

HRS Heat Exchangers has won an order for its novel Digestate Concentration System (DCS) which will be installed at Cattlegate Farm in Enfield near London as part of a new multi-million pound anaerobic digester being developed by Willen Biogas. The system will reduce digestate (a nutrient rich bio-fertilizer) storage and application requirements by around 40 per cent, reducing capital investment accordingly.

The anaerobic digestion plant will use a natural process to manage 27,000 tonnes of London's food waste, which would otherwise go to landfill, into renewable electricity and agricultural fertilizer from the resulting digestate.

The plant at Cattlegate Farm will produce 1.5 MW of renewable electricity for the grid, enough to power around 1,750 homes saving approximately 21,000 tonnes of CO<sub>2</sub>e per year, equivalent to taking 9,500 cars off the road. An adjacent composting facility on the same site turns 25,000 tonnes of green waste from parks and gardens into compost each year.

Farming business D. Williams & Co., which owns Cattlegate Farm, and which grows arable crops and produces fresh herbs on more than 2,000 acres of land, expects to save over £90,000 a year in fertilizer costs by using the compost and digestate. They add that the HRS Digestate Concentration System is a key part of utilizing the nutrient rich digestate effectively. Not only does it reduce the volume of digestate produced while maintaining the nutrient concentration, but it also reuses as much heat as possible improving process efficiency of the entire AD plant.



Using HRS technology, Willen Biogas can create a nutrient rich bio-fertilizer

Adrian Williams, Chairman of Willen Biogas and Partner in D. Williams & Co. comments: "As a business we have always looked into diverse operations that compliment agriculture and respect the environment as well as trying to achieve government targets. With the location of the farm close to the centre of one of the major population capitals of the world, we could see a huge potential for a food waste fed anaerobic digestion plant.

"We will be producing approximately 41,000 tonnes of liquid digestate each year which will be full of nutrients for the farm, but we want to minimize the amount of traffic going across the farm and the amount of storage needed. The DCS system from HRS will help us to have more efficient spreading windows for the farm making digestate handling a lot more manageable. We will have the same benefits of the nutrients with less volume of digestate, to apply to the land that we farm.

"We needed to remove some of the water to allow us to have more efficient spreading windows for the digestate. With less volume to handle it becomes much more manageable, but with the same nutrient benefits. Each tanker will have around 40 per cent more nutritional benefit."

The HRS DCS uses a multi-effect concentration process using forced recirculation to process the digestate. In this case, HRS will provide a three stage concentration system to take the liquid digestate, which has a low dry solid content, and increase the dry matter from around 4% to 9%. This reduces the overall volume of digestate produced, meaning that up to 60% less storage capacity is required and that it can be applied with fewer operations, while also ensuring that all the valuable crop nutrients are retained in a more concentrated form.

The HRS System works by superheating the digestate in a vacuum to facilitate concentration, coupled with HRS' corrugated tube heat transfer technology which reduces fouling and reduces maintenance periods. By using a three effect concentrator, the low temperature steam which is evaporated can be reused, making the process highly energy efficient. The use of multiple concentration units means that the process can continue to run even if one of the concentrators needs to be taken offline for cleaning or maintenance. Cleaning is also provided using an integrated cleaning system for Cleaning in Place (CIP) to maintain concentrator efficiency.

The water that is removed by the process is recovered and mixed with the feedstock for the anaerobic digestion process, increasing the efficiency of the digester and reducing the amount of energy and water used by the plant.

Matt Hale, International Sales Manager for HRS commented:

"We are delighted to have worked closely with Willen Biogas to aid the management of the digestate and improve the overall process efficiency. The solution we proposed will integrate fully with the rest of the plant and help to maximize output throughout the year, as it allows the plant to keep operating when part of the DCS needs maintenance and reuses hot water which would otherwise be wasted.



Willen Biogas will commission the food waste to energy AD plant in October 2015

"Using quality digestate on the farm is an integral part of this project and this Digestate Concentration System has been specifically designed to reduce the volume of material to be stored and applied, while maintaining its value as an organic fertilizer. Not only will this deliver considerable financial savings to the farming business, but it will also help it to further reduce its carbon footprint as it will need less conventional fertilizer."

The project has been praised by Matthew Pencharz, the Mayor of London's Senior Energy & Environment Adviser, who said: "This innovative facility is turning food and garden waste into two much needed resources - energy and cheap fertiliser. This truly demonstrates that investment in London's Cleantech Industries can deliver real savings, jobs and growth for London."

Construction of the plant began last August and is expected to be completed in October 2015.

#### **About HRS Heat Exchangers**

Headquartered in the UK, HRS Heat Exchangers Ltd operates at the forefront of thermal technology, offering innovative and effective heat transfer solutions worldwide, across a diverse range of industries. With over 30 years' experience, we specialize in the design and manufacture of an extensive range of corrugated tube and scraped surface heat exchangers. All our products comply with the European Pressure Vessel Directive. HRS has a global network of offices: Spain, USA, Malaysia, Australia and India; with manufacturing plants in the UK, India and Spain.

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