This project has received funding from the European Union's H2020 Coordination Support Action under Grant Agreement No. 894356.

Best Practice	ADAPT THE OFFER TO REAL NEEDS	PUMP-02
Application	Optimisation of Pumping Systems	
SME sector	Industrial	
SME Sub-sector	All	
Technical description	In many pumping systems, the flow and pressure level are above the real needs. In cooling loops for example, the temperature difference between flow and return is too small. It shows that the heat exchange is poor, and the flow rate is too high. Consequences are: • Over-consumption of pumps • Unnecessary cold production Flow rate is often not really controlled in users and could be reduced without negative impact on them. To maintain network temperatures, three-way valves are installed with a significant "leakage" rate. Another common problem is an unnecessarily high level of pressure. The high pressure at the pump discharge is then lowered in valves before reaching the users. It results in pure energy loss.	
Recommendation for optimisation	It is important for the operator of an industrial site or a service provider in charge of the energy analyses of a given equipment to start with an analysis of the flow and pressure requirements. Where possible, three-way valves should be replaced with two-way valves. Correct flow rates in each branch also require hydraulic balancing of the network. Valve dedicated to lower the pressure should be as far as possible suppressed and the pump pressure controlled by converter (or new sized pump). When the flow rate has been identified as too high, a VSD is a first way to reduce the flow rate to the real need. When the need is constant, it is also possible either to reduce the impeller diameter or to change the pump. If the network pressure drops leads to a poor efficiency of the pump, a VSD or machined impeller will not save the situation.	
Relevant technical considerations	If the pressure drop of the network leads to poor pump efficiency, a variable speed pump (VSD) or a machined impeller will not remedy the situation.	

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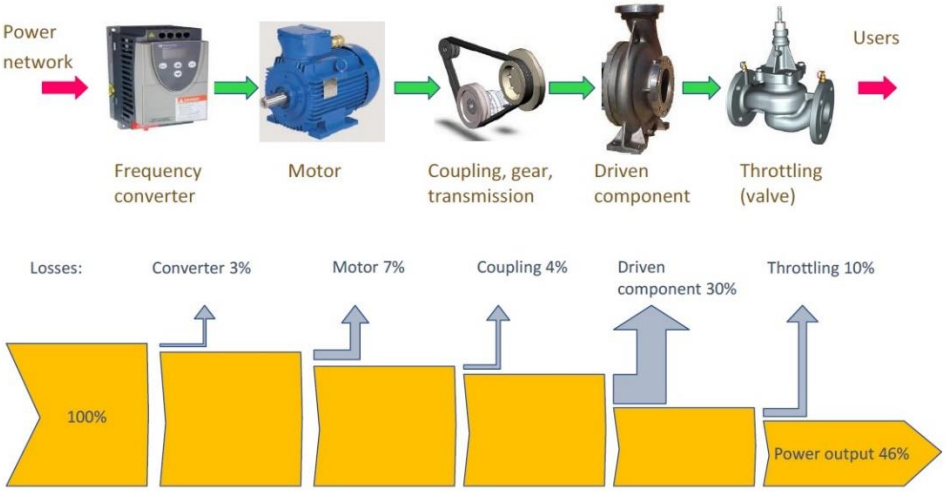
Schemes and diagrams	 Electric drive components
Economics	Unit cost of flow control valves from 50 EUR up to 500 EUR
Energy savings	A detailed analysis of pumping systems generally allows energy savings of 20 to 40%. In cases with several sources of savings it can be even higher (70%).
Economic savings	Economic savings are closely linked to the reduction of electricity used
Average Payback Time	3 years
Emissions	0,7kgCO_2/kWh$_{el}$
Environmental benefits	Reduction of CO_2 emissions due to lower energy needs.
Main NEBs (Multiple benefits)	☒ Environmental benefits ☐ Increased productivity ☐ Work environment/Health/Safety ☐ Increased competitiveness ☐ Maintenance
Replicability	High
Related measures	None

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Case study	Replacing 3-way valve into 2-way valve (Switzerland, 2017) • Initial Situation: on a large industrial site, a pump distributes chilled water to cool and dehumidify the air in the ventilation and air conditioning units of several workshops in the plant. Most branches of the network are equipped with 3-way valves that maintain a flow rate even when there is no need. • Description of the optimisation: the replacement of these 3-way valves with 2-way valves significantly reduces the total flow rate when the need is low. • Implementation costs: 23,000 EUR • Payback Time: 2.3 years
References	Nicolas MACABREY, Planair, 2019

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