



## Leveraging better wastewater treatment

Reinhard Seidel, sales engineer for Verder South Africa, talks about the need for wastewater treatment plant designers to carefully consider pump requirements and modern options, using both CAPEX and OPEX studies to determine the long-term viability and suitability of their choices.

For water to be utilised without harm it needs to be clean and, the fact is, fresh water is not an infinite resource. In addition, increasing urbanisation places strain on water resources and infrastructure networks across Southern Africa. Fresh water used in industrial and process applications that is not remediated properly before being discharged back into local sewerage systems is also a significant contributor to water pollution, placing further pressure on treatment plants.

All this is being further exacerbated by climate change and extreme weather events, most particularly the devastating impacts of drought cycles. This was plain to see in 2018, when following a three-year record drought (2015–2017) in the southwest of South Africa (SSA) and precipitated by the last El Niño, Cape Town came within days of Day Zero – becoming the first city in the world to run out of water.

Startlingly, the latest monthly Seasonal Climate Watch issued by the South African Weather Service makes tentative predictions extending until August, which currently indicate that another El Niño looms for South

Africa from mid-year, which could mean further droughts for the Western Cape with consequent water shortages.

Wastewater encompasses a broad spectrum, including drainage from households, commercial establishments, hospitals, and industries. It also includes stormwater and urban runoff, along with agricultural, horticultural, and aquaculture effluent. Untreated, dirty water gets released into natural water reservoirs, where it wreaks havoc on fish, animals, and crops.

As it currently stands, however, wastewater treatment is not being fully leveraged. According to the UN, approximately 80% of wastewater is released into the environment without being recycled or adequately treated. This increases the risk of contamination to potable and drinking water.

Furthermore, failing to fully utilise efficient wastewater treatment has a deleterious impact on socioeconomic issues, impeding sustainable economic development.

Effectively utilising wastewater is not only essential to environmental conservation and a smart way to address water shortages, but also potentially a resource, from which water,

energy, nutrients and a variety of recoverable materials can be garnered. According to the UN Environmental Programme, and the Global Wastewater Initiative, there is 330 km<sup>3</sup> of municipal wastewater being generated globally each year. If this wastewater could be managed effectively, the resources embedded in the water could be used to irrigate and fertilise millions of hectares of crops, as well as produce biogas that could supply energy for millions of households.

One of the reasons given why wastewater isn't treated to its full capacity is the cost associated with upgrading wastewater treatment systems. However, the Environmental Protection Agency in the US notes that this can be mitigated, as plant upgrades can pay for themselves and/or end up saving a plant money.

Wastewater treatment plant design engineers have a huge responsibility and stake in the management of diminishing water resources. When designing new, and upgrading existing infrastructure, they should be very careful of false economy when setting the standard for their pump requirements.

Many factors should influence the selection decisions for plant equipment, but with budgetary constraints, many of these factors are often overlooked. CAPEX versus OPEX studies should be extensive in the planning and implementation of new treatment facilities, as well as in managing and operating existing treatment facilities.

For instance, when upgrading aging infrastructure, new and improved technologies should be explored and considered instead of just replacing equipment like-for-like. The process should constantly be assessed and viewed in its entirety, and ultimately developed, refined and improved by adopting modern and more economical solutions to better the overall plant efficiency and efficacy.

There are technological developments that can help reduce costs associated with maintenance and improve plant uptime, such as peristaltic dosing pumps, which are efficient and cost-effective. Over time, this technology has evolved from familiar lower pressure, low-flow medical devices into heavy duty, medium pressure industrial pumping

solutions that mimic the well proven principle of peristalsis found in the human body.

Sometimes called hose pumps, peristaltic pumps are essentially simple, using a specially designed, reinforced rubber hose that is repeatedly compressed by a rotating pressing shoe and then allowed to relax. This action results in a simple positive displacement pumping mechanism with a powerful, high vacuum suction, dry priming action.

A key factor in wastewater treatment applications, is that the pumped medium – for example, lime, flocculant or other dosing chemicals – is always contained within the tube and never allowed to come into contact with any of the pump's moving parts. There are no valves, glands or seals for the pumped medium to affect, which often account for the weak points on other pump types.

The Verderflex Ds500 peristaltic metering and dosing pump, for example, can handle solids, abrasives, slurries and crystals – and is not affected by 'off gassing' of compounds such as sodium hypochlorite in the potable water industry. These features make the unit fit-for-purpose for more advanced wastewater treatment plants.

This brings significant benefits in eliminating much of the process downtime and maintenance costs, as the only component that may need to be replaced with any sort of frequency will be the flexible hose.



Verderflex Dura peristaltic/hose pumps offer simple positive displacement pumping with a powerful, high vacuum suction and dry priming, making them ideal for many applications in modern wastewater treatment plants.

Doing so effectively returns the pump to its 'as new' condition. In addition, these pumps are cost effective when the entire lifecycle cost is considered and, resulting in lower overall maintenance costs and downtime, they offer a higher return on capital. They use less space and power than other conventional pumps, and they can be operated continuously without any problems, meaning that process operations do not need to be interrupted. The pumps contribute to boosting operational efficiencies and they pose less risk of leakages, because there are no seals to leak, which means less waste and fewer contaminants are released into natural environment.

Data from the EPA notes that some wastewater treatment plants can remove more nitrogen and phosphorus from their discharges than others, depending on the equipment used and how the wastewater is treated. This suggests that there is room for progress and improvement, which bodes well for better and more economical wastewater treatment.

While there are many and complex aspects involved with a circular approach to complete water management, there can be no doubt that successful water treatment of wastewater is essential for the sustainability of water resources and our planet.

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## KSB, sustainability and energy

As the mining industry in Southern Africa continues to grow, there is an increasing need for pumps and valves that are bigger, more energy-efficient and sustainable.

KSB Pumps and Valves has been at the forefront of this movement, designing and manufacturing pumps that are specifically built to meet the needs of the mining industry. With a focus on sustainability, KSB is leading the charge when it comes to providing equipment that can handle a variety of mining conditions, is easy to maintain, and can provide a long wear life.

"In addition to our focus on sustainability, KSB also dedicates time and energy to minimising downtime on our mining pumps, which is achieved through a range of measures, including the use of high-quality materials and manufacturing processes, as well as extensive testing and quality control procedures," says Rob Bond, KSB Pumps and Valves, area manager for mining in Southern Africa. This in turn ensures that KSB pumps are built to last, with minimal need for maintenance or repairs.

But when issues do arise, KSB's after-sales service is there to provide support and assistance. "With a global network of service centres and technicians, KSB can provide rapid

response times and quick repairs, minimising downtime and ensuring equipment is up and running as quickly as possible," says Bond. This commitment to after-sales service is a key part of KSB's approach to sustainability, as it helps to extend the life of pumps and reduce the need for replacement or disposal.

"One of the biggest challenges facing the mining industry is the need to operate in a sustainable and environmentally friendly manner. To meet this challenge, we have focused on developing pumps and valves that are designed to reduce energy consumption and minimise the environmental impact," he adds.

By using the latest technology and materials, KSB has been able to produce pumps that are more energy-efficient, while still delivering the high performance the mining industry demands. KSB's after-sales service is also focused on preventative maintenance, with a range of services available to help customers keep their pumps and valves in top condition.

From regular inspections and maintenance schedules to training and technical support, KSB's after-sales service is designed to help customers get the most out of their equipment, while reducing the environmental impact of their operations. "We have 37

production sites in 18 countries and nine foundries on three continents. Plus, we have over 3 500 worldwide service staff ready to assist customers wherever they may be. KSB Mining has proven it is well-equipped to offer our partners a complete package of products and services. We use our expertise to make our customers' experience easy and successful. We provide exceptional and unparalleled customer service," concludes Rob Bond.

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KSB Guard offers comprehensive pump monitoring to ensure pumps operate optimally.



The Verderflex Ds500 metering and dosing pump has been designed specifically to challenge traditional technological solutions to chemical dosing in municipal and industrial pumping applications.