

West of Scotland Water gains 48% reduction in energy costs

A massive saving in electricity costs is being achieved by a Scottish pumping station following the installation of ACS 600 drives from ABB.

- 48% reduction in energy costs
- £80,000 in electricity savings
- Improved reliability
- Overflow problems minimised



Two ABB ACS 600 AC drives - supplied and installed by ABB Drives Alliance partner EDC (Scotland) Ltd - keep the water flowing at the Helensburgh pumping station in West Dunbartonshire, saving West of Scotland Water £80,000 worth of energy

Problem

West of Scotland Water's Lomond Street Wastewater Pumping Station in Helensburgh, West Dunbartonshire, pumps wastewater to the Ardmore treatment works. The existing pumpsets showed low efficiency in terms of cubic metres pumped per kilowatt-hour consumed. The wet well also had occasional problems with overflowing.

Solution

An energy audit of the pumping station by ABB Drives Alliance Partner EDC revealed that a small decrease in pump speed would deliver large energy savings. Two ACS 600 drives from ABB were installed, reducing energy consumption by 48%.

The wet well is now monitored with ultrasonic level instrumentation, generating a speed reference signal, which increases or decreases the pump speed and allows the start and stop levels to be selected. This results in the motors running between 73% and 88% duty, the optimum speed range for energy efficient operation of pumps.

Flow meters monitor the performance of the pumps. Combined with kilowatt-hour readings from the drives, this gives a pumping index for each pump. A decreasing index indicates wear in the pump, enabling West of Scotland Water to optimise the pumps' service intervals.

Energy efficient motors were fitted to further improve energy efficiency, as the gap between standard and high efficiency motors becomes even greater in variable speed operation.

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Equipment: Two ACS 600 AC drives

Investment: £17,000

Savings p.a: £4,000

Benefits

The efficiency has more than doubled with the ACS 600 drives. It is projected that the drives will save at least £80,000 in electricity costs over a 20-year life span. With the number of pumping cycles being increased, the holding capacity of the wet well and combined sewer are able to cope with a greater flow than the old system would allow, minimising the risk of overflow.

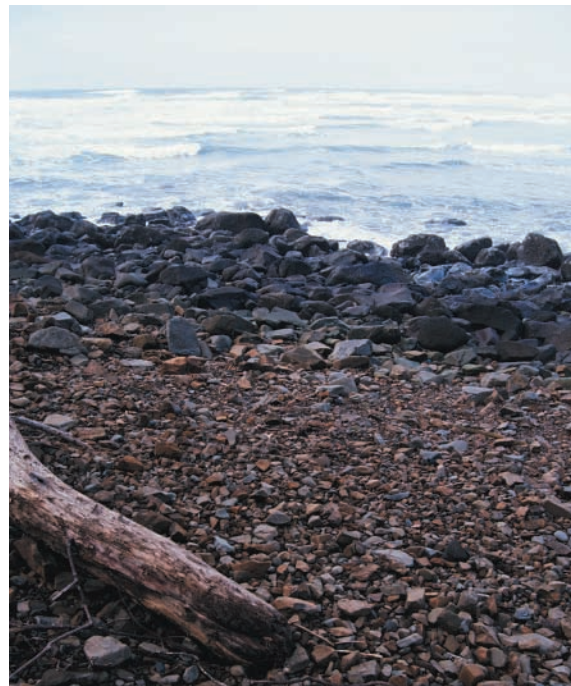
The old pumps were estimated to have a pumping index of 14m³ per kWh. After fitting new pumps and drives, but still running at the same speed as the old pumps, this increased to 21m³ per kWh. With the drives interfaced to the analogue reference signal, this was further improved to 30m³ per kWh.

“Indications are that the electricity consumption has been reduced by 48% compared to the same period in the previous year”, says Charles McCaig, Electrical Design Engineer at West of Scotland Water’s Planning & Capital Procurement Department.

“I estimate that 44% of the savings can be put down to maintenance and 56% to the drives.”

The installation has also reduced noise. The ACS 600 drives feature motor flux optimisation, making the pumps quieter when in operation. This is of importance in the residential area where the station is located.

“Already small decreases in pump speed give large energy savings, when a variable speed drive is used,” explains Allan Murray, Managing Director of EDC, Ayrshire, the company that supplied, programmed and commissioned the system.



With the number of pumping cycles increased, the risk of overflowing onto a nearby beach has been greatly reduced as the holding capacity of the wet well and combined sewer can cope with a greater flow than the old system would allow

“This is because decreasing a centrifugal load, such as a pump, gives a power decrease based on the cube of the load.

“We also supplied energy efficient motors to the system to further improve energy efficiency, as the gap between standard and high efficiency motors becomes even greater in variable speed operation.”



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