

Fresh eyes uncover additional energy savings across pumping system

A water supply system had previously been analysed and pumping efficiency optimised. However significant savings were still realised by taking a Process Energy approach.

The Challenge

Our objective was to deliver savings on a pumping system that was previously considered to be optimised. The system comprised of seven borehole pumps, various inter-stage pumps and seven high-lift pumps across three water treatment sites.

Methodology

The cost of water from each of the three source sites was calculated, which revealed that total abstraction costs were variable.

“Savings were achieved on a system that was previously considered to be optimised”

Iain Ashcroft, Director, Projective

Benefits

- ▶ Net annual savings of **£19,200**
- ▶ Carbon dioxide savings of **101 tonnes** per annum
- ▶ **Short payback time** of 1.6 years

Our Approach

One site was expensive due to the majority of abstraction being from a remote borehole. Flows were high leading to start/stop operation, significant frictional losses and deep pumped water levels. Variable speed drive (VSD) installation for the pumps was investigated to alleviate these issues.

Modelling

Two models were created; one for the service reservoir to determine the operation at site level, and one for the contact tank of the site with the remote borehole. The modelling identified that VSD operation of the remote borehole would be severely limited by the large fixed flow (but VSD driven) high-lift pumps at this site. VSD operation of both sets of pumps was therefore investigated.

Intelligent Solution

An adaptive control method was instigated that related the speed of the pumps directly with reservoir or contact tank level. This allowed a greater proportion of the storage volume to be used than could be achieved with controlling to a level set-point.

The Result

The project resulted in electrical savings of 228,571 kWh or £19,200 per annum on a system that had already been optimised. Pumping efficiency has not been altered but the system is now using the minimum amount of energy to meet reservoir demand. The Operations Department was engaged throughout the project to ensure they understood the current and proposed operation of the system. Their support was vital to bringing the project in on time and on budget.



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