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Northumbrian Water to save £100,000 energy costs with ABB drives

Northumbrian Water is set to save over £100,000 a year on pump running costs following a project with ABB Drives Alliance member, Quantum Controls, to install ABB low voltage AC drives on its anaerobic digester.

An anaerobic digester uses micro-organisms to break down biodegradable material such as sewage waste. The company was experiencing a problem with the pumps on the three digester tanks that make up the anaerobic digester at its Bran Sands sewage treatment works on Teesside.

Each digester tank had two 90 kW star-delta controlled pumps with no speed control. When run at full speed, the pumps caused a foaming of the liquid in the tanks, making it difficult to control the digestion and to measure the sludge levels.

As well as processing the sewage sludge, the digesters also produce methane. This is supplied to gas fuelled engines which contribute up to 4 MW of power, helping to offset the site's total power requirement. The foaming also interfered with the volume of methane produced.

Northumbrian Water and Quantum Controls investigated whether it could achieve a form of pump control that would prevent the foaming. Quantum Controls fitted two low voltage AC drives to one of the digester tanks. As well as giving the ability to reduce the motor speeds, avoiding the foaming, Quantum Controls also demonstrated a substantial cost saving for the application through the reduction of the energy used by the motors. Quantum Controls measured the difference in power between two pumps running simultaneously, with the first pump being star-delta and the second being controlled by a low voltage AC drive.

Quantum Controls calculated that the overall saving based on these results would be £107,000, giving a payback period of 0.27 years. As well as the monetary savings, Northumbrian Water will also be able to reduce its CO₂ footprint by over 700 metric tons a year, giving an additional saving of £8,600 under the current UK carbon tax credits scheme. This brings total savings up to £115,000, with a return on investment of 92 days.

Daniel Fitzsimons, Utilities Account Manager for Quantum Controls, says: "At first it was not clear how much the pumps would need to be slowed to prevent the foaming. We initially did a test that involved fitting two low voltage AC drives on a temporary basis. This would also tell us if the reduction in pump speed would cause any temperature problems with the existing motors.

"Using the drives, the speed of the pumps was reduced from 1500 rpm to 900 rpm, allowing them to pump without causing excess foaming. We also found that there were no problems with excessive pump temperatures."

Ian Clark of Northumbrian Water says: "This project was a good example of the partnership which exists between NWL and one of our preferred suppliers. We gave Quantum the basic specification and they supplied the equipment to suit. Due to our limited on site resources, they also installed and commissioned alongside NWL technicians".

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Caption: Northumbrian Water is set to save over £100,000 a year on pumping running costs following installation of ABB low voltage AC drives on its anaerobic digester.

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