Save Energy and Reduce Emissions With Energy Efficient Pumping

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While not a new idea, pump optimization is highly relevant in today's competitive business climate. With the right pumps, you can reduce total cost of ownership, raise system performance and enhance your plant's environmental profile.

By optimizing pump selection, it is possible to reduce energy consumption and realize savings of up to 50%.[1]

Buy Based On Price Or Total Life Cycle Costs?

There are several factors to consider when selecting a pump for a given duty. Choosing a high-quality, energy-efficient pump with close tolerances, optimized internal design and robust construction is generally a wiser approach than going with a low-cost pump. Some other considerations for pump selection:

- Careful calculation of the duty point and pump design in order to optimize the system.
- Working with suppliers that have a broad pump offering and expertise in choosing the right pump for the right process and duty
- Best Efficiency Point (BEP) as the selection criteria for the pump (see below).

Choose the Best Efficiency Point

The Best Efficiency Point (BEP) is the point at which a pump operates at the optimal head and flow rate to deliver the highest possible efficiency for a particular duty. The closer the Best Efficiency Point is to the duty point required, the higher the pump efficiency. Computerized programs, such as the Alfa Laval CAS design and selection tool, can help select the right pump for the task at hand.

Optimize To Economize

The principles of efficient pump operation apply to both new and existing systems. Because systems change over time and even minor changes impact efficiency, it is important to evaluate and modify systems continuously.

During installation, newly designed systems may require modifications in the pipe layout due to on-site restrictions. After installation, the actual flow and pressure may therefore differ from the design flow and pressure. Or the viscosities of the final products may differ from those predicted.

By auditing existing systems, using pump performance characteristics, and pressure gauges, flow meters and amp draw meters, it is possible to evaluate and adjust pump operation. Modifications like these may restore pump efficiency:

- Change to a pump operating at the BEP.
- Add a variable frequency drive, which will contribute reduced energy costs.
- Change the diameter of the pump impeller.

Other modifications, such as changing the pipe layout to reduce system pressure losses or removing the control valves, can also improve pump efficiency.

Payback for such modifications, which contribute to energy savings and reduced emissions, most often takes less than a year.

Saving Energy And Reducing Emissions

Take, for example, a recent system audit at a major Danish dairy. Alfa Laval proposed the replacement of two pumps, each with a 100 kW motor, with two Alfa Laval LKH pumps equipped with variable speed drives and a rated power of 75 kW per pump. The new pumps will pay for themselves in less than a year through 36,000+ EUR in annual energy savings and reduce annual carbon emissions reductions by 100,000 kg.

CIP Energy And Water Savings

Optimizing cleaning-in-place (CIP) pumps also contributes to energy savings and environmental benefits. Replacing conventional static spray balls with high-efficiency rotary jet head tank cleaning machines and operating CIP pumps at the BEP will deliver electrical energy savings of between 60 and 80%, or roughly 3 to 10% of total CIP cost per tank, depending on the tank size.

Why Optimize?

Pumps consume 1340 terawatt hours (TWh) or 10% of the total worldwide energy production.* Pump optimization therefore makes good business and environmental sense.

[1]Source: British Pump Manufacturing Association (BPMA), 2009 study, www.bpma.org.uk.