# Energy optimization plans in water/wastewater pumping systems

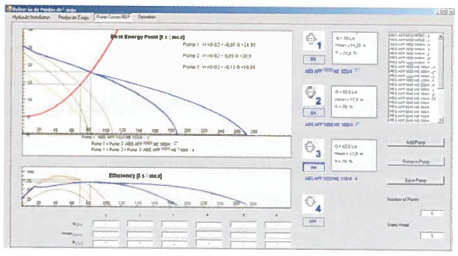
**Optimization of energy use in water/wastewater pumping systems represents an opportunity to minimize costs of utilities and contribute for the reduction of carbon footprint.**

In fact, at the pump level, the efficiency of the equipment may differ considerably from the theoretical information of manufacturers. This happens mainly because: i) the pump may run far from the best efficiency point, where the efficiency is reduced, and ii) pump's efficiency significantly deteriorates over time. In this context, continuous pump performance and efficiency monitoring should be considered for the most critical and energy intensive pumps in any system.

On the other hand, the largest energy savings may be achieved at systems' level through a better design and operation of pumping systems. In fact, the overall efficiency is mainly dependent on the ability to cope with varying consumptions/inflows, even if the installed pump shows a reasonable efficiency level for the operating point.

NORAQUA provides a new service regarding the development of energy optimization plans for water or wastewater pumping systems. These plans are grounded on the assessment of the energy saving potential, measuring the current efficiency of the pumping equipment (actual pump performance and efficiency curves) and on the financial evaluation of energy reduction of possible optimization techniques. Their application can be divided into five major stages:

- Overall system assessment - identify system's critical points and guide the implementation of an energy monitoring system, starting with intensive energy consuming installations.
- Analysis of real operation conditions - definition of water consumption patterns, in water systems, or inflows patterns, in wastewater systems, and realization of pump performance tests. For evaluation of systems' performance NORAQUA uses an accurate and state of art technology, the thermodynamic method that dismisses flow measurements.
- Assessment of optimization solutions – simulation of pumping system behaviour, and evaluation of efficiency improvements with optimization solutions. For this purpose NORAQUA uses a hydraulic simulation model (Pump 3E) and specific energy efficiency indicators.
- Financial analysis - evaluation of potential investments through Life Cycle Costs analysis.
- Follow up of optimization results - measure the actual reduction of energy costs and check the adequacy of the implemented solutions to operating conditions.



PUMP 3E – HYDRAULIC SIMULATION SOFTWARE FOR ASSESSMENT OF POTENTIAL OPTIMIZATION SOLUTIONS

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# ProCME Group – Hi-tech engineering

ProCME Group, comprising companies developing their activity well within the scope of hi-tech engineering, is deeply involved with the Spanish ACS Group, presently one of the largest in the world and a global reference in the service and construction activities.

CME has almost 30 years of experience in virtually every water-related technology and service translates into appropriate engineering solutions to the clients' most complex challenges. The company offers integrated services for total project delivery, covering detailed design, procurement, contract management, construction, training and operations and maintenance.

In the field of water supply and sanitation for municipalities, CME has experience in projects ranging from small to large scale exceeding 700,000 Population Equivalent. Within this, CME activity operates in the following areas: Withdrawal, Pumping, Water treatment, Storage, Distribution; Collection, Wastewater Treatment, Sludge Treatment, Energy production from biogas and Water Recycle.

In the industrial field, CME has experience in auxiliary systems for industrial projects, particularly in the Oil & Gas, Petrochemical, Pulp and Paper and Power sectors. Within this activity CME offers solutions in the following areas, in addition to the aforementioned: Water Treatment Plants for ndustrial use, Industrial Wastewater Treatment Plants, Wastewater Treatment Sludge and byproducts, Filtration and Oil Separation.

Some executed contracts:

- Preventive maintenance and leakage repair of distribution network, water mains in Lisbon, 24/7, over the past 10 years, including more than 2.000 kilometers of water lines and underground piping (EPAL)
- Implementation of *"Complexo da Boavista"*, including a Water Treatment Plant and Reservoirs with capacity for supply and distribution of water to about 280,000 Inhabitants equivalents (Águas de Portugal)
- Design-Build Guia WWTP, producing electricity through cogeneration using biogas from anaerobic digestion (Generating more than 50% of the electricity consumed) (SANEST, AdP Group).
- Construction and Operation of nine Waste Water Treatment Plants and 20 km of drainage systems within Douro Region (AdP Group).
- Withdrawal, Treatment and Distribution of water and demineralized water (Lares Combined Cycle Power Plant; EDP Group)
- Collection and Industrial Wastewater Treatment: Regeneration demineralization Chain Wastewater, Oily Wastewater, Effluent Wash Filters (Lares Combined Cycle Power Plant; EDP Group)
- Design and construction of flue gas desulphurization plant (1200 MW Thermal Power Plant at Sines, EDP Group)

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