

CPE pumps – energy-efficient by design

Energy efficiency is a hot topic in the process industry, and many authorities around the world are preparing related regulations. First, the European Union (EU) created the Energy-Related Products Regulations (ErP). Now, the U.S. Department of Energy (DOE) has introduced a regulation that specifies the Pump Energy Index (PEI) for clean-water pumps, with the target of reducing energy consumption. From 2020, only pumps, which can satisfy the PEI requirements, are allowed on the market.



See video of CPE pump.

In many industrial processes, pumping systems are responsible for 25–90% of energy usage. The energy consumption depends on the design of the pump and the installation, the specific application, as well as on the conditions and the operation of the system. These components and factors have to be configured optimally to achieve the lowest possible energy and lifetime costs.

Steps to energy optimization

Energy is often wasted because of inefficient or oversized equipment. To optimize the pumping system, users have to be aware where most of the energy is used and how to boost the efficiency of the installed equipment. Optimization of the equipment helps not only to save costs, it cuts down the carbon dioxide footprint as well (Fig. 1).

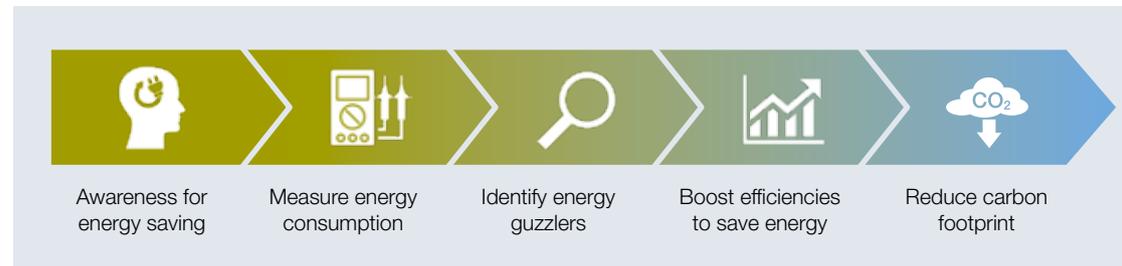


Fig. 1 Steps to reduce the carbon footprint of pumps.

Correct pump selection saves energy

Energy costs are the biggest share of the total cost of ownership (TCO) of a process pump (Fig. 2). Using the right pump technology that is properly sized for a specific application is the best way to reduce energy consumption and the overall lifetime cost of the pump.

To select the most efficient pump technology for an application, the Sulzer sales engineers need to thoroughly understand the application, fluid characteristics and flow demands. Combined with a comprehensive knowledge of pumping technologies, this information helps to define the most appropriate pump for optimal performance and energy savings. The most cost-effective solution when it comes to initial capital investment and long-term operating costs will be achieved by matching the most appropriate pump construction and material.

The next highest impact on energy consumption can be accomplished through optimal sizing of the pump. Pump duties are often overestimated and safety factors added to the required head and flow of the pumps. This results in the selection of an oversized pump, which does not run at its best efficiency point (BEP) and, therefore, wastes energy.

The rotational speed of the pump has a big impact on the selected pump size and its efficiency. For clean liquids, high rotational speeds can be selected to maximize the efficiency and energy savings – with direct savings to the end users as a result.

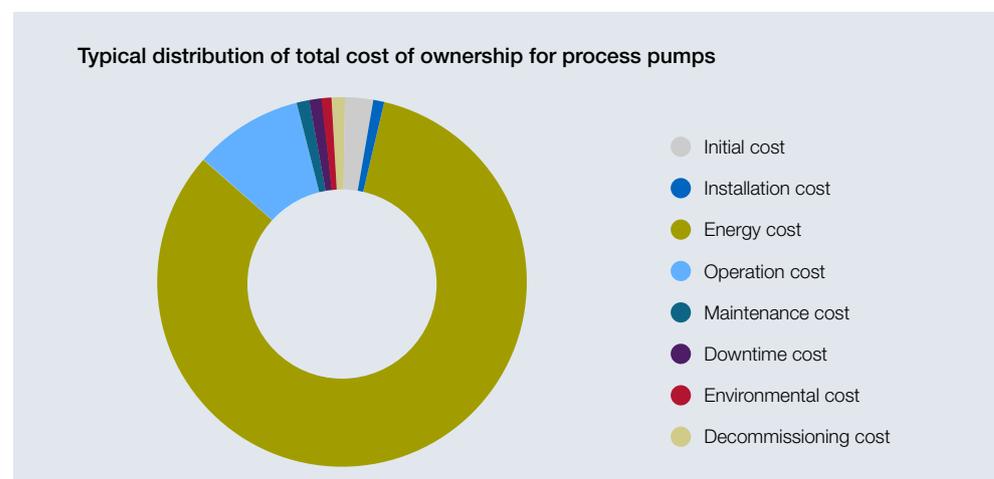


Fig. 2 Energy costs are the biggest share of a process pump's lifetime costs.

Replacing a pump with a high-efficiency design normally increases the efficiency (Fig. 3) and reduces the energy consumption between 3% and 20%. In some cases the reduction can be as much as 50%. Correct pump selection enables considerable savings in energy and investment costs, and is a key factor for successful process runnability.

The best efficiency and further energy savings can be achieved by driving the pump with a variable-speed drive (VSD) and a maximum diameter impeller. This combination allows the rotational speed of the pump to be adjusted to achieve the desired head and flow for the process application. The efficiency improvement can be up to 10% over that of a pump driven at constant speed.

Efficiency by design

Sulzer has been adapting to market needs for centuries, and is always thinking ahead to fulfill future needs of its customers. Sulzer launched the new CPE ANSI process pump range in June 2018. The pump range is designed to exceed the strictest energy regulations for all industries as well as the requirements of the ASME B73.1 standard. The CPE pump (Fig. 4) also complies with the U.S. Department of Energy (DOE) pump efficiency index (PEI) that will come into force in 2020.



Fig. 4
The CPE process pump reaches PEI 0.77 values.

The CPE pump is the next-generation ANSI pump. The new pump range meets the process requirements in a variety of industrial applications. It is suitable for use with clean or slightly contaminated liquids, viscous liquids and fibrous slurries. When engineering the new CPE pump range, Sulzer engineers considered the factors that influence the total cost of ownership (TCO) of a process pump. The goal was to offer a pump that brings savings to the end customers in all TCO fields. With the new pump design, the engineers improved not only energy efficiency but also stability and reliability.

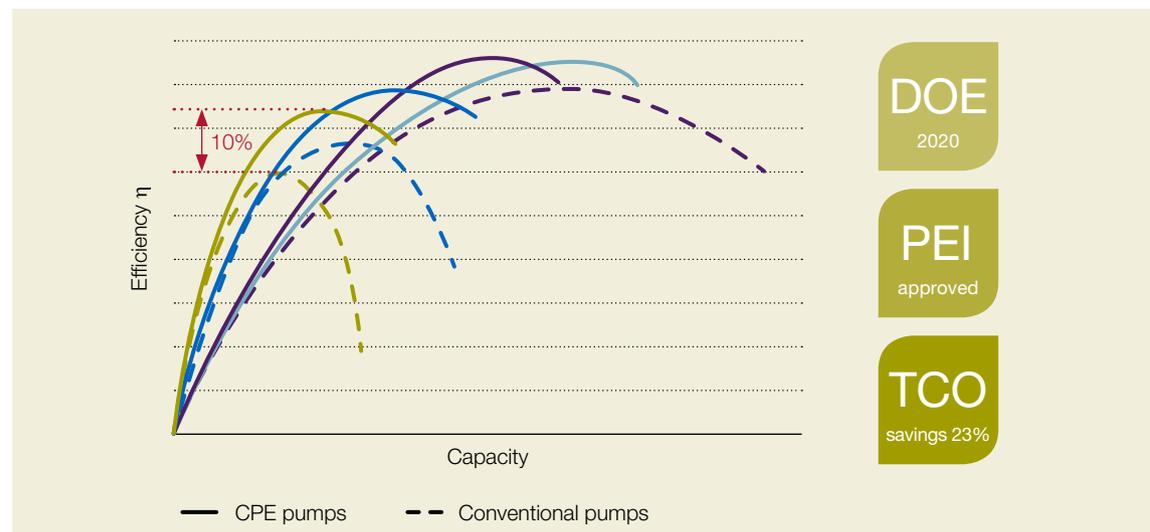


Fig. 3 CPE pumps show excellent performance through advanced hydraulics and unique design.

Industries where CPE pumps are in use



Chemical process industry



General industry



Water and wastewater



Pulp and paper



Hydrocarbon processing



Oil and gas



Power generation

“ We are eager to offer our new CPE pump series to our customers because it fits a wide range of industrial applications and will reduce their operating costs. We responded to the needs of the market with this new pump series.

Joe Salah, Sales Manager, Sulzer Pump Solutions Inc., Easley, SC, USA



Fig. 5 Add a Sulzer ejector to the CPE pump to make it an efficient self-priming pump.

The new closed impeller design with low net positive suction head (NPSH) runs stably with low suction pressures. The impellers are optimized for low flow applications, therefore a special low flow impeller is not needed. The innovative impeller was designed in tandem with the volute case and sealing chamber. The result is a very efficient hydraulic system, which, together with improved conditions in the shaft sealing area, leads to higher reliability. Heavy-duty rigid bearing units ensure a long bearing life and minimize the service interventions. Semi-open and closed impellers offer versatility for a variety of liquids, maximizing standardization and minimizing the need for spare parts.



Saku Vanhala,
Kotka, Finland

Self-priming, high-efficiency option available

The CPE pump can also be used in applications where it is necessary to pump liquid from below floor level. By adding a Sulzer ejector to the standard CPE pump, it turns into an efficient and fast self-priming pump (Fig. 5). Ejectors can be installed on all standard dry-installed process pumps — both as retrofits for existing installations and for new installations.



Annette Wirén,
Kotka, Finland

Optimal pump for various industries

Sulzer ANSI pumps are used in a wide range of chemical process applications as well as in general industry including clean water. Selecting the best material according to specific process requirements is important for maximizing pump life, especially for aggressive processes where resistance to corrosion and abrasion is vital. Sulzer offers a large variety of material options for the ANSI pumps, ensuring the optimal pump for each process in a wide range of industries.