

Externally mounted GasMix systems

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Since its formation in 1993, Eco Sustainable Solutions has always looked for improvement with a total commitment to innovation that has distinguished itself in renewable energy.

From supplying soils, composts, top dressing, turf & grass seed, mulches, barks and playground surfaces, Eco opened its first AD plant in Dorset, determined to create a highly innovative and cost effective process.

Success was achieved, but when the company built its second digester and introduced a new externally-mounted digester mixing system, it almost immediately found vastly improved gas yields. So much so, Eco retrofitted its first digester – also realising a big reduction in energy costs.

Externally mounted GasMix systems, designed and manufactured by Landia, have helped Eco Sustainable Solutions increase the amount of biogas it produces by 12.5%.

GasMix, which utilises Landia's chopper pump, replaced inefficient and unreliable rotary submerged equipment. The retrofit has also reduced the energy use of mixing equipment by 50%.

The 1.6MW AD facility in Piddlehinton, near Dorchester, takes in food waste from around 60,000 Dorset households, plus liquid waste from milk and cheese production. At first, around 5 to 10% chicken manure was added to the feedstock, but gas yields have remained higher without.

Since the installation of GasMix, which was also chosen for ease of access (no moving parts

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inside the tank) and vastly reduced health and safety risks, the digesters' contents are kept at a constant 41°C, with a retention time of 40 days.

Initially, Eco had employed the standard rotary submerged equipment for its first digester, but opted instead for Landia's GasMix when the second digester was built. Such was the noticeable increase in gas, plus additional benefits, the first digester was then retrofitted with Landia's GasMix.

A total of four Landia GasMix systems serve the two 2500m³ digesters, utilising 18.5kW chopper pumps to generate a total of 700m³ gas per hour. Total mixing is achieved via specially angled recirculation nozzles. Compared to many energy-burning systems that have to run flat-out, 24/7, Landia's GasMix at Piddlehinton only needs to operate for approximately 10 minutes per hour. Despite using 18.5kW motors, compared to typical 7.5kW submersible units, GasMix has been shown to use fifty per cent less energy than the previous system.

Eco Sustainable Solutions' Managing Director, Trelawney Dampney, commented: "Primarily, we chose the Landia GasMix system because all the pumps and pipe-work parts are on the outside of the digesters, so importantly, can be maintained without interruption to our 24/7 process. Since the installation, we have had absolutely no performance or reliability issues, but to see such an improvement in the process by way of increased gas, as well as reducing our energy usage, is a massive bonus. For any AD operator, a proven boost of twelve and a half per cent is very significant."

Even at 15 minutes per hour, the energy usage is just 110 kW per day, compared to 180 kW. This is on just one mixer/pump.

The 2.5 acre site, which was Eco's first move into renewable energy, supplies 60% of its power to Mole Valley Farmers' neighbouring Dorchester Feed Mill, the first feed mill in the UK to be powered completely by renewables. The remaining 40% generated is sold on to the National Grid. PAS 110-approved digestate is also sold on as fertiliser to two local farms.

The success of Landia's GasMix at Piddlehinton has already drawn international attention with the visit by a delegation of business leaders from South Korea who made a special trip to site. The delegation included representatives from the Korea Environment Corporation, the country's Ministry of Environment, two engineering companies and a livestock cooperative association. On a separate visit to the UK, the South Korean delegation also visited Landia at Whitchurch in Shropshire to take a closer look at the pump and mixer manufacturer, from whom they had placed an order for GasMix systems as a direct result of their visit to Eco. Goods were rigorously inspected before leaving on their 5,000 mile journey to East Asia.

Paul Davies, Key Account Manager at Landia, commented: "This was a very significant day at our premises on Waymills Industrial Estate. Our guests from South Korea very much liked what they'd seen at Eco and placed a sizeable order with us. The visit to Whitchurch gave our visitors the opportunity to see Landia for themselves and make a detailed inspection of the GasMix systems we've built for them. As with Eco, their initial interest was in reliability and ease of service, but such a vast improvement in gas yields and overall optimisation of the process was impossible to ignore."

In separate tests, GasMix reduced viscosity by more than 31% when used in a heat exchange

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tank treating agricultural residues prior to anaerobic digestion.

This reduced viscosity input from the heat exchange tank allowed for a twelve and a half per cent reduction in downstream reactor mixing times, equivalent to a saving of 210 kWh per day in electrical consumption.

Trelawney Dampney added: "Completed on time and within budget, our AD facility at Piddlehinton is proving itself as a highly efficient plant and I believe will act as a blueprint for future resource projects."

Read more about Landia GasMix

