KSB SupremeServ

Your system rendered fully transparent with SES System Efficiency Service

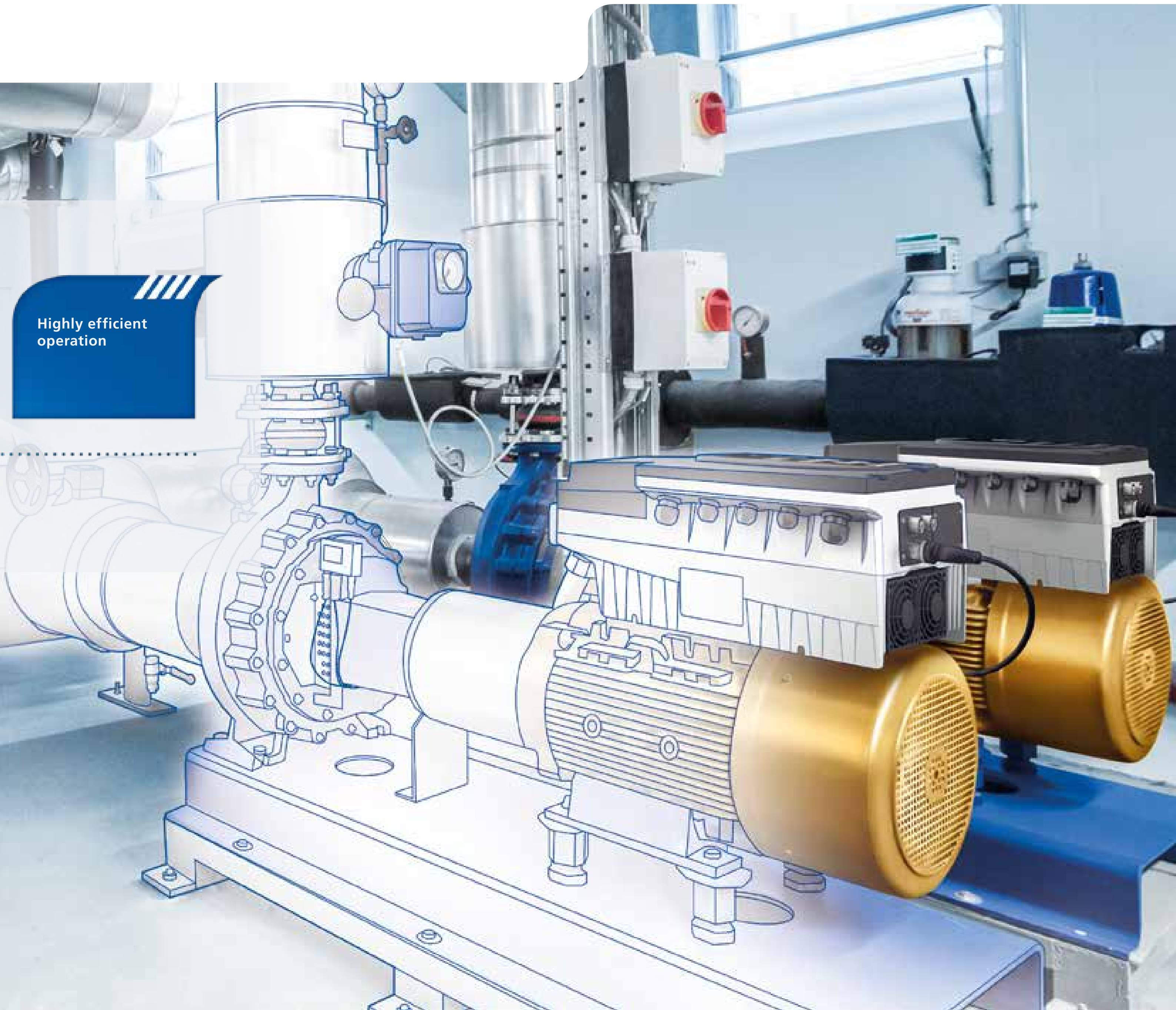
Systematically identifying optimisation potential with SES and FluidFuture®

Operating a hydraulic system reliably and efficiently requires knowledge and understanding of how the system is actually behaving. To this end we perform extensive measurements of all relevant process variables. Our expertise and long-standing experience allow us to precisely analyse the recorded load profile and provide recommendations for action regarding energy efficiency and improved system availability.

The analysis is the first step to systematically optimising your system with FluidFuture®

Efficient and reliable system operation thanks to FluidFuture®
An analysis of potential optimisations provides the basis for improving your system's energy efficiency and availability sustainably. With FluidFuture® we look at the entire life cycle of your hydraulic system and then apply a four-step procedure to perfectly match the system's individual components to one another. Combining our expert knowledge with smart products and services enables us to exploit all potential savings, lowering your operating costs significantly. As well as increasing the economic efficiency and availability of your system, the energy objectives in accordance with ISO 50001 are also achieved.

For more information visit **www.ksb.com/fluidfuture**



Increasing system profitability through comprehensive system analysis

Whatever the application – energy, industry, water or waste water – comprehensive system analyses include the recording of the pumps' actual load profile using a data logger. Experienced project engineers evaluate the measurement data and compare it with the pumps' design conditions. This allows them to identify potential savings (energy efficiency analysis) as well as any causes of damage (damage analysis).

Regardless of the installation type (dry/wet) and manufacturer, a system analysis can be performed for all pumps from ratings of 30 kW.

Overview of system analysis

- Energy efficiency analysis in accordance with ISO 50001
- Identification of causes of damage by means of vibration analyses
- Report and presentation of findings including action plan and profitability analysis
- Verification of implemented measures via a free-of-charge second measurement

Process variables:

- Pressure (EN ISO 9906)
- Effective power
- Rotational frequency
- Fluid and bearing temperature
- Flow rate
- Analog signals (customer) 0/4-20 mA

Vibration levels to DIN ISO 10816

- Vibration velocity
- Frequency spectra
- Natural frequency analyses
- Diagnosis of rolling element bearing noises

First methods for evaluating potential savings

Pump Operation Check for single-pump applications
The efficiency of single pumps is analysed using Pump Operation Check.
This includes measuring the pressures over a representative period of time and establishing a qualitative load profile based on the data compiled. The measurement is performed with KSB's PumpMeter without interrupting the operating process. In addition to the load profile, our experts not only give specific recommendations for action based on the efficiency analysis but also provide a profitability analysis. For more information visit **www.ksb.com/poc**


Etanorm with PumpMeter

Identification of potential with KSB Sonolyzer®
Whether or not detailed measurements of a pump are worthwhile depends on what potential savings are possible. The free KSB Sonolyzer® app analyses the motor sound of fixed-speed asynchronous motors to identify whether the operating point is inside or outside of the part load range. Performed during a site survey, this quickly and reliably reveals savings potential and prevents unnecessary measurements.
Discover your savings potential: **www.ksb.com/sonolyzer-en**

Energy efficiency analysis: a waterworks achieves energy savings of 25 %

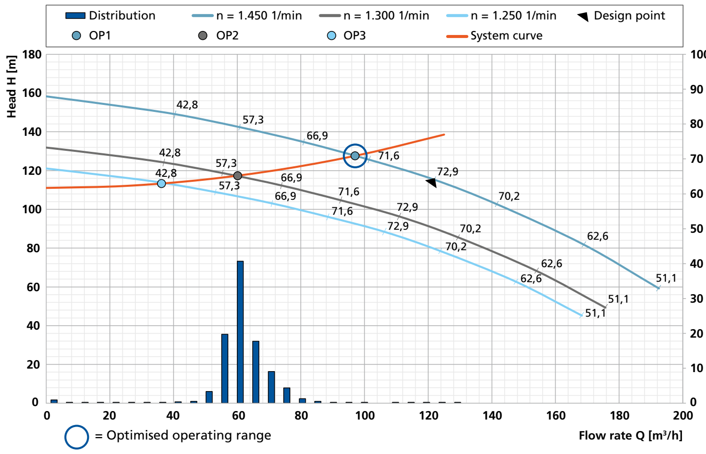
Our system analysis revealed significant potential savings for the clean water pumps used in a waterworks. Three variable speed pumps installed in parallel transported clean water to an elevated tank. The every-day demand was covered by a single clean water pump running at reduced speed in continuous operation. With approx. 60 m³/h, it delivered an almost constant flow rate, thus keeping the elevated tank fill level constant. This meant that the clean water pumps were continuously operated in the part load range, reducing overall efficiency and increasing specific energy consumption.

Costs saved thanks to SES

Energy costs per year **before optimisation**	31,013 €
Energy costs per year **with modified control strategy**	23,163 €
Savings p.a.	7,850 €
Costs for control modification	1,381 €
Payback period	0.2 years
Energy savings	78,502 kWh/a
CO_2 savings	44.4 t/a

Recommendations for action:

- Adapting tank management
- Employing measured start/stop operation instead of continuous pump operation
- Operating the clean water pump at nominal speed in a significantly improved efficiency range

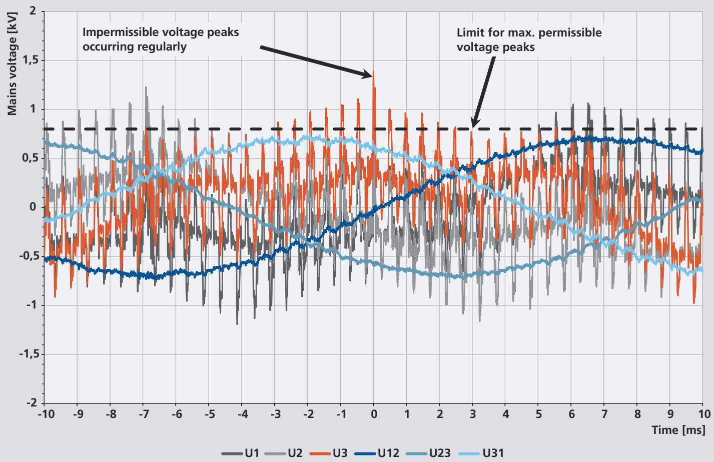


Damage analysis: increased availability of UPA pumps

Repeated winding damage was noted on the submersible motors of UPA pumps installed in a reverse osmosis system for seawater desalination. Following detailed measurements in the power grid, we were able to identify impermissible voltage peaks. They became apparent in the carrier frequency of the frequency inverter between the output filter and the submersible motor.

These voltage peaks caused the damage to the motor windings. The suggested remedies: optimise the mains filter, improve the earthing system and retrofit the motors with special windings better suited to coping with the increased load conditions resulting from frequency inverter operation.


Burnt submersible motor windings



Energy efficiency analysis: energy savings of 51 % in the cooling water circuit

Six circulating pumps installed in parallel in the cooling water circuit of a steel mill were being operated at constant speed with fluctuating system load. The pumps were continuously controlled via throttling using discharge-side valves. The system analysis revealed distinctive signs of wear in combination with increased vibrations. Repairing the pumps was no longer economical.

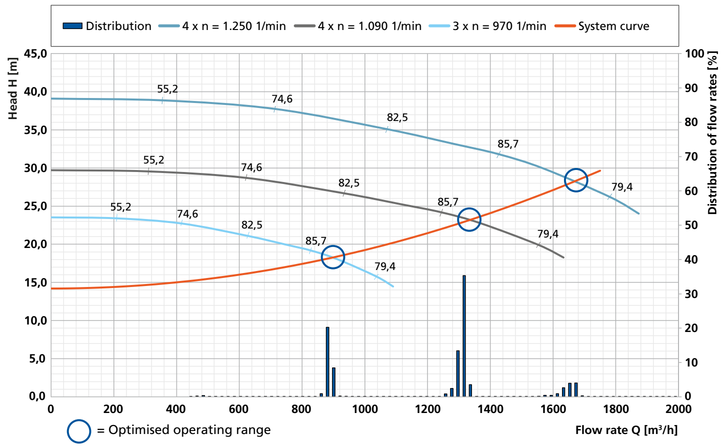
Recommendations for action:

- Avoiding throttling losses and
- Increasing the efficiency by installing new pumps equipped with a smart pump control system

1st option: Same number and size of new pumps incl. control system – therefore no need for piping modifications
2nd option: Same number, however smaller new pumps incl. control system – piping modifications required (additional costs)
3rd option: Reduced number of pumps with identical system load – additional costs for adapting the piping, but lower investment costs for new pump sets

Costs saved thanks to SES – 1st option

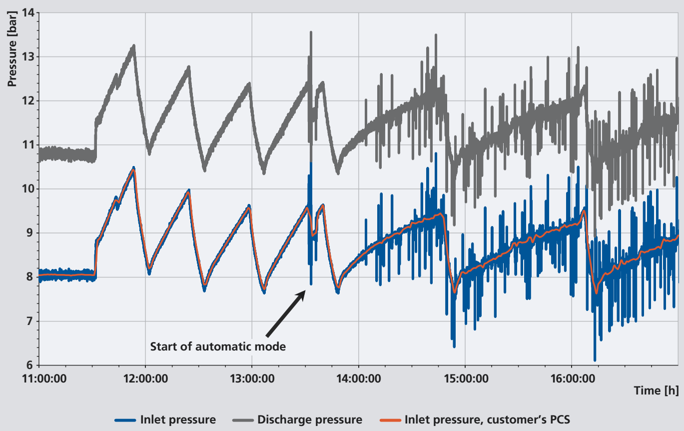
Energy costs per year **before optimisation**	213,772 €
Energy costs per year **using a variable speed system**	105,065 €
Savings p.a.	108,707 €
Investment costs	172,773 €
Payback period	1.59 years
Energy savings	905,896 kWh/a
CO_2 savings	512.7 t/a



Damage analysis: improved process reliability thanks to measurements with high sample rates

Repeated bearing damage and defective magnetic couplings on a process pump used in a chemical company have resulted in increased maintenance costs and reduced system availability. The process data from the customer did not reveal any irregularities in the system's process. The system's actual behaviour only became transparent after KSB had performed process data measurements with high sample rates. We were thus able to identify the collapse of vapour bubbles and the resultant pressure surges which ultimately led to the frequent damage of the pumps.

Broken bearing bush of process pump



Technology that **makes its mark**

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