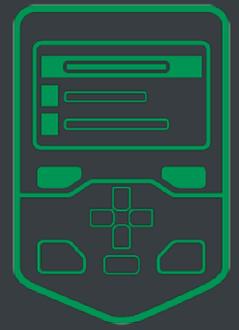


## CASE STUDY – ABB VARIABLE-SPEED DRIVES



### Anglian Water cuts £2,000 a year from borehole pump costs

Variable-speed drive eliminates intermittent starts and stops on borehole pump, saving energy, reducing turbidity and improving reliability.

Anglian Water is saving £2,000 a year on a borehole pump's electricity costs following the installation of an ABB variable-speed drive (VSD) on a submersible pump motor. The £7,000 project investment is expected to pay for itself within three and a half years.

The borehole is one of two operated by Anglian Water, at separate locations, that feed the reservoir serving customers in Sudbury, Suffolk. Prior to fitting the VSD at Blackhouse Lane, both pumps were run at fixed speed all of the time but had to be turned off frequently as the reservoir had reached the desired capacity.

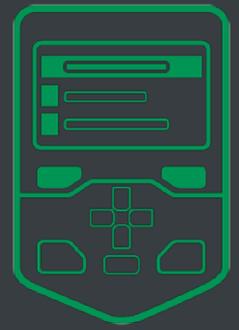
Anglian Water suspected that this system was inefficient as it was pumping more water than was required. The frequent stopping and starting of the pumps was also causing excess turbidity in the extracted water.



ABB authorised value provider, Gibbons Engineering Group, was asked to perform an energy assessment on both pumps, in Blackhouse Lane and Woodhall Road.

Andy Vincent, works technician at Blackhouse Lane, says: "The report found that the boreholes had a combined pumping rate of 70 litres per second, whereas the combined optimum rate was 50 litres per second. The actual demand from the reservoir was lower than our total pumping capacity and was the equivalent of the water pumped from one and a half boreholes."

The decision was taken to install a VSD on the pump motor at Blackhouse Lane. The drive alters the speed of the pump's motor to top up the reservoir as required. The borehole pump at Woodhall Road, without a VSD, runs at full speed to provide most of the demand.



Gibbons recommended a 132 kW ABB drive. The VSD receives a 4-20 mA signal via a radio link from the reservoir's level transducer. If the signal is less than 16 mA, the pump motor runs at maximum speed, while a signal of greater than 16.8 mA means that the pump motor runs at minimum speed in a range of 40-50 Hz.

This has reduced the amount of energy used by the pump motor at Blackhouse Lane, resulting in the £2,000 annual saving. It has also solved the problem of turbidity levels in the extracted water, which is now within acceptable levels.

The new arrangement has also built redundancy into the system, improving reliability. "Previously, running both pumps at full speed meant that the borehole pump at Blackhouse Lane could not take up the slack if the other failed – now if the pump fails it can ramp up the pumping rate to compensate," says Andy.

As well as the VSD, Gibbons also installed a du/dt filter to cut down interference on the mains. The windings in a borehole pump motor do not always perform well when connected to a modern drive so the filter was added to smooth out the voltage.

Another benefit of installing the VSD is that the risk of the chlorine in the treated water deteriorating is reduced. Chlorine left standing for too long can reduce in strength. With the VSD, the pump runs slower for longer, eliminating this problem.