

Case note

Yorkshire Water saves £61,000 on energy costs with ABB drives



Yorkshire Water's Bradford Esholt wastewater treatment plant is saving over £61,000 after installing ABB drives on its re-circulation pumps

Yorkshire Water supplies its customers with around 1.24 billion litres of drinking water each day as well as collecting, treating and disposing of about one billion litres of wastewater safely back into the environment.

Reducing flow saves energy costs

The filter re-circulation pumps at Yorkshire Water's Esholt Wastewater Treatment Works are used to pump final effluent to the filter distribution chamber, diluting the effluent and providing the required wetting rates for the filters.

There are three 180 kW, fixed-speed re-circulation pumps on site, which were operating as duty/duty/standby. Normal operation was for two pumps to be operated continuously providing a re-circulation flow of approximately 1,000 litres per second. Operating the two pumps this way cost £235,000 per year.

Recent operational changes at the site have meant that the load to the filters is substantially reduced and some of the filters have been de-commissioned. As part of its plan to reduce electricity consumption by seven percent by 2015,

Yorkshire Water wanted to review the flow rates of these pumps to determine if there was any scope for savings.

Investigations showed that the pumps were efficient, but that flows could be reduced to save £23,500 per annum. More detailed process calculations indicated flow reduction should be possible, giving a calculated saving of £50,800 per annum.

Trials prove saving potential

Yorkshire Water asked ABB Drives Alliance member Halcyon Drives to look at the application. Mick Hawksworth, Plant Engineer for Esholt, says: "For our energy projects, we look for a three year payback period. When we put together the business case for this project, the payback time improved on that goal so it was a definite bonus."

The project involved installing 200 kW ABB low harmonic variable-speed drives (VSDs) on the three re-circulation pumps. The project included building and supply of the drives in panels to replace the existing soft start units and installation of insulated bearings on the existing motors.

Once the installation was complete, which took four days; a programme of trials was started, which included reducing the speed of the VSD driven pumps at a pre-determined rate and monitoring the effect for two weeks. On each step of the reduction, power readings were taken to assess the savings that would be achieved on an annual basis if the pumps were continually operated at that speed.

Savings bigger than expected

The final speed at which measurements were taken was 45 Hz, which would produce a saving of £61,324.

As well as the main benefit of energy saving, the VSD project gives Yorkshire Water more operational control. The flow is used as dilution flow and incoming loads could possibly change in the future. Using the VSDs gives flexibility over and above simple fixed speed operation.

Challenge

- Review operation of fixed-speed re-circulation pumps to determine possible energy savings
- Contribute to company's energy reduction programme

Solution

- 200 kW ABB low harmonic variable-speed drives installed on the three re-circulation pumps
- Building and supply of the drives in panels to replace the existing soft start units
- Installation of insulated bearings on the existing motors

Benefits

- Saving of £61,000 in energy costs per year
- Greater flexibility to deal with changing loads



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