



Life cycle cost analysis of pumps optimises the brewing process

Despite the extensive consolidation that has been taking place in the German and European brewery industry, Pfungstädter Brauerei has so far managed to remain an independent business, safe in the hands of the family that founded it. The brewery now has 165 employees and generates an annual beer output of 450,000 hectolitres. There have been many innovations during the 175-year history of Pfungstädter Brauerei – including numerous specialist beers and beer-based mixed drinks. However, one thing has remained unchanged - the original recipe for the cool and sharp Pfungstädter beer, which has been passed down from one generation of master brewers to the next.

The Situation

Feed pumps in breweries often have to run around the clock and this means that the pumps should undergo regular efficiency checks. Due to progress in a number of areas, including motor technology, modern pump systems often achieve greater efficiency and boost lower power consumption. Replacement of what is to all intents and purposes, still a fully functional technology therefore often makes financial sense. For the technical management of the brewery, Rüttger Stieg, Technical Director, and Michael Schmitzer, Technical Systems Manager, it was therefore more or less a matter of good practice that Grundfos Service did a life cycle cost (LCC) analysis of the coolant feed pumps: "Obviously, we are constantly on the look-out for energy-efficient solutions."

The Grundfos Solution

Based on the efficiency and energy conditions, the condition of the circuit pumps for supply of process cooling was determined by listing the performance-related values.

Using evaluation and calculation software custom-developed by Grundfos, the values obtained were compared with those of potential new pumps; the potential savings for each pump were determined for identical duty points. It quickly became clear that with an efficiency level of 45%, the performance data for the existing pumps no longer matched the best technology available and resulted in excessive operating costs. A Grundfos Series NB 125-200/221 end-suction pump was proposed as the replacement version. At the desired duty point, the 11 kW pump achieves an efficiency of 66% (P1 = 6.4 kW).

The Outcome

Compared to the previous pump installation, this offers potential electricity savings of 92,020 kWh/year (based on 8600 operating hours/year and 23 h/day).

At an energy price of €0.10/kWh, this corresponds to annual savings in operating costs of €9202/year, or 61% of the operating costs of the old pumps. Note: The assumed cost of 10 cents per kilowatt-hour is very low. There is a corresponding reduction in payback time if energy costs are higher.

This reduction also involves a reduction in CO₂ emissions (lignite-generated energy) of 37,176 kg/year (source: the German Federal Environment Agency – 'Climate Change 05/07').

Assuming investment costs of €3,800 for replacement of one of the pumps, payback of the entire investment will already be achieved after around five months.

The recommended pump was installed in Pfungstädter Brauerei in August 2009. Control measurements showed that the forecasted data are achieved almost 100%.

This project once again shows that investment in an LCC analysis can identify a considerable savings potential. "We have to admit that we were very surprised just how uneconomic the operation of the old feed pumps was. Thanks to the clearly set-out and well documented LCC analysis from Grundfos we had a reliable decision-making basis for our investment in the new pump," Rüttger Stieg and Michael Schmitzer conclude.

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