The first UK Dry Anaerobic Digestion Facility now in full operation

The new Fife Council dry AD plant at the Lochhead landfill site, Dunfermline is now in full operation after being successfully commissioned. It is not only the first of its kind in the UK, it is also the largest batch dry AD plant in Europe and represents a significant innovation in the management of bio-waste.

While “dry” or high solids anaerobic digestion is quite commonly deployed in the processing of bio-waste in mainland Europe, the first tranche of AD facilities in the UK have all been “wet” systems where pumpable substrates are digested in stirred cylindrical tanks. However, as much of the biological material in the waste stream is not readily pumpable, there are a lot of advantages in managing this material in its original form as opposed to having to exclude large proportions of the bio-waste stream from digestion and/or having to deploy expensive and energy hungry pulping and de-contamination equipment required to facilitate wet digestion. Dry digestion is thus very well suited to the processing of co-mingled food and green waste, contaminated food waste and even the biological fraction of MSW.

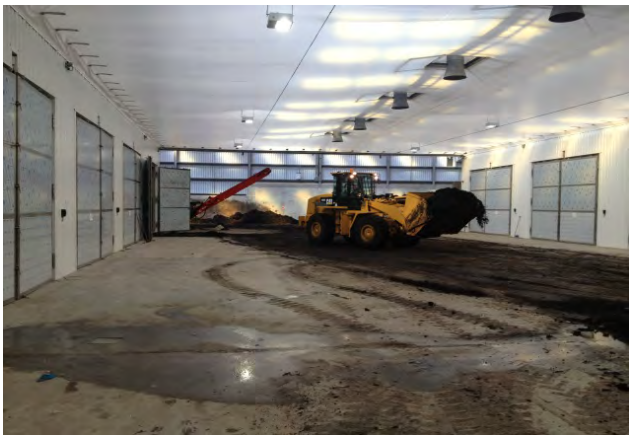
In 2011 Fife Council (Scotland), supported by technical advisors SLR CONSULTING LTD, considered its options in relation to facilitating the co-collection of food and green waste while being able to derive the renewable energy benefits of anaerobic digestion. In this regard, wet digestion was ruled out and accordingly Fife Council opted for a dry digestion solution that allowed the processing of both food and green waste while having the flexibility to also process commercial Category 3 material.

Following an open tender process Lochhead Energy (a JV between Jones Engineering and Luddon Construction) was awarded the contract to deliver the facility. The facility is designed to process 40,000 tonnes per annum of co-mingled domestic bio-waste and 3,000 tonnes per annum of Category 3 commercial food waste. The facility consists of 14 BIOFERM batch dry fermenters coupled with a CELTIC BIOENERGY digestate composting and pasteurisation system. The important advantages of dry batch digestion in the configuration described include:

- The improved logistics of co-mingled collections
- The minimal pre-processing required
- The harnessing of the biogas potential of green waste as well as food waste wherein the inclusion of green waste can double the biogas potential from domestic collections
- Fully ABPR compliant
- The advantages of generating low volumes of compost as opposed to large volumes of digestate liquor
- Low parasitic electrical demand and low emissions

The facility completed construction in July 2013 and underwent commissioning and performance testing in the following five months with a comprehensive performance test being concluded in December 2013. The plant has a number of unique features in that the incoming co-mingled bio-waste needs little or no pre-treatment prior to direct loading of the bio-waste into the fermenters using loading shovels. Over the 28-32 day digestion period the bio-waste generates between 90 and 125 m3 of biogas per tonne of input. This biogas is exported to the existing energy compound at the adjacent landfill where the biogas is utilised by dedicated CHPs that export c. 1.4MW electricity while contributing c. 900kW of heat into the district heating system in Dunfermline. After the batch digestion phase the solid digestate is unloaded and bio-dried using forced aeration wherein no mechanical de-watering is required. Thereafter the digestate is pasteurised in mechanically heated proprietary solid state pasteurisation tunnels prior to storage of the compost product ahead of beneficial use in agriculture. In this regard, the plant is a genuine dry system where very little wet digestate is produced with the primary product being a stable marketable compost. In this regard the plant will also likely be the first in the UK to generate a PAS 100 compost product from an anaerobic digestion plant. The plant has also gone through its ABPR validation and is due to be shortly issued with its full license. The facility also operates under a SEPA PPC permit with excellent emission standards being achieved.

Looking to the future, further BIOFERM/CELTIC facilities are under development at Rotherham and Milton Keynes where MSW fines are to be processed as part of two centralised Mechanical Biological Treatment (MBT) / energy recovery facilities. The Jones Engineering company JCBE has been appointed to undertake these works and again these facilities will be the first of their kind in the UK where batch dry digestion is deployed in as an MBT technology.



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