** enquiries@nrm.uk.com **www**.nrm.uk.com

Fitz scientific
Monitoring and Testing Services

Unit 35,
Boyne Business Park,
Drogheda,
Co. Louth
Ireland
Tel: +353 41 9845440
Fax: +353 41 9846171
Web: www.fitzsci.ie
email info@fitzsci.ie

A copy of this certificate is available on www.fitzsci.ie

| | | | |
|---|---|---|---|
| ***Customer*** | **Paula Galvin**<br>**Stream Bioenergy**<br>**40 Main Street**<br>**Blackrock**<br>**Co. Dublin** | ***Lab Report Ref. No.*** | **1651/006/02** |
| | | ***Date of Receipt*** | **17/02/2016** |
| | | ***Sampled On*** | **15/02/2016** |
| | | ***Date Testing Commenced*** | **17/02/2016** |
| | | ***Received or Collected*** | **By Fitz:** |
| | | ***Condition on Receipt*** | **Acceptable** |
| ***Customer PO*** | | ***Date of Report*** | **04/03/2016** |
| ***Customer Ref*** | **OPB01** | ***Sample Type*** | **Other** |
| ***Ref 2*** | | | |
| ***Ref 3*** | | | |

# *CERTIFICATE OF ANALYSIS*

| Test Parameter | SOP | Analytical Technique | Result | Units | Acc. |
|---|---|---|---|---|---|
| % Dry Matter | 302 | Drying @ 104 C | 99.71 | % | |
| % Dry Matter (AT4) | 302 | Drying @ 104 C | 63.69 | % | |
| % Organic Matter | 333 | Furnace 500˚C | 60.87 | % | UKAS |
| AT4 | 335 | Oxitop Method | 6.56 | mgO2.g DW | |
| *Gross Calorific Value (As Received) | 0 | By Subcontractor | 16669 | KJ/Kg | Yes |

***Signed :*** A Harmon ***Date : 04/03/2016***

***Aoife Harmon - Technical Supervisor***

Acc. : Accredited Parameters by ISO 17025:2005
PVL - Parametric Value Limit as per EU (Drinking water) Regulations (SI 122 2014)
For bacterial analysis a result of 0 means none detected in volume examined
All organic results are analysed as received and all results are corrected for dry weight at 104 C
Results shall not be reproduced, except in full, without the approval of Fitz Scientific
Results contained in this report relate only to the samples tested (P) : Presumptive Results

UKAS TESTING 2802

** : The test result for this parameter may be invalid as it has exceeded the recommended holding time (BS EN ISO 5667-3:2012)

* Subcontracted