

The project:

The shopping centre is the tenth largest in the U.S.A with 30 million annual visitors and more than 350 stores. They have a large amount of food waste from the dine-in restaurant tenants including California Pizza Kitchen, P.F Chang's, The Cheesecake Factory and the other 15 restaurants available. This shopping centre, one of 230 in the client's group, was selected for the pilot trial of the XO digester considering the California State Assembly Bill No 1826, requiring businesses to divert food waste from landfill. The client is seeking an alternative disposal method for organics to avoid the prohibitive cost of landfill and identified Advetec technology, specifically the XO digester, as a candidate for this shopping centre and potentially the 20+ other properties in California affected by the new regulations. A demo version of the XO reactor was trialled at this site to showcase the reduction ability on their organic waste.

Type of waste:

Restaurant food waste (organics)

Client/ Location:

Sunrise, Florida,



| Date | Feedstock weight (lb) | Digestate Weight (lb) |
|------------|-----------------------|-----------------------|
| 5/11/2015 | 11.5 | — |
| 6/11/2015 | 30.5 | — |
| 7/11/2015 | 135.8 | — |
| 8/11/2016 | 199.0 | — |
| 13/11/2015 | 68.9 | — |
| 15/11/2015 | 92.2 | — |
| 16/11/2015 | 55.2 | — |
| 17/11/2015 | 61.6 | — |
| 18/11/2015 | 99.0 | — |
| 19/11/2015 | 20.0 | — |
| 20/11/2015 | 74.7 | — |
| 21/11/2015 | 75.9 | 3.5 |
| 22/11/2015 | 91.7 | 3.0 |
| 23/11/2015 | 17.8 | 2.5 |
| 24/11/2015 | 48.7 | 4.4 |
| 25/11/2015 | 31.9 | 3.6 |
| 26/11/2015 | 41.8 | 3.7 |
| 27/11/2015 | 51.6 | 4.9 |
| 28/11/2015 | 42.1 | 3.1 |
| 29/11/2015 | 53.2 | 13.6 |
| 30/11/2015 | 60.1 | 2.7 |
| 1/12/2015 | 51.9 | 5.1 |
| 2/12/2015 | 33.5 | 3.7 |
| 3/12/2015 | 54.2 | 4.0 |
| 4/12/2015 | 36.6 | 3.3 |
| 5/12/2015 | 37.7 | 4.3 |
| 6/12/2015 | 66.0 | 4.3 |
| 7/12/2015 | 56.3 | 4.1 |
| 8/12/2015 | 53.3 | 2.9 |
| Total | 1752.7 | 76.7 |

Objectives:

The purpose of the trial was to determine the technology's efficiency and the level of organic reduction on their food waste stream. This was anticipated to be in the region of an 85% reduction. The trial provided the personnel and operational team the opportunity to observe the XO reactor in a live production environment.

Implementation:

A site study was conducted to determine a suitable location for the XO reactor, which was then loaded with feedstock and heated to between 80 and 140 degrees centigrade. The commissioning period, normally between 7-14 days, allows the temperature to reach the optimal range for bacterial activity. The operational stage of the trial included recordings of the feedstock going in and the digestate output for a minimum of one week to provide enough data for accurate reduction calculations. For this demonstration, California Pizza Kitchen and P.F Chang's were each provided with 6 five-gallon orange buckets for food waste collection. In total 108 feedstock buckets were processed during the demonstration. Samples of the digestate were sent off to Florida-Spectrum Environmental services INC.

Results:

The XO trial ran for 34 days (16 commissioning and 18 operational). During this time 1,752.7lb (795.0kg) of feedstock was loaded into the XO reactor. The waste stream composition was estimated to be a minimum of 95% organics, with some inorganic like straws and plastic gloves etc. Therefore, the anticipated reduction percentage was high. The operational mass input was 904.3lb (402.kg) which gave a digestate output of 76.7lb (34.8kg), this is a 91.5% reduction, exceeding the 85% expectation.

Summary:

This XO demonstration has indicated that a reduction of 91.5% with food waste can be achieved in 48-72 hours, showing a considerable reduction in waste volume and was preventing use of landfill. The organic content of the waste from the shopping centre was ideal to digest in the XO reactor, and if used instead of landfill, would allow them to comply with state regulations while generating significant savings.