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BRIDGING DIVIDES: LWUA'S TRANSFORMATIONAL STORY

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**DRIVING CHANGE:
MINISTER
SENZO MCHUNU'S
ROADMAP FOR
WATER REFORM**

**Water use efficiency
remains key to
Gauteng's water demand**

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ON THE COVER

Since its establishment in 2002, the Lebalelo Water User Association (LWUA) has fostered a unique coalition, encompassing both public sector members from government and private sector stakeholders from mining companies. In an exclusive interview, Bertus Bierman, CEO of LWUA, discusses the Association's evolution, transformative journey, and future. **P6** (Photo credit: Piet Duminy)

Regulars

Editor's comment	3
It was said in WASA	4
Index to advertisers	48

Cover Story

Bridging divides: LWUA's transformational story	6
---	---

WISA

CEO's comment	10
Chair's comment	11
A mentor/mentee pilot project	13

Hot Seat

Quality assurance for the economy's unsung heroes	14
---	----

Water Governance & Funding

Driving change: Minister Senzo Mchunu's roadmap for water reform	17
NWRIA: An update	22

Water Security

Less reliant on infrastructure and more reliant on innovation	25
Water use efficiency remains key to Gauteng's water demand	26
Water storage gives businesses peace of mind	31
Navigating water security: From crisis to collaboration	34

Water Conservation

A company's blueprint towards sustainable water use and savings	36
---	----

Pressure Management

Taking the pressure out of water pressure management	38
--	----

Energy

The hidden cost of green hydrogen	40
-----------------------------------	----

Dams & Water Storage

How to build an imperishable concrete reservoir	42
Precast concrete: a game-changer in water infrastructure	44

Smart Meters

The African smart metering experience	46
---------------------------------------	----

CONTENTS

14

BRIDGING DIVIDES: LWUA'S TRANSFORMATIONAL STORY



17

MINISTER SENZO MCHUNU'S ROADMAP FOR WATER REFORM



22

NWRIA: AN UPDATE



40

THE HIDDEN COST OF GREEN HYDROGEN



46

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IN THE HOT SEAT



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Inspiring passion for water

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DIVISIONS

- Anaerobic Sludge Processes
- Industrial Water
- International Water Association-Southern Africa (IWA-SA)
- Innovation for Water Supply & Sanitation
- Mine Water Lead
- Process Controllers
- Small Wastewater Treatment Works
- Water Distribution
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- Women In Water
- Young Water Professionals



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I finally managed to interview the Minister

While I have often attended a press conference or event
with Minister of the Department of Water and Sanitation
Senzo Mchunu, I have never had a 'one on one' interview with him.
I was fortunate to secure an exclusive interview for this edition.

Minister Senzo Mchunu's
passion for the
sector and dogged
determination to turn
it around shone through. To be honest,
I have been impressed for a long time.
Since he has been at the helm, the
Department of Water and Sanitation
(DWS) has, for one, been far more
accessible to the media. A renewed sense
of energy started to move through the
department. Officials started to whisper
about how he never sleeps and is always
on the go.

I remember interviewing someone
during his first month in the position.
Comments were made such as, "The
Minister arrived on time," or, "He took
notes," and, "He even came back to me at
a later stage, giving input on a document
that I submitted to him." This shows how
low the bar was set.

It was a little bittersweet for me, as I am
fairly sure that he will move to another
position after the upcoming elections.
But he has made a huge impact
since he moved to the department in
August 2021.

For starters, he appointed Dr Sean
Philips as the Director-General of the
DWS. This post seldom had a permanent
appointment in the department. In an
early press conference, the Minister
announced: "This is not Hollywood;
there is no need to have 'acting' in front
of every person's name." An engineer
by profession, Dr Sean Philips has more
than 20 years' in senior management
positions in government, with expertise
in service delivery improvement, public
service governance and administration,

infrastructure procurement and
delivery management, project and
programme management, and
operations management.

Another huge (and brave move) made
by the Minister was to bring back the
Blue and Green Drop Reports, as well as
launch the new No Drop Report. While
the results are dismal in all three reports,
they will incentivise improved wastewater
and water treatment performance, as well
as the reduction of non-revenue water.
They provide an important means to
measure the performance of wastewater
treatment plants, thereby providing
the DWS and the sector at large with
the information needed to plan for and
implement improvement.

One of the final gifts that Minister
Mchunu will leave with us is the
establishment of the National Water
Resource Infrastructure Agency (page
22), as well as amendments to the Water
Services Act. These amendments seek
to ensure that water services authorities
provide water services to an acceptable
standard. To strengthen the provisions
of the Water Services Act and to assess
whether water service providers are
providing water to standard,
the DWS wants to introduce
an operating licence. There
will also be an amendment
to Section 63 of the Act to
strengthen enforcement
mechanisms. Read
the interview on
page 17. ●

Kirsten



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You said it in WASA

The opinions and statements shared by thought leaders in the water industry to Water&Sanitation Africa.



"The Lebalale Water User Association is a nonprofit, transparent organisation with good governance and an excellent track record in terms of project roll-outs. We have world-class expertise and tools at our disposal. Every drop of water we deliver contributes to job creation, economic growth, and societal well-being. I have no doubt that the dedication of our team – together with the trust of our partners, members, and communities – will continue to propel us forward, as well as enable us to create a sustainable and prosperous future for the communities we serve." **Bertus Bierman, CEO of Lebalale Water User Association**

PAGE
06



"A change in behaviour is linked to water education. Most people have little understanding of how much of water is in a kilolitre, or how much a kilolitre of water costs. They have little information in terms of benchmarking. For instance, how much water should a family of four use in a month? It is through accurate, easy to understand information that we will be able to nudge people's behaviour towards using water responsibly. Water education should begin with the schooling system."

Dan Naidoo, chairman, WISA

PAGE
11



"As the silent guardians that ensure clean, safe water reaches millions of South Africans, process controllers deserve personal development and career advancement opportunities. Their job can be demanding, requiring constant vigilance and a deep understanding of complex treatment processes. We recognise the challenges they face – long hours, working in sometimes harsh environments, and the pressure of ensuring consistent water quality. These are not easy tasks, and their dedication deserves our utmost respect and appreciation." **Dr Lester Goldman, CEO, WISASouth Africa**

PAGE
10



"Often, a pump model has been discontinued, or a pump manufacturer no longer exists, or has exited Africa. APE Pumps is then requested to retrofit these pumps to extend their lifespan. The pumps are stripped, cleaned, and visually assessed. From there, the quality of the various pump parts is assessed using non-destructive testing. APE Pumps uses technology and its expertise to extend every pump's life, repairing components where practical." **Tian Coetzee, manager: Non-destructive Testing and Stripping, APE Pumps and Mather+Platt**

PAGE
14



"To arrest and reverse the deterioration of municipal water services, the Department of Water and Sanitation is amending the Water Services Act to empower national government to intervene effectively in failing municipalities. The Water Services Amendment Bill has been approved by Cabinet for public comment. The key changes included in the Bill are a legal requirement for all water service providers to have an operating licence, and an amendment to Section 63 of the Act to strengthen enforcement mechanisms." **Minister Senzo Mchunu of the Department of Water and Sanitation**

PAGE
17



"There's a growing realisation that a water crisis is more challenging to solve and has more severe consequences than an electricity crisis. In response, clients are turning to innovation for off-grid water solutions, seeking consistent, high-quality water for their operations. Taking this scarce resource for granted is a thing of the past and, in this time of crisis, clients want the confidence in knowing that they have a consistent supply of quality water for their operations." **Wayne Taljaard, MD, WEC Projects**

PAGE
25



"The increased water supply to municipalities beyond the budgeted water requirements has caused unintended financial distress to municipalities and an accounts receivable burden on Rand Water's finances. In 2019, Rand Water debtors' days were sitting at 56 days but by the end of the financial year in 2023, the debtors' days had grown to a whopping 109 days, demonstrating sheer financial distress by municipalities. Despite many packages Rand Water made available to the municipalities, the municipalities still struggle with their water bill payment. Some of the interventions included the extended payment period and interest holidays."

Siphso Mosai, chief executive, Rand Water

PAGE
26



"A backup water storage tank is no longer just a 'nice-to-have'; it's a lifeline for businesses. Water storage tanks ensure a consistent and reliable water supply, vital for the smooth running of day-to-day operations. A water shortage or water infrastructure cut due to damaged pipework, aged infrastructure, sabotage, or routine maintenance could result in prolonged downtime, with a significant impact on productivity and profitability."

Chester Foster, MD, SBS Tanks

PAGE
31



"The business of water to a large extent is broken. As noted, there are many aspects that can contribute to conflicts associated with water but if we can somehow fix the business of water, a great deal of the conflicts can be resolved with more money available to solve these problems. The costs of the abstraction, treatment, and conveyance of water from source to tap are not being covered by the revenue collected, and this results in budgetary constraints, where many important new water infrastructure projects and continual infrastructure refurbishment and maintenance activities are delayed – further compounding the problem. There is insufficient working infrastructure to serve our growing population and no business is sustainable if only half of the product being produced (like clean water) is being paid for. While there are many solutions available for alternative water sources (such as reuse and desalination), we need to go back to the basics, where we conserve and manage our existing systems more effectively."

Jan-Willem van Huyssteen, director, AECOM

PAGE
34



"Unfortunately, not everyone in a water system is impacted equally. We are witnessing this in areas such as Johannesburg and Durban. When reservoirs run low, the people on top of hills or further downstream are likely to experience water shortages first. There can also be conflict in a catchment area where people upstream are either polluting water or are withdrawing higher amounts of water and this negatively affects people living further downstream. Then there are catchments that cross borders where one country's use of water in that catchment area can negatively impact on another country's use of water. Water also often flows towards money. Projects that are deemed economically viable are regularly prioritised over projects that provide less economic benefit or appear difficult to sustain financially."

Jonathan Schroder, water resources technical lead for Africa, AECOM

PAGE
34



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BRIDGING DIVIDES: LWUA'S TRANSFORMATIONAL STORY

Since its establishment in 2002, the Lebalelo Water User Association (LWUA) has fostered a unique coalition, encompassing both public sector members from government and private sector stakeholders from mining companies.

In an exclusive interview, Bertus Bierman, CEO of LWUA, discusses the Association's evolution, transformative journey, and future prospects.

Sepedi proverb: *Maitsebo a mokganya o mphedile*

Translation: A single stick may be easily broken, but a bundle of sticks is strong



The Bushveld Igneous Complex in the northern parts of South Africa contains some of the richest ore deposits on earth. But many of the mines along the eastern limb of this complex would not exist without the bulk raw water infrastructure that was built and is currently operated by LWUA.

A brief history

This infrastructure – known as the Lebalelo Scheme – includes an abstraction weir on the Olifants River, settling ponds, storage dams, pump stations, reservoirs, and a pipeline that runs from Modubeng to Mototolo Mine.

During the building of the scheme, provision was made to ensure the Department of Water and Sanitation (DWS) or any other water services authority (WSA) would be able to abstract raw water for purification and supply 105 villages, demarcated by local government.

An agreement was made between the DWS (then DWAF) and the Department of Agriculture, whereby LWUA would be temporarily licensed to use a specified volume of water out of the Olifants River from the Flag Boshielo Dam. This allocation

was to be 'borrowed' from the non-utilised irrigation volume for a period of seven years.

During those years, LWUA financed the raising of the Flag Boshielo Dam wall by 5 m to ensure there was an adequate supply of water for the mining industry. They also embarked on building the southern extension of the pipeline – expanding it to 110 km.

Currently, LWUA owns, operates and maintains:

- Havercroft weir, settlement ponds, and storage dams
- five pump stations (Havercroft, Clapham, Spitskop, Dwarsrivier, Borwa)
- two reservoirs (Croyden, Mooihoek)
- 110 km of bulk raw water pipeline.

At the time, LWUA's mandate was very specific: to provide bulk raw water to mines and an offtake for the WSAs serving the surrounding communities.

Period of discontent

From roughly 2015, there was a negative perception among the communities in the surrounding areas that the



Bertus Bierman, CEO of LWUA

De Hoop Dam



mines were taking *their* water and giving little back in the form of jobs or opportunities. This dissatisfaction also spilled over towards LWUA. This led to government publishing an intention to disestablish LWUA and incorporate it into Lepelle Northern Water.

During that period, LWUA also suffered damages of over R25 million to its pipeline due to vandalism and theft aimed at halting mining operations.

The transformation: ORWRDP and OMMP

"This was a pivotal moment, where LWUA started to position itself as an asset to the country with the purpose of improving lives through water. We created a vision to be a strategic water management partner and catalyst for the creation of sustainable socio-economic development (SED) in the region in which we operate," states Bierman.

During its transformation process, LWUA prepared a proposal to revise government's Olifants River Water Resources Development Project (ORWRDP), which was conceptualised by the DWS in parallel to the construction of the Lebalelo Scheme to relieve pressure on the overallocated Flag Boshielo Dam and to supply water to Polokwane, Mokopane, and Sekuruwe.

"The project was aimed at addressing the water needs of the Middle Olifants Catchment Area in Limpopo. Slow progress was being made due to a lack

of funding and expertise. We wanted to propose sharing in 50% of the project's costs and expand it by providing potable water infrastructure (to a yard connection) to approximately 390 000 people living around the mines. We wanted to include bulk potable water and water reticulation in the scope to improve social harmony in a region where infrastructure development has been very slow during the past decades," adds Bierman.

However, LWUA first had to win over the mining companies with its suggestion, as this would almost double project costs.

"Mining companies only need raw water for their operations, but we were proposing treating a portion of that raw water and supplying potable water infrastructure to communities living in the surrounding areas," explains Bierman.

Most of these mines had tried to supply potable water to communities via their own corporate social investment and social labour plan projects. According to Bierman, this was a difficult and complicated task, as some communities could be supplied by two different mines while other communities were not supplied at all. Furthermore, water treatment/reticulation was not a focus area of these mines and very often had to be outsourced.

"The mines eventually gave their consent for Lebalelo to present the idea. At first, the DWS was reluctant, but they have come on board and fully

support the move. We are receiving incredible support from government," says Bierman.

"Initially, there was a high level of distrust between the government institutions and mining companies, and both groups had difficulty working together. But LWUA is all about collaboration and there is a lot of common ground shared by the

KEY NUMBERS AND PROJECTED IMPACT OF THE OMMP

200 km

of bulk raw water pipeline

675 km

of bulk potable water pipeline

140 communities

will benefit from potable water to a yard connection (i.e. at the boundary of each stand), impacting about 390 000 people

42 000 people

will be impacted through direct, indirect, and induced employment for the duration of the OMMP



Dwarsrivier Pump Station

public and private sector. We play a role in linking the public sector with the private sector to pool funds, expertise, community and stakeholder engagement projects, risk sharing, and regulatory support. We then implement projects to the satisfaction of both parties. There is sometimes a reluctance to give government money due to complex procurement issues and a perceived high level of corruption; however, individual mining companies are too small in size to tackle water security issues in the area alone. This is where LWUA comes in."

As a result, LWUA developed the Olifants Management Model Programme (OMMP), which is resequencing and accelerating the completion of the ORWRDP to meet revised water needs and reduce capital infrastructure costs. The OMMP is fast-tracking the construction of bulk raw and potable water infrastructure that will supply targeted communities and commercial water users (such as mining companies and industrial users) in Sekhukhune District Municipality and Mogalakwena Local Municipality, while optimising the utilisation of existing dams and infrastructure. In addition, the OMMP will enhance water supply to Polokwane Local Municipality. The projects within the OMMP will cost R25 billion.

"In terms of commitment from government, so far, the DWS has officially appointed LWUA as implementer of the OMMP, and both an operations and maintenance agreement and a resourcing agreement are about to be signed. We

have also received confirmation of Budget Facility for Infrastructure (BFI) funding for Phase 2B and 2B+," says Bierman.

"In the face of significant capital constraints and downward pressure on revenues, it is a 'big ask' for mines in the area to sign their part of a R25 billion commitment towards the OMMP. But they see the value, and I believe that all of them will come on board."

Community development

The OMMP aims to leverage infrastructure development to strengthen SED across Limpopo. It will unlock the strategic mineral and industrial potential in the specified regions and bring with it much-needed potable water, water security, significant job creation, and SED.

"In line with our purpose – improving lives through water – SED is a core ingredient of any LWUA-funded project going forward. LWUA understands that, to deliver against its mandate, it must prioritise the wellness of the communities in its area of operation. So,

1% of all capital and operational costs of a project are directed towards SED," he adds.

This is anticipated to generate between R170 million and R190 million for SED initiatives within the next five years. The Association plans to further increase SED spend by collaborating with OMMP contractors and consultants, other commercial users, collaboration partners, and donor funders.

While water is an essential service for a community, there are other needs like food (agriculture), electricity, schools, roads, and healthcare. LWUA plans to assist communities in all these areas.

An example of this work can be seen in LWUA's school upgrade programme, where the existing infrastructure of selected primary and secondary schools in specific communities within Limpopo is augmented by employing innovative, modular, and low-maintenance solutions.

Last year, Kwata Primary School in Ga-Phala, Limpopo, was fitted with bulk water storage, water-based ablution facilities (and also the upgrading of existing toilets), a revitalised vegetable garden, rainwater harvesting, a wastewater treatment plant, a paved school gathering area, solar power, internet access, and teacher aid tools like interactive whiteboards and training.

"Our SED programmes are not a one- or two-year vision; we plan to provide decades of community support. Our ultimate goal is to build a thriving secondary economy in the communities that can survive without the mines," says Bierman.

Renaming and rebranding

As a newly transformed entity, LWUA will be changing its name to Badirammogo Water User Association. The name Badirammogo is a Sepedi





Clapham Pump Station



Clapham storage dam



Borwa Reservoir

word that means 'working together' or 'collaboration'. The new brand is a symbol that represents both the collaboration between the public and private sectors, and the Association's expanding role.

The elephant in the logo not only symbolises community and social harmony, but also wisdom, stability, loyalty, and determination. Elephants show great care towards their herd, offspring, and elders. The elephant also represents the origin of Lebalelo, with reference to the Olifants Catchment Area.

The water drop is a combination of an inverted triangle on top of a circle, which represents a balance



Part of the Olifants Management Model Programme: construction of the Spitskop Pump Station 2

LWUA FACTS & FIGURES

- LWUA may extract 16 000 000 m³/annum for mining and mining related purposes, as well as 3 880 000 m³/annum for domestic supply. LWUA's licence was successfully amended to allow for abstraction from both the Olifants River at the Havercroft Weir and the De Hoop Dam from the Steelpoort River
- Total operating income for 2022/23 financial period: R160.7 million
- Non-revenue water percentage: 0.25% water loss in the 2022/23 reporting period; slightly better than the 0.39% achieved in 2021/22
- Number of employees: 51

in power, a solid foundation, unity, and longevity. The five drops also represent the Association's five new values: Safety, Collaboration, Integrity, Empowerment, and Sustainability.

While the Minister of Water and Sanitation – Senzo Mchunu – has already approved the name change, some members of the Association still need to sign the amended constitution. Once this is finalised, the name change will be published in the *Government Gazette*.

"Our Association is a nonprofit, transparent organisation with good governance and an excellent track record in terms of project roll-outs. We have world-class expertise and tools at our disposal. Every drop of water we deliver contributes to job creation, economic growth, and societal well-being. I have no doubt that the dedication of our team – together with

the trust of our partners, members, and communities – will continue to propel us forward, as well as enable us to create a sustainable and prosperous future for the communities we serve," concludes Bierman. ●

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There are some exciting developments within the water sector, such as Regulation 3630, the implementation of EWSETA programmes, and the upcoming WISA conference. **By Dr Lester Goldman, CEO, WISA**

WISA INITIATIVES FOR PROFESSIONAL GROWTH

It has been nearly a year since Regulation 3630 has come into effect – announcing that all water and wastewater works must be overseen by someone who has the relevant qualifications and experience to ensure compliance and best practice principles. This has been welcomed by WISA, as it empowers process controllers and improves water and wastewater services for the public. It is also nearly a year to go where all water and wastewater institutions must be compliant with Regulation 3630 (30 June 2025).

As the silent guardians that ensure clean, safe water reaches millions of South Africans, process controllers deserve personal development and career advancement opportunities. Their job can be demanding, requiring constant vigilance and a deep understanding of complex treatment processes. We recognise the challenges they face – long hours, working in sometimes harsh environments, and the pressure of ensuring consistent water quality. These are not easy tasks, and their dedication deserves our utmost respect and appreciation.

Process controllers will need to register with WISA, the custodian of the professional process controller designation. WISA will assist process controllers in maintaining their professional status by honing their

skills. In addition, we will provide guidance and support to new entrants into the field.

Partnership with EWSETA

The Energy and Water Sector Education and Training Authority (EWSETA) is a skills development authority serving the energy and water sectors. It plays a crucial function in ensuring that the National Skills and Development Strategy is executed within the energy and water sectors.

I am proud to announce that WISA is implementing three programmes on behalf of the training authority.

• EWSETA Skills Programme

This programme is aimed at upskilling staff at various water boards and municipalities across the country. Persons successfully completing the programme will earn 50 credits against the NQF level 2 certificate on water and wastewater treatment process operations. This programme is well underway and is expected to be completed soon.

• EWSETA Candidacy Programme

Here, we will be evaluating, training and registering 100 professional process controllers across various water boards and municipalities around South Africa.

• EWSETA CPD Short Courses Programme

This programme involves continuous professional development (CPD) short course training interventions across water boards and municipalities, nationwide. They are aimed at process controllers, engineers and scientists who need to earn an annual amount of CPD point to stay registered.

WISA 2024 Conference

I am excited to see all of you again at our upcoming conference. This conference is a testament to our shared passion for water, and I am grateful for your dedication to this critical issue. If you have any queries about this event, please visit the website www.wisa2024.co.za or contact events@wisa.org.za •



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WATER EDUCATION FOR A THIRSTY COUNTRY

Citizens of this country are increasingly turning to water professionals to make sense of the water quality and water supply issues that disrupt their lives. Here lies an opportunity.

By Dan Naidoo, chairman, WISA



water conservation and management should be a huge part of our education system. There should be more engagement with schools, universities and technikons regarding water conservation and management, where all new information around this value resource is shared. There is not enough emphasis on the importance of water. Water is part of a variety of subjects: social sciences, geography, microbiology, environmental science, and law.

However, it is hard to get people to change their behaviour when there is a lack of trust in government entities. These entities need to acknowledge their failures – that at least shows a level of respect and introspection.

Where to from here?

A certain degree of advocacy is required by all water professionals to deconstruct complex technical information into something that is clear and easy to understand. This information must be easily accessible and further mainstreamed into the education system, media and public domains that will encourage further dialogue, transparent engagement and impact on behavioural changes. ●



People want to know if their water is safe to drink, or why they have not received water for days on end. The answers to these questions (justifiably) are complex and of a technical nature. But as professionals, we have a duty to provide the public with accurate and easily understandable information. It is through the public that better management of water resources can be lobbied. Additionally, it can spark a behaviour change where all citizens are reducing their water consumption.

There has been a definite behaviour change towards energy. Solar panels and inverters are commonplace in many residential homes and commercial properties. Many people are aware of how much electricity they are using and what appliances are efficient. While solar panels have been a relatively simple solution to implement

in the face of the energy crisis, it is far more difficult for the public to tackle the water crisis by themselves.

There are health risks attached to water. It is far more complex and expensive to treat and store water.

Education

A change in behaviour is linked to water education. Most people have little understanding of how much of water is in a kilolitre, or how much a kilolitre of water costs. They have little information in terms of benchmarking. For instance, how much water should a family of four use in a month? It is through accurate, easy to understand information that we will be able to nudge people's behaviour towards using water responsibly.

Water education should begin with the schooling system. As a semi-arid country, ranked within the 30 driest countries in the world,

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MINING



A MENTOR/MENTEE PILOT PROJECT

The WISA Gauteng Branch (WISA-GP) has launched the MentWorking Project in Gauteng. A combination between **mentoring** and **networking**, the project will connect water professionals of all ages and provide a platform where younger professionals can learn, and experienced professionals can help shape the future of the South African water sector.



Networking has always been core to WISA's service offerings, and the results from the 2022 WISA Members Satisfaction Survey identified mentorship as the second most desired offering by WISA members.

Ultimately, the vision for the MentWorking Programme is that it be rolled out nationally as a matching service between prospective South African water sector mentors and mentees. However, the first step in realising this goal is the MentWorking Pilot Project, which consists of a select group of 20 hand-picked mentors who were manually matched with mentees. The intention of trialling the programme at a small-scale is to gain insight into the feasibility of implementing the programme at a national scale, gauge the potential benefit such a programme might bring

to the sector and individuals, as well as to understand the dynamics associated with the professional relationships that may be formed as part of such a programme.

Recently, WISA-GP held the WISA MentWorking Pilot Project launch event. The event was attended by mentors and mentees alike, many of whom got to meet each other in person for the first time and were able to learn more about the Pilot Project. Discussions were held on what each volunteer would like to gain from the programme, as well as stories shared of mentees' long-term goals in the water sector and mentors' career challenges and how they overcame these challenges. The event was met with enthusiasm from the participants, as conversations flowed, and meaningful connections were made. Participants indicated the importance of such a programme for all involved, not just for growing technical skill and

increasing knowledge sharing, but also for focusing on soft-skill development and mutual sector support.

Over the course of three months, the volunteer participants will be engaging in a mentor/mentee relationship with mentoring pairs. They will be encouraged to meet regularly and to independently decide what form their mentoring engagement will take. Additional events will be organised by WISA-GP for the participants to share their feedback and lessons learnt. The experiences and results of this pilot project are being tracked and captured via monthly surveys and the results of the MentWorking pilot project will be shared with the rest of the sector at the WISA Conference 2024.

For more information on the MentWorking Programme, please email mentworkingprogramme@gmail.com. ●



Quality assurance for the economy's unsung heroes



APE implements quality procedures across the entire business

Pumps are at the heart of every fluid transfer system. The APE Pumps and Mather+Platt Group sheds light on how innovation, experience, and skill guarantee peak pump quality throughout the phases of design, production, installation, commissioning, and even refurbishing.

As a proudly South African original equipment manufacturer (OEM), how important is quality control to APE Pumps?

Dlamini From powering industrial processes to ensuring water supply, pumps play a pivotal role in every sector. However, their importance often becomes most apparent when they malfunction, leading to potential catastrophic consequences such as huge financial losses, delays in product manufacture, flooding, safety hazards, lack of water and electricity, and even health risks. A single overlooked flaw in a

component could lead to a breakdown. The pumps themselves are high-value items and end-users therefore try to get the maximum possible service life out of them. Quality lies at the very heart of APE's business.

We are ISO 9001:2015 compliant and SABS certified. We strictly adhere to our quality inspection plan to make sure that all pumps are manufactured to the scope and drawings agreed upon by our customers.

Material certificates are supplied as a guarantee. Pumps also undergo a

hydrotest where the pump (or another component) is filled with a liquid, typically water, and pressurised beyond typical operating pressure. The purpose is to check for leaks, structural integrity, and the ability of the pump to withstand the pressure it's designed for.

From a quality perspective, pump design and fabrication are completed and verified in-house. We have developed and follow quality procedures from the moment we receive materials to when a pump is actually commissioned.

On installation, for instance, the dimensions of various pump parts like the impeller are checked and verified twice. This is all noted on an assembly release form that confirms everything fitted complies with the correct specifications.

Recordkeeping is a crucial aspect of APE Pumps' quality system. Technical drawings for every single pump ever produced since 1952 are kept in a vault system. These technical drawings can be used to execute assessments, repairs, refurbishments, or a complete rebuild. The drawings contain details like metallurgical materials, type of liquid handled, casing, and impeller trims.



Ultrasonic examination



Material particle inspection

Our recordkeeping is a vital service for our public and private sector end-users, some of whom may no longer have any institutional knowledge of our pumps due to organisational and/or ownership changes. We also keep records of legacy products we inherited as a Group prior to our formation in 1952.

From our pattern shop where we make the foundry moulds for casting to our final tolerance inspections on every new, restored, or repaired pump, there's a strict quality control process defined by our ISO 9001 registered systems.

Measurement by hand is a traditional quality tolerance check, but our investment in 3D scanning ensures absolute precision. We can now verify the final machined tolerances with 100% accuracy against the original design.

Our latest CNC machine is equipped with specialist CAM (computer aided manufacturing) software. This downloads the approved model design to the CNC unit instead of having to manually input machining parameter settings. Our final quality inspection report further provides a comparison between the pump's health before and after repair, reinstallation, and commissioning.

What types of flaws are found in pumps?

Nel With loadshedding, the castings from foundries sometimes have blowholes. In these cases, the castings are rejected. Corrosion damage and stress fractures are also commonly found in used pumps.

When refurbishing a pump, there are also instances where we detect that the pump has been retrofitted with pirate parts. Counterfeit component fabrication is an ongoing concern. Those who succumb to the temptation of perceived short-term savings due to 'cheaper' prices will initially experience pump inefficiency and ultimately pump failure.



From its pattern shop, where foundry moulds are made for casting, to final tolerance inspections on every new, restored, or repaired pump, APE employs a strict quality control process defined by ISO 9001 registered systems

For instance, the impeller trim is calculated by engineers to achieve the best pump curve for efficient operation. The incorrect trim can create an inefficient system and even a mismatched trim and casing, causing pump damage.

Pirated parts expose the pump to the risk of cavitation, as well as imminent bearing, impeller, seal, and shaft failures.

In addition to using OEM parts, what else can be done to prevent pump failures?

Nel There are service-level agreements (SLAs) in place between APE Pumps and most of our clients in Africa. This essentially means that APE Pumps is contracted to service and support our installed systems. Operation and maintenance type work

has been a clear area of growth in the past decade, and we see this trend continue, especially in other African countries.

These services include the remote monitoring of system health, plus in-field inspection and maintenance services to confirm that every Group pump installed is running optimally by testing for alignment, vibration, temperature, and flow dynamics. We also conduct pump calibrations. Regularly maintaining and servicing pumps can save money in the long run.

There are some SLAs where APE keeps stock of brand-new units for a client so that we can implement a service exchange. The client will provide APE with an old pump to bring to OEM specifications and APE will supply the client with a new pump. This



L-R: Pieter Nel, design draughtsmen; Themba Dlamini, quality assurance manager; and Tian Coetzee, manager: Non-destructive Testing and Stripping



gives us more time to service or repair pumps while our clients' operations do not experience any interruptions. Many companies are no longer keeping critical spares in stock, so we do this for them.

Whether it's an off-the-shelf product, an OEM custom design, or a retrofit, all of our work comes with a warranty.

What role does non-destructive testing (NDT) play in quality control?

Coetzee An extra layer of quality control is applied using various non-destructive testing (NDT) techniques and specialist equipment. NDT detects the presence of defects or flaws in a pump part without damaging or destroying the material being examined. NDT gives our clients total quality assurance.

Some pump defects cannot be seen with the naked eye, and NDT is an evidence-based system for quality control.

Digital reports are generated from the various NDT assessments, indicating whether the pump and pump parts meet (or fail to meet) certain specifications and tolerances. These reports are often supplied to customers. It really is a case of 'showing' a customer the quality of a pump instead of merely 'telling' them.

NDT gives our customers peace of mind, and saves time and money. It prevents the occurrence of transporting, installing, and commissioning a pump, only for it to immediately fail.

Often, a pump model has been discontinued, or a pump manufacturer no longer exists or has exited Africa. APE Pumps is then requested to retrofit these pumps to extend their lifespan. These pumps are stripped, cleaned, and assessed

visually. From there, the quality of the various pump parts is assessed using NDT. APE Pumps uses technology and its expertise to extend every pump's life, repairing components where practical.

What NDT technology has APE Pumps invested in, and what does it do?

Nel Last year, APE Pumps invested in a 3D scanner. 3D scanning is used over and above the traditional quality control methods. It is an additional aid to prevent the misalignment of pumps by verifying pump geometries (concentricity, parallelism, perpendicularity, and shaft runouts) during manufacturing, assembly, and even commissioning. All pump parts (new and old) are scanned to confirm that they either meet the specifications of the manufacturing drawings or are feasible to reuse. These pumps can be scanned at the APE premises or on-site. The 3D scanner can even identify a hot spot on a bearing housing.

Coetzee Examples of other NDT processes done in-house by the Group include:

- **Ultrasonic examination:** This uses soundwaves to identify defects (cracks and voids) inside the material that are

APE Pumps uses technology and its expertise to extend every pump's life, repairing components where practical

not visually apparent and to assess the material's thickness. It is done based on the rate of response (reflection) of the soundwave.

- **Magnetic particle inspection:** This checks for surface or subsurface cracks (known as relevant indications) in pumps made with ferrous metals.
 - **Dye penetrant (DP) inspection:** This is used to detect casting, forging, and welding defects like hairline cracks in the surfaces of pump parts on non-ferrous materials that cannot be magnetised.
- All these tests are done by qualified, trained professionals that have completed the American Society for Nondestructive Testing (ASNT) certification programmes.

And thoughts in closing?

Dlamini It is all well and good for pump manufacturers to claim that quality is a priority. At APE, we implement quality procedures into *every facet* of our business. We have the paperwork and the test results to prove this. With APE's dedicated and experienced staff complement, it becomes second nature to find a flaw or diagnose a reason for a pump failure. Our recent testing and equipment purchases merely validate that knowledge. We didn't become a pump leader by chance. Our growth over more than seven decades has been driven by engineering excellence and world-class customer service. ●

APE keeping stock of pump parts for a client



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DRIVING CHANGE:

Minister Senzo Mchunu's roadmap for water reform

Our Minister of Water and Sanitation – Senzo Mchunu – sat down with **Kirsten Kelly** to discuss municipal service delivery, key projects and, of course, National Water Month.

This year's World Water Day is observed under the theme, 'Water for Peace', which encourages communities and countries to use water as a tool for peace, when cooperating over this shared resource. What are your thoughts on Water for Peace?

Minister Mchunu Water holds the unique duality of tranquillity and aggression. Many people find solace in the presence of large bodies of water such as oceans, lakes, or rivers. The gentle sound of waves or the stillness of a serene lake can induce a feeling of peace. I was recently staying overnight at accommodation in Mpumalanga that was next to a river and the wonderful sound of the river had a calming effect on me.

Water always finds a way to flow towards gravity. Pulled by gravity, water changes its form many times as it moves from the melting snow on the mountain tops toward the sea level. It essentially flows from one neighbour to another until it reaches the sea. We should learn from water: sharing and managing resources collaboratively.

Water is powerful but unarmed. Many rivers cut across borders and have the potential to cause conflict. Water also has a violent side to it like flash floods



and stormy seas. Water can be dangerous and cruel as we have seen through the 2022 KwaZulu-Natal floods. Fortunately, we can mitigate the negative effects of water. We need to adjust and work around the movement of water.

But I believe that in the end, water is peace. Water can unite people and countries. I saw this at the United Nation's Water Conference last year in New York. Here, presidents, ministers, businesses, and citizens from around the world discussed and shared water problems and solutions. There was a spirit of cooperation where people were willing to share their knowledge and help one another. Water brings people and countries together.

One fundamental change that you have made to the DWS is transitioning the department from one that only concentrates on bulk water and water resource management to a department that is increasingly focussed on better supporting water services management. Would you like to elaborate?

During my orientation period in the department, I came to the realisation

that we were not dealing with the value chain of water. There was a huge focus on rivers, dams and water abstraction.

But on the ground, when people protest, they seldom demand dams or reservoirs; they want to open their taps and receive a constant supply of potable water. There is no mayor of water and sanitation, there is no municipality of water and sanitation,



Minister of Water and Sanitation Senzo Mchunu



there is only our department and people in South Africa look to us to deal with water issues. They do not care what level of government is responsible for what portion of the water in the value chain.

When legislation was drafted, local government was given the responsibility of water provision to

households and businesses, with the Minister having limited oversight. This must change. We must go where the people are and address their needs. We must strengthen our role in regulating, supporting and intervening in municipalities where water and sanitation services are deteriorating. We have realised that community

protests and complaints around water services have occurred as a result of the DWS and water boards directing their sole attention on water resource management and leaving reticulation exclusively to municipalities. Some municipalities' capacity to supply water and sanitation to households has declined. The DWS will not abandon its focus on bulk water and water resource management but seeks to balance its priorities with water services management. Therefore, as a department, we have first concentrated on a reconfiguration of water boards to better support water services authorities (WSAs).

What are the challenges with water and sanitation service delivery?

The crux of our challenge lies in ensuring that water WSAs understand their duties and responsibilities as well as the requirements for delivering efficient water and sanitation services. This is particularly difficult when there are frequent leadership changes in local government. For instance, the City of Tshwane has had four different mayors in five years while the City of Johannesburg has had eight different mayors in five years.



I was not appointed as Minister in order to explain challenges, I was appointed as Minister to resolve challenges. South Africa's water sector has the potential to compete with the best in the world. But this requires leadership. You need to be persistent. You need to be strong; you need to listen to people but you need to be decisive. My plan going forward is to transform the public sector in terms of service delivery in water and sanitation, and transform lives in doing so."



To arrest and reverse the deterioration of municipal water services, the DWS is amending the Water Services Act to empower national government to intervene effectively in failing municipalities. The Water Services Amendment Bill has been approved by Cabinet for public comment. The key changes included in the Bill are a legal requirement for all water service providers to have an operating licence, and an amendment to Section 63 of the Act to strengthen enforcement mechanisms.

These amendments are seeking to ensure that WSAs provide water services to an acceptable standard. We will only issue a licence to WSAs with relevant technical and financial competencies. These proposed amendments will still allow municipalities to be both a WSA and WSP, but they must have a licence to carry out the WSP function.

Where there is a persistent failure to meet licence conditions, I will be empowered to enforce a separation between the role of WSP and WSA, ensuring that a capable service provider is appointed by the relevant municipality.

WSPs must comprise skilled people that manage water efficiently. Revenue received from water provision will be ring-fenced for further investment in operations and maintenance of water.

The DWS will support WSAs wherever possible. We do not want to take away their duties or undermine them. But when water and sanitation services fail, we have an obligation to intervene on behalf of the people we serve.

We will not allow revenue from water to be used as a 'slush fund' for municipalities to waste.

We are looking at municipalities like eThekweni, Tshwane, and iLembe to potentially give the water service provider function to water boards.

We have witnessed the reconfiguration of water boards, the revival of Blue Drop and Green Drop reports and even the newer No Drop Report, what else has been done to reform the sector?

• **CMA's and WUA's**

The DWS is in the process of finalising the establishment of the catchment management agencies (CMAs). Their purpose is to enhance decentralised decision-making and involve

stakeholders in managing water resources, in an integrated manner, at a local level.

Three extra CMAs have been established to facilitate the local management of water resources:

- Pongola-Mzimkhulu in KwaZulu-Natal
- Mzimvubu-Tsitsikama in the Eastern Cape
- Vaal-Orange in the Free State, Gauteng, Northern Cape, and some parts of the North West.

The operating area for Breede-Gouritz CMA has been extended to include the Berg-Olifants for the entire Western Cape province and will now be called Breede-Olifants CMA.

We are also establishing more than 300 water user associations (WUAs). The purpose of a WUA is to enable people within a community to pool their resources (money, human resources, and expertise) to carry out water-related activities more effectively. Through a WUA, members can benefit from addressing their local needs and priorities. WUAs operate at a restricted localised level. WUAs can provide a mechanism through which the catchment management strategy can be implemented at the local level. They have an important role to play in terms





of poverty eradication and providing food security.

• Pricing

Currently, the DWS's newly established Water Regulator Commission is guiding recommendations on the raw water pricing tariffs and, the setting of tariffs in the water sector. They are creating water sector pricing tools and methodologies, building networks and establishing peer review opportunities with other regulators both nationally and internationally. This will be a transparent process that is aimed at attracting investors to the sector.

Currently, price increases between water boards vary significantly, and there is often no scientific method used when determining the price increase. The Water Regulator Commission aims to change this.

• Transboundary agreements

The DWS has signed a memorandum of understanding (MoU) for the transfer of treated water from Beitbridge Water Treatment Works in the Republic of Zimbabwe to Musina town in the Limpopo province, South Africa.

The MoU between the two countries will allow for supply of 41 Mℓ/day of treated water to the Musina area. The Musina Local Municipality has a total population of 132 009 residing in 192 villages. The area is dry with limited sources of water and largely relies on groundwater for supply.

Furthermore, South Africa, Zimbabwe, Botswana and Mozambique who are all members of the Limpopo Watercourse Commission (LIMCOM) have signed an amended LIMCOM transboundary agreement. This will strengthen South Africa's relations with the three riparian states which share the Limpopo River Basin and use water from the river to support various socio-economic activities including agriculture, tourism, energy generation as well as for domestic use.

What are some of the key water projects in the country?

A lot of emphasis has been placed on key priority projects – at different stages of development – that will ensure water security not only at a national level but inclusive of provinces, metros and district municipalities. I am personally visiting these projects on a frequent basis.

• Gauteng

- As Gauteng is the economic hub of the country, the revival of the Lesotho Highlands Water Project Phase 2 is very important as it will boost the province's water supply and will help to alleviate some of its supply challenges. R40 billion in capital is required for this phase and will be raised in South Africa's financial markets by the Trans-Caledon Tunnel Authority.

• Western Cape

- Another project that has been revived is the raising of the Clanwilliam Dam wall by 13 m. This nearly triple the dam's capacity and be a huge relief to farmers within the area.

- The Brandvlei Dam in Worcester will also be raised to provide farmers in the area relief. This forms part of the greater Brandvlei Scheme.

• KwaZulu-Natal

- The raising of the Hazelmere Dam project was recently completed at a cost of R820 million, increasing the storage capacity of the dam.

- The R23 billion uMkhomazi Water Project has been resuscitated, after being delayed for several years. This will increase water security in the uMngeni Water Supply System which supplies eThekweni, uMgungundlovu, iLembe, Ugu, Harry Gwala District Municipalities and Msunduzi Local Municipality.

• Limpopo

- Significant progress has also been made towards the R4.1 billion Giyani Bulk Water Project, with the first phase completed in 2023. This involved constructing a pipeline from the Nandoni Dam outside Thohoyandou to the Nsami Dam in Giyani.

- Olifants Water Resource Management Module (OMM Programme).

- Masodi Wastewater Treatment Works Project (nearly completed).
- Olifantspoort and Ebenezer Water Supply Schemes will be implemented in three phases over a seven-year period. This first phase of the upgrade works is envisaged to increase the availability of potable water supply to the city by between 55 Mℓ/day and 65 Mℓ/day by 2026.
- The raising of the Tzaneen Dam Project in Limpopo is expected to be completed in March 2025, at a cost of R555 million.

• Eastern Cape

- The Mzimvubu Water Project is back on track after years of delay. The project has since been reconfigured to make it more affordable, and the estimated cost has been reduced from R18 billion to R8 billion.
- Augmentation of the James Kleynhans Bulk Water Supply in Makhanda.

• Free State

- Greater Mangaung Water Augmentation Project.

• North West

- The Pilanesberg Water Supply Project will supply additional treated water to Rustenberg Municipality through the construction of a pipeline, pump station and reservoir.

• Northern Cape

- Vaal Gamara Regional Water Supply Scheme, which will include distribution of water to communities. The Scheme is expected to cost R10 billion.

If you had a magic wand and could grant the water sector one wish, what would it be?

I want the water and sanitation space to be self-sustainable, where we have efficiently run systems and where all the people who can afford to do so, are paying for these services.

In conclusion, I was not appointed as Minister in order to explain challenges, I was appointed as Minister to resolve challenges. South Africa's water sector has the potential to compete with the

best in the world. But this requires leadership.

You need to be persistent; you need to be strong, you need to listen to people but you need to be decisive. My plan going forward is to transform the public sector in terms of service delivery in water and sanitation and transform lives in doing so. ●


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In 2005, government approved plans for the establishment of the National Water Resources Infrastructure Agency (NWRIA). **Kirsten Kelly** gives an update about its rationale and status.

NWRIA: AN UPDATE

A lack of water is a constraint to economic growth. There is a need for greater investment in national water infrastructure. Unfortunately, the fiscus has limited resources. The NWRIA is primarily established to create an enabling institutional environment for raising more private sector finance – domestically and internationally – for water resource infrastructure.

Currently, the Department of Water and Sanitation (DWS) cannot raise capital directly on the financial markets, and is reliant on special-purpose vehicles, such as the Trans-Caledon Tunnel Authority (TCTA), to finance and implement viable economic projects.

The current national water resources infrastructure base – if properly managed and maintained – can be leveraged to fund and develop the infrastructure requirements identified in the National Water Resource Strategy and Master Plan.

Furthermore, the NWRIA will have the added advantage of an institution that separates the policy development and regulatory responsibilities of the DWS, as the custodian of the national water

resources, from the development and implementation responsibilities for infrastructure management.

TCTA and the Water Trading Entity as well as all national water assets will be transferred to the NWRIA. The NWRIA will therefore have a substantial balance sheet and the intention is for it to work towards being able to raise finance, which is not backed by government guarantees. There will be substantial revenue streams associated with the NWRIA's asset base which can be used to raise finance. Currently, the ability for TCTA to raise finance is constrained by a





lack of balance sheet and revenue, as well as a limit to the amount of government guarantees that can be given without affecting its credit rating.

The establishment of the NWRIA will also strengthen governance and transparency in the water sector by separating the roles of player and referee. The DWS will retain responsibility for planning, regulation, policy and price setting, while the NWRIA will build, operate and maintain water resource assets. It will also address the current fragmentation of asset management and revenue collection functions for national water resource infrastructure between the TCTA, the WTE and the department.

Furthermore, by absorbing the TCTA and water trading entity, the NWRIA will build a high level of technical capabilities. As the TCTA has a board, there will be no additional costs once the TCTA is absorbed because there will be only one board with the NWRIA.

The NWRIA should be open to considering a range of business models for the construction and operation of national water resource infrastructure such as public-private partnerships like build, operate, and transfer models. Business models will include the current

TCTA model of financing that is backed with off-take agreements and explicit government guarantees.

Responsibilities will be limited to building, managing and operating national water resource infrastructure. This will assist municipalities by ensuring that there is a security of supply of bulk water. The department has other entities (the water boards) and programmes and grants which are aimed at assisting municipalities to provide access to water and sanitation to currently underserved communities.

There will also be an obligation to promote the development of projects that will meet the social needs of the country and not only to identify these projects, but to facilitate the financial arrangements and funding in terms of his project so that these projects will in fact materialise.

Legal standing

The NWRIA will be incorporated and established as a juristic person, that is wholly owned and controlled by the State. It will be registered as a state-owned company in terms of the Companies Act (No. 71 of 2008) and listed as a major public entity in terms

of schedule 2 of the Public Finance Management Act. This reaffirms the position that it will not amount to privatisation of water.

Regarded as an independent legal entity, the NWRIA will become an integral member of society that will cooperate as a good corporate citizen with an ethical board and its accounting authority. It will be composed of not less than nine and not more than 11 executive and non-executive members.

The governance chapter of the bill has been comprehensively crafted and compatible with the provisions of the Company Act. There is a clause dealing with the recovery of improper benefits or profits. There is another clause that allows for the investigation of the NWRIA and interventions to be taken by the Minister.

The NWRIA will not replace or supersede any existing institutions like catchment management agencies or water boards. It will also be bound to perform treaty and non-treaty functions. This will include the treaty on the Lesotho Highlands Water Project between the Government of the Kingdom of Lesotho and the Government of the



Republic of South Africa (LHWP) ensures the supply of water by Lesotho to South Africa from the Orange River in return for royalties, which are used to construct dams that produce electricity.

The Minister may, in writing, request the NWRIA to plan, design and construct/maintain or rehabilitate infrastructure as further projects, which were not included in the corporate plan after consultation with Ministers of Finance and Public Enterprise, and subject to suitable financial arrangements that have been made.

Progress made on adoption of the Bill

The NWRIA Bill is a Section 75 Bill. The National Assembly adopted on 26th March 2024 and referred the Bill to the National Council of Provinces (NCOP) for concurrence. The NCOP has referred the Bill to the Portfolio Committee on Water and Sanitation for consideration. The Portfolio Committee on Water and Sanitation has adopted the B-list version and committee report of the National Water Resource Infrastructure Agency Bill, which brings to an end the committee's

consideration of the Bill. Having adopted the Bill and a report, the committee will recommend that the National Assembly adopts the Bill.

As part of the process, the committee received 120 public submissions, with oral submissions received from the National Economic Development and Labour Council (Nedlac), the South African Local Government Association (Salga), the National Treasury and the Congress of South African Trade Unions (Cosatu).

Some of the concerns raised during the public hearings included that there was no socio-economic impact assessment (SEIAS) on the Bill. The Department of Water and Sanitation has now confirmed that the Presidency approved the final SEIAS in June 2023, and the National Treasury has independently reviewed and assessed a business case for the NWRIA. It has also been emphasised that the right to water access will not be diminished by the NWRIA.

The portfolio committee proposed and adopted numerous amendments

relating to the following clauses: 1, 3, 7, 9, 17, 34, and 35. Of critical importance to the committee was strengthening parliamentary oversight over the agency and critical amendments were made to ensure the submission of annual corporate plans and quarterly reports to Parliament, emphasising the role of the parliamentary committee in reviewing and engaging with these. ●

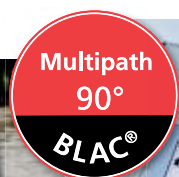


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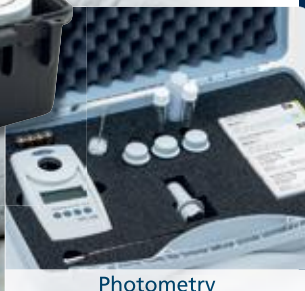


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Climate change, rapid urbanisation, and failing infrastructure have led to a massive shift in the supply and demand for water, resulting in many businesses facing intermittent water availability.



Installation of treatment plant at Mothae Mine

Just as users are moving away from the power grid to independent power generation to avoid loadshedding, many users also recognising the importance of becoming partially or fully water independent through engineered, on-site water treatment systems.

"There's a growing realisation that a water crisis is more challenging to solve and has more severe consequences than an electricity crisis. In response, clients are turning to innovation for off-grid water solutions, seeking consistent, high-quality water for their operations. Taking this scarce resource for granted is a thing of the past and, in this time of crisis, clients want the confidence in knowing that they have a consistent supply of quality water for their operations," states Wayne Taljaard, MD, WEC Projects.

Businesses often turn to WEC Projects to reduce effluent discharge and reuse water, but water security is becoming a top priority. With unreliable government water supply, businesses aim to gain control over their water supply to avoid production disruptions.

Water quality

In addition to having a consistent supply of water, many businesses require their water to meet specific quality standards. Many businesses require water to meet specific quality standards, such as SANS 241 or certain product manufacturing requirements, necessitating pre-treatment.

"We first identify the gap between what a client needs in terms of water quantity and quality and what they have already," adds Taljaard. From there, WEC Projects evaluates all other client parameters, budgets and possible constraints. They then define and further refine a process and offering to cater to the client's needs.

"WEC Projects specialises in engineering bespoke options that are designed to meet the exact requirements of a client. Our team has experience in finding solutions for projects in complex locations with complex operating parameters," states Taljaard.

Growth

Taljaard believes that the water sector is poised for growth and there will be a growing trend towards collaboration between the public and private sectors in South Africa and across the continent. "Governments cannot solve this crisis on their own. Some water service functions will be outsourced to the private sector.



There is also a focus on quick wins – and modular plants or packaged plants are a speedier option than building traditional, centralised treatment plants. Our decentralised plants can be quickly deployed to address immediate needs. This is provided that there is buy-in from the client and a clear idea of what the plant needs to achieve in terms of water quantity and quality. There must also be an understanding around the associated costs to achieve this."

Africa

With a core focus area on package plants, water treatment, sewage treatment and renewable energies, WEC Projects is active throughout the African continent. From building water treatment plants for a Côte d'Ivoire gold mine to completing a sewage treatment plant for a diamond mine in Lesotho, WEC Projects walks a path with customers to ensure all expectations are met.

"We win our work in African countries from our reputation as a reliable engineering, procurement and construction (EPC) contractor that delivers results. Most of our clients approach us due to our good performance on previous projects. WEC Projects is agile and can make decisions and can adapt operations to match prevailing conditions and grab opportunities where they present themselves," says Taljaard. ●

Wayne Taljaard, MD, WEC Projects

WATER USE EFFICIENCY REMAINS KEY TO GAUTENG'S WATER DEMAND

Gauteng's water supply and demand dynamics must be navigated within the context of its water scarcity and a financially strained municipal landscape.

By Sipho Mosai, chief executive, Rand Water

The debate around an adequate water supply cannot be isolated to a water quantity dialogue without considering the affordability of a resource that is both a social and an economic one.

The complexities of water provision must be fully understood in full, beyond the unbalanced noise of "just pump more water into the system." How water is provided and efficiently utilised needs to be included in the conversation. To narrow and over-simplify it as a one-dimensional water quantity science is unsustainable and can only serve to collapse the water supply system and annihilate the value chain, particularly Rand Water, resulting in a never seen before water catastrophe in Gauteng and parts of Mpumalanga, North West and Free State provinces.

Water stressed country

What we must first understand is that South Africa is a water-stressed country. South Africa's mean annual rainfall is estimated at 492 mm/year against the world average of 985 mm/year. To make matters worse, rainfall distribution in the country is uneven with the eastern part of the country receiving over 1 000 mm/year of rainfall and the

western part receiving no more than 250 mm/year of rainfall.

Gauteng only receives between 500–1 000 mm/year of rainfall. This rainfall is not sufficient to meet the water use needs of Gauteng for the irrigation, environmental, domestic, mining, and industrial uses if this rainfall is to be dammed in the province.

To rub salt into the wound, the Gauteng region is also in the receiving end of the El Niño state the country now finds itself in. According to the South Africa Weather Services (SAWS) Climate Watch Report issued on 31 October 2023 for the period November to March 2024, this state is expected to persist through most of the summer months.

Sipho Mosai,
chief executive,
Rand Water

The estimated system input volume for Gauteng is 1 500 000 000 m³/annum and non-revenue water (NRW) is 637 100 000 m³/annum (42.4%), which is above the international norm of 15%



The Vlaktefontein Reservoir is the largest reservoir in the world

The SAWS multi-model rainfall forecast indicates below-normal rainfall for the north-east of the country during Nov–Dec–Jan, Dec–Jan–Feb and Jan–Feb–Mar with below normal rainfall predicted for the central and south-western parts of the country. Minimum and maximum temperatures are also expected to be mostly above-normal countrywide for the forecast period. For Rand Water and Gauteng, this in turn means higher than normal water consumption.

To meet the water demand in its area of operation, Rand Water has as early as 1903, started exploiting water resources beginning with groundwater development. As the Witwatersrand demand for water started exceeding the supply, Rand Water started exploiting surface water by the building of the Vaal Dam with the then Department of Irrigation in 1955.

Integrated Vaal River System

Progressively, many dams were built in the country, including Lesotho's Mohale and Katse dams as the demand for water exponentially grew. The number of these dams has increased over time to several dams that feed into the Vaal dam from which Rand Water abstracts raw water. These dams together with the rivers that feed them form a system that is called the Integrated Vaal River System. It is a river system made up of 14 dams located in Gauteng, Mpumalanga, Free State, KZN, Northern Cape, and Lesotho. It is reported that the system supplies water to 46% of the country's economy and 33% of the population.

Water demand

Rand Water has since those early ages

been closely monitoring water demands of water users in its area of operations and contributing to the water

resource reconciliation studies that advise the now Department of Water and Sanitation (DWS) when to build the dams to meet the future water requirements. Subsequently, Rand Water then expands its bulk water infrastructure to meet future water requirements.

Rand Water's demand forecasting is mainly made up of:

1. Customer water demands: This forecasting is based on demand forecasts from major customers (municipalities) per meter connection at five-year intervals. Included in this forecast is planned municipal developments.

2. Population forecasting: Rand Water obtains estimates of population growth from Statistics South Africa and various institutions because the water demand growth is closely related to population growth.

Intrinsically, Rand Water looks at factors affecting demand growth, and utilises the population demographic model and questionnaire model to major customers.

Infrastructure projects

Following the acquisition of the water demand forecasts, Rand Water imposes this demand into its asset life cycle management model for the planning and design of infrastructure augmentation projects to

meet future water requirements by its customers. This model not only assists with infrastructure planning but also ensures that Rand Water operates and maintains its infrastructure fleet so that the assets achieve their original design or estimated useful life.

The identified projects are given effect by the Infrastructure Development Plan that highlights projects that must be implemented in the medium-term future. Rand Water plans for 20 years.

Rand Water in 2023, because of its long-term planning discipline, launched two flagship projects namely:

- **Vlaktefontein Reservoir No. 3:** This is a 210 Mℓ post-tensioned concrete reservoir with associated inlet works, outlet chambers and scour chambers. It is the largest post-tensioned reservoir in the world. The reservoir supplies Tshwane (Pretoria East), Ekurhuleni, Govan Mbeki, Victor Khanye, Thembisile Hani and Lesedi Municipalities.

- **Zuikerbosch System 5A:** The project's main objective was to provide an additional 1 200 Mℓ/day of potable water to the current supply capacity of Rand Water. Construction of the scheme commenced in 2015 and the project is already adding an additional water supply of 150 (Mℓ/day) into the system from August 2023.

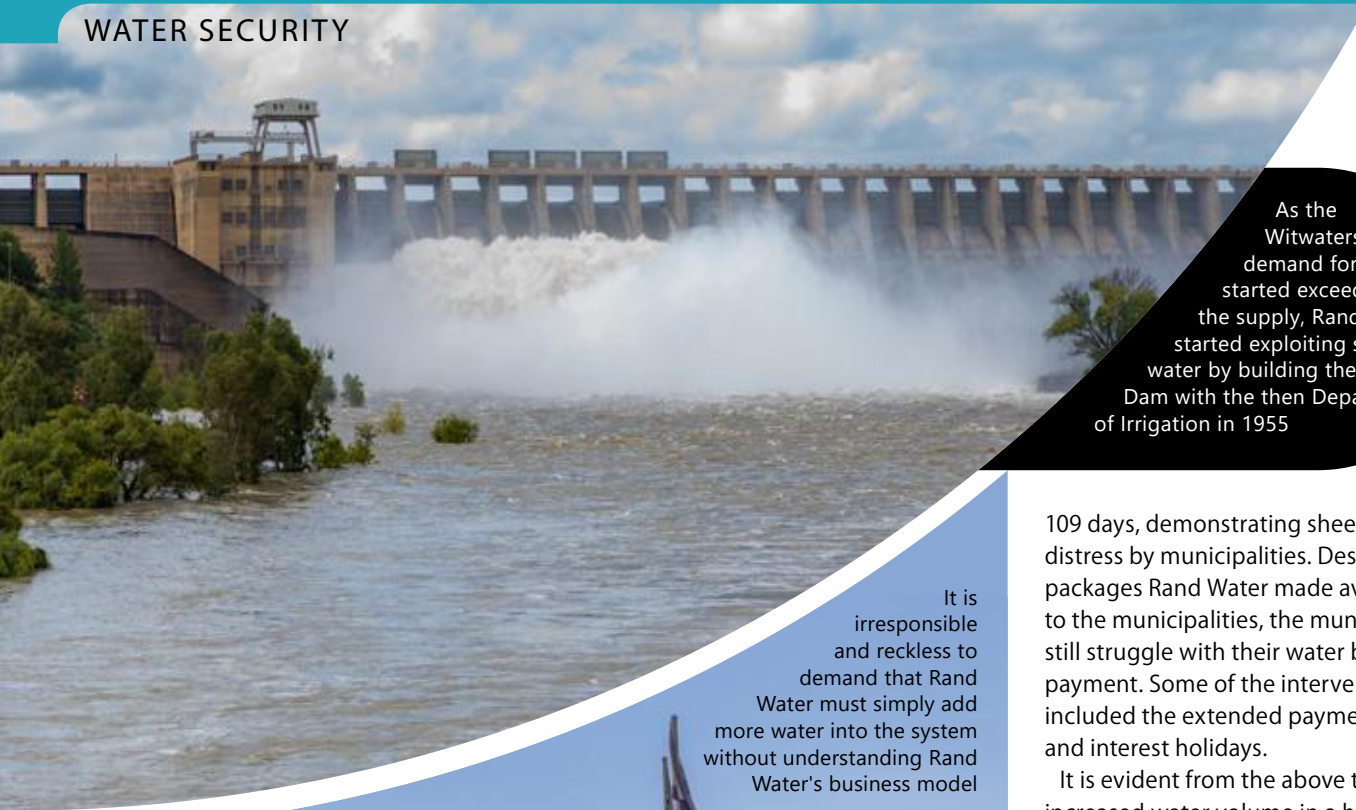
These augmentation projects have since enabled Rand Water to supply water that far exceeds our customers' water demands which usually grow year-on-year by 1.2%. Rand Water has been growing and increasing bulk potable water supply to municipalities.

In 2023, relative to 2022, the water supply variance as a percentage of planned volumes grew by 6.1%. In volume terms, Rand Water on average supplied 4 520 Mℓ/day relative to the planned water supply demand of 4 262 Mℓ/day. This

consumption was approximately 1.5% more than 4 444 Mℓ/day potable water supplied in 2022. Rand Water has for the last three years been increasing water provision year-on-year exponentially for the last five years. In effect, Rand Water has been pumping more



The debate around an adequate water supply cannot be isolated to a water quantity dialogue without considering the affordability of a resource that is both a social and economic one



As the Witwatersrand demand for water started exceeding the supply, Rand Water started exploiting surface water by building the Vaal Dam with the then Department of Irrigation in 1955

It is irresponsible and reckless to demand that Rand Water must simply add more water into the system without understanding Rand Water's business model



109 days, demonstrating sheer financial distress by municipalities. Despite many packages Rand Water made available to the municipalities, the municipalities still struggle with their water bill payment. Some of the interventions included the extended payment period and interest holidays.

It is evident from the above that increased water volume in a high-water loss environment is not helpful to the municipalities and pumping more water into such a system will not only harm municipalities with high debt but also cause Rand Water financial distress and extinction in the long run. Insisting on Rand Water to pump more water into the system is potentially detrimental to the largest water utility in the country.

Physical water losses

According to the No Drop report published by the Department of Water and Sanitation in November 2023, the estimated system input volume for Gauteng province is 1 500 000 000 m³/annum and non-revenue water (NRW) is 637 100 000 m³/annum (42.4%), which is above the international norm of 15%.

The major contributor to NRW is largely composed of physical losses (33%). This is due to, amongst others, pipe leaks/bursts and reservoir overflows. The leak repair performance of municipalities ranged from poor to critical as outlined by the No Drop Report. The report also points out that the Gauteng litres per person pay day

water into the system than planned water demand.

Financial impact

The increased water supply to municipalities beyond the budgeted water requirements has caused unintended financial distress to municipalities and an accounts receivable burden on Rand Water's finances.

The Rand Water debtors' days have during the same period of increased water supply further deteriorated. Most municipalities are struggling to pay their water bills to Rand Water on time and some have completely stopped.

In 2019, Rand Water debtors' days were sitting at 56 days but by the end of the financial year in 2023, the debtors' days had grown to a whopping



Zuikerbosch System 5A's main objective was to provide an additional 1 200 Ml/day of potable water to the current supply capacity of Rand Water



water consumption is 279 against the international average of 173 litres per person per day owing to high municipal non-revenue water.

In 2023 Rand Water, which provides wholesale water in bulk to municipalities, peak water supply at the end of the financial year was 5 200 Mℓ/day. The 33% physical water loss translates to the total physical water loss of 17 billion litres of water a day when Rand Water's supplies are at peak. Put differently this is an equivalent 850 million two-litre water bottles a day.

A mistake

It is irresponsible and reckless to demand that Rand Water must simply add more water into the system without understanding Rand Water's business model. We first purchase raw water from the DWS and then purify it at a net operating cost of R16 billion per annum – without any national fiscus support and appropriate

South Africa's mean annual rainfall is estimated at 492 mm/year against the world average of 985 mm/year

cash-backed revenue. Asking us to simply add more water into the system is a call for the total destruction and complete annihilation of a water supply value chain that an estimated 18 million water consumers are dependent on.

To demand that Rand Water add more water into a water leaking system and then try to silence us from demanding that we are paid on time is an unfortunate, ill-informed unhelpful expediency with short-term focus completely lacking oversight. It simply flies in the face of basic science. We too need to fund our infrastructure, raw water, chemical, labour and electricity costs.

The solution

The solution to water supply challenges in Gauteng still lies in water use efficiency. This is a matter that is not completely new to the water supply sector and has been at the fore since the advent of the first addition of the

National Water Resources Strategy in 2004. The national water resource strategy is the country's blueprint that provides the framework for the protection, use, development, conservation, management, and control of water resources in the country. The strategy makes it clear that "we have enough water to meet our nation's needs for the foreseeable future. But we need to use that water sparingly, and we must reduce and avoid pollution." It further emphasises, "We are not on the point of running out of water, but we have to use our limited water supplies more efficiently and effectively."

The second edition in 2012 also indicated that water conservation and demand management (WC/WDM) is the foremost reconciliation strategy to balance water supply and demand. WC/WDM targets must be met in several priority water supply systems to reduce demand and thus 'stretch' the available water resources up to the date when the new augmentation



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In 2019, Rand Water debtors' days were sitting at 56 days but by the end of the financial year in 2023, the debtors' days had grown to a whopping 109 days, demonstrating sheer financial distress by municipalities

projects will be implemented. If this is not achieved, earlier and more severe water restrictions will have to be implemented when droughts are experienced. The report suggested that a dedicated national programme is required to deal with water wastage and losses, which will have additional job creation and small business development benefits.

The strategy proposed that specific actions and targets be set for different water use sectors, which include:

- Implement effective water metering and monitoring systems.
- Set and implement realistic targets for water use reduction.
- Develop incentive schemes.
- Implement targeted regulation and ensure effective control.
- Obtain sector commitments.
- Focus on improved technology.
- Improve associated water

management, especially in priority risk areas.

- Support effective water use for productive purposes in rural and peri-urban communities.

The third edition of the NWRS dated November 2021 emphasises the same. It emphasises water demand management to ensure efficient use of water by all sectors through the implementation of appropriate WC/WDM measures to meet the social and economic needs of South Africa both now and in the future. Furthermore, the report indicates that where water is used efficiently, WC/WDM could postpone the need for capital infrastructure such as dams and bulk treatment works. The resources, scope of work, and prioritisation of WC/WDM activities should be determined through an integrated planning process.

The latest No Drop Report further underscores that Gauteng's solution lies with the investment in WC/WDM. According to the DWS, there is an insufficient investment in operation and maintenance (O&M), resulting in operational inefficiencies of the infrastructure leading to massive water losses. The lack of O&M has resulted in the rapid deterioration of the condition and performance of the infrastructure. There are a few interventions that can immediately be affected to set the WC/WDM interventions on their way. These include:

- Enforcement of by-law, such as tackling unwise water usage.
- Appointment of a panel of service providers to fix leaks on an urgent basis.
- Implement pressure reducing valves to manage night flows.
- Restriction of high consumption meters.

The above must be supported by repurposed institutional arrangements wherein water and sanitation revenue is ring-fenced so that infrastructure investments can be made into the sector enabling sufficient budget to implement WC/WDM measures. ●



Progressively, many dams were built in the country, including Lesotho's Mole and Katse dams, as the demand for water exponentially grew

WATER STORAGE GIVES BUSINESSES PEACE OF MIND



Whether it is for agriculture, industry, or emergency preparedness, water storage solutions play a crucial role in safeguarding water resources and mitigating the impact of water scarcity.

Around 50% of Johannesburg residents experienced severe water shortages, in the middle of a heat wave, over this year's World Water Day. Businesses, schools and even hospitals in Africa's richest city came to a standstill.

Almost every item is manufactured with water and water is used as a medium for heat transfer and cooling in plants too. Furthermore, office buildings accommodating a lot of people need water for toilets, hand washing, eating and drinking.

"A backup water storage tank is no longer just a 'nice-to-have'; it's a lifeline

for businesses. Water storage tanks ensure a consistent and reliable water supply, vital for the smooth running of day-to-day operations. A water shortage or water infrastructure cut due to damaged pipework, aged infrastructure, sabotage, or routine maintenance could result in prolonged downtime, with a significant impact on productivity and profitability," states Chester Foster, MD, SBS Tanks.

SBS Tanks has been in the water storage tank industry for over 25 years and has carved out a niche for itself in the water storage tank space.

"Previously, our clients typically planned for a water backup solution

lasting one or two days. However, we've observed a shift as clients now seek backup solutions for extended periods, spanning four days or more," says Foster.

SBS Tanks

SBS Tanks has an in-house engineering and design team that develops adaptable and customised water storage solutions for a wide range of industries. From elevated to cyclonic water storage tanks to powder-coated custom-coloured tanks and tanks built in underground parking areas or tight spaces on-site, SBS Tanks delivers solutions that meet the unique needs of its clients. Each tank has an expected lifespan of over 65 years and comes with a 10 year no leak warranty on the internal PVC water and liquid storage liners.

The elevated tank range has 6 m, 10 m and 15 m stands. The height boosts water pressure delivery and negates the use of pumps that need electricity to function and are inoperable during loadshedding and electricity outages. Furthermore, SBS can supply solar energy backup too.

"Water storage tanks can no longer be considered a luxury, but a critical business necessity. Not only do they ensure operational continuity, but they also play a significant role in risk management, long-term sustainability, and the delivery of the most basic and essential resource to industry and communities – water," concludes Foster. ●



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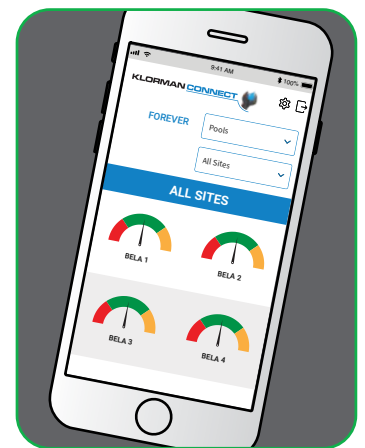
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NAVIGATING WATER SECURITY: FROM CRISIS TO COLLABORATION

The close bond between humans and water is illustrated in Maslow's Hierarchy of Needs, where water meets the most basic of physiological needs. But despite its critical role, water is frequently overlooked and undervalued.

“**T**his always make me think about the actions people would take when faced with the unthinkable situation where water is not coming from your tap. Communities would flock to any water source available such as water storage tanks, reservoirs, and even swimming pools. When those run dry, they would move to rivers in and around cities, which will likely be contaminated,” says Jan-Willem van Huyssteen, director, AECOM.

Commenting on the United Nations' World Water Day theme – Water for Peace – Van Huyssteen believes that water can both spark conflict and create peace. “When people have unequal or no access to water, tensions can rise. However, eventually everyone realises that they have to work together. We saw this in the Western Cape with the looming Day Zero. Water management requires cooperation. It is in this spirit of collaboration that great solutions can be found. Water management is everyone's problem.”



Jan-Willem van Huyssteen, director,
AECOM



Jonathan Schroder, technical lead for
Africa: Water Resources, AECOM

According to Jonathan Schroder – technical lead for Africa: Water Resources, AECOM – there can be different levels of conflict within a water system. “Unfortunately, not everyone in a water system is impacted equally. We are witnessing this in areas such as Johannesburg and Durban. When reservoirs run low, the people on top of hills or further downstream are likely to experience water shortages first. There can also be conflict in a catchment area where people upstream are either

polluting water or are withdrawing higher amounts of water, and this negatively affects people living further downstream. Then there are catchments that cross borders where one country's use of water in that catchment area can negatively impact on another country's use of water. Water also often flows towards money. Projects that are deemed economically viable are regularly prioritised over projects that provide less economic benefit or appear difficult to sustain financially.”





Business of water

South Africa's non-revenue water (NRW) is rising to unsustainable levels, with nearly half the water piped through the country's infrastructure being lost through leaks, theft or nonpayment.

"The business of water to a large extent is broken. As noted, there are many aspects that can contribute to conflicts associated with water but if we can somehow fix the business of water, a great deal of the conflicts can be resolved with more money available to solve these problems. The costs of abstraction, treatment, and conveyance of water from source to tap are not being covered by revenue collected, and this results in budgetary constraints where many important new water infrastructure projects and continual infrastructure refurbishment and maintenance activities are delayed – further compounding the problem. There is insufficient working infrastructure to serve our growing population and no business is sustainable if only half of the product being produced (like clean water) is being paid for. Presently, NRW is South Africa's biggest challenge. While there are many solutions available for alternative water sources (such as reuse and desalination), we need to go back to the basics, where we conserve and manage our existing systems more effectively," states Van Huyssteen.

"As engineers, we are problem-solvers and one would think that we would be calling for more dams and treatment plants, but I think a good starting point would be greater public awareness and education around the business of water, as well as sustainable water conservation and water demand management. Unlike the electricity crisis, where one can install some solar panels on a roof, solving lack of access to water is a more complex problem. Drilling your own borehole is a solution but groundwater is often

not a sustainable source due to licensing constraints, water quality issues, and a lack of access to suitable groundwater aquifers. Our government will remain the key provider of this service and, as the general public, we can get involved in many ways to ensure sustainable water supply. First, we must hold our government accountable through the various political structures to ensure proper management of resources, but then also take personal responsibility to conserve water, repair leaks on our properties, report leaks on public infrastructure and, most importantly, pay for our water," he continues.

Water security

From a resource perspective, there is a misconception that full dams equate to water security. "These full dams exist in the context of a water-scarce country where there are many instances of over-abstraction. Dam levels simply tell you how much water is stored, not how long it will last. Rainfall may vary significantly from year to year, and full dams do not guarantee that we are water-secure in, say, three years' time. Consistent,

appropriate water conservation behaviours, continual effective water infrastructure management, and the prudent commitment of resources through new developments are more important to sustainable water security."

Van Huyssteen notes that even with full dams, there is not always infrastructure in place to transfer water from certain catchment areas to communities and treat it. "You may have a full glass of water, but do you have a straw to get it to your mouth? There are system constraints and system failures.

"Alternative water sources are available in the form of groundwater, desalination, and water reuse. But there are complexities attached with these sources regarding the high cost of treatment, location of the source in relation to the demand, and negative public perception in the case of treatment of wastewater for potable reuse. Addressing NRW and leaks remains the lowest hanging fruit to ensure water security," he adds.

AECOM has been involved with numerous projects within the African context to support clients and communities solving these problems. The company has assisted in studies with the Department of Water and Sanitation to achieve long-term water security and short-term resource allocation, with an aim to guide role-players in cooperative governance. This encompasses strategies for reconciliation, implementing interventions, and delineating roles and responsibilities within the water sector to ensure long-term, sustainable water supply for all users within a system or catchment area. They have also assisted government clients in the development of new infrastructure and refurbishment of existing infrastructure to support water supply, as well as commercial, industrial, and mining clients to optimise their water usage, looking at alternative and sustainable water supply solutions. ●





A COMPANY'S BLUEPRINT TOWARDS SUSTAINABLE WATER USE AND SAVINGS



When a drought forced the Tennessee Valley Authority to reduce its hydropower generation, it lost in the region of \$300 million. And when a Coca-Cola plant in India started to compete with local farmers for water resources, it eventually shut down. **By Chetan Mistry, strategy and marketing manager, Xylem Africa**



The most important detail from both these examples is that they occurred over 15 years ago, and there have since been more examples of how competition for water is a growing risk for businesses.

According to McKinsey, by 2030, the world's water supplies will satisfy only around 60% of global demand, and even less in developing economies such as China, India, and South Africa, where water stress is already an issue. To complicate matters, interventions

to secure and deliver good water can be a long and intensive journey, and in the short term, governments will likely raise prices to compensate for constrained supplies.

It is no surprise that the World Economic Forum has named water scarcity the number one global risk.

Yet the picture is not entirely gloomy. The silver lining of water stress is that we've been generally passive at it and leaving a lot of opportunities on the table. The growing problems with water is not a reckoning but instead a call to start doing more. And since water has not received the same level of diligence and planning as other resources, companies can get results much faster with minimal interventions.

Water stewardship

Water management is becoming a cornerstone consideration for healthy ESG strategies, and more investors and market analysts look for a positive water attitude in companies. Numerous companies are living up to these ideals, making interventions that also align with their growth strategies.

3M, the global manufacturing conglomerate, set a goal to reduce its water use by a quarter and return clean water to the environment. It relies on water purification systems to reduce its pollution footprint and recycles water to improve resilience. The vehicle giant Ford has been on a mission to reduce its water consumption. An average car requires almost 150 000 litres of water to manufacture – by reducing that demand by 70%, Ford has saved more

than 41 billion litres of water through its water-management plans.

High-tech firms are also very water conscious: Meta, the owner of Facebook, WhatsApp, and Instagram, uses thousands of litres to cool its data centres. The company adopted a policy to return more water than it uses by 2030 and has already shrunk the water usage at some of its data centres by more than 70%. Infrastructure giants are as interested in water sustainability: Guadalajara's Urban Electric Train System (SITEUR) in Mexico combines water management with dewatering strategies to ensure its underground railway tunnels do not flood. And water technology leader Xylem has reduced its water use by 26% since 2019.

Solutions

Water scarcity is arguably the most significant emerging risk to businesses and communities. Fortunately,

numerous water conservation and management tactics can reverse the tide. Xylem has worked with many public and private organisations across the world to develop water systems that recycle, revive and make their operations more resilient.

Here are steps to take towards more sustainable water use:

- Utilise water measurement data to pinpoint areas of high-water usage and wastage. Smart meters, sensors, and data platforms can quickly develop a working picture of water needs and wastage.
- Install low-flow toilets and taps to significantly reduce water consumption. Give employees the knowledge to spot water leaks and wastage, and accessible channels to report such issues will create easy opportunities to reduce water reliance.
- Expand water recycling initiatives,

from simple reuse in irrigation to advanced filtration for industrial processes.

- Use groundwater and rainwater harvesting to alleviate pressure on municipal supplies. Some larger sites invest in small reservoirs.
- Agriculture sites can invest in drip irrigation and a variety of new methods that significantly reduce water consumption. These techniques are very effective for crop farms, and livestock farms also benefit from reducing the water needed for feed crops.
- Prioritise leak detection and repair to minimise water losses. An unaddressed leak that leaks one drip every ten seconds can accumulate to 1 800 wasted litres a year. Ten such leaks mean 18 000 litres. The average middle-class house can waste as much as 38 000 litres a year – imagine how much leaks are costing businesses. ●

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TAKING THE PRESSURE OUT OF WATER PRESSURE MANAGEMENT

Water treatment systems in metropolitan areas demand careful monitoring and management processes across sprawling networks. Process automation through the use of pressure transmitters can be a major aid to the personnel in charge of ensuring the operation of the many moving parts that make up a water treatment system.

In theory, these instruments allow water treatment companies to easily automate their processes so that they would have more time to work on more pressing matters. Not all instrumentation is created equal, and by receiving inaccurate readings, companies face major difficulties and delays, costing thousands of rands worth of equipment damage.

Using sensors from various manufacturers can be challenging. One of the biggest issues faced is the end-user experience, as the

different devices each have a unique way of configuration and setup and the knowledge gained on learning to operate and calibrate a single sensor is not transferrable to using another sensor.

Another hurdle could be obtaining support for each of these devices. In some cases, water treatment facilities are left to their own devices when configuring and troubleshooting are to be done. VEGA clients found that standardising their pressure devices to a single manufacturer simplifies the operation of the water treatment plants significantly. ●

VEGA SENSORS OFFER EASE OF CONFIGURATION, PRECISION & RELIABILITY

- Using the **VEGADIF 85** universal pressure transmitters to handle influent and effluent flow metering in locations throughout systems, water treatment facilities can obtain high-precision measurement value detection. The **VEGADIF 85** is highly reliable through the integrated overload diaphragm, and functions as a multivariable sensor through integrated measurement of absolute reliable pressure. By using the **VEGADIF 85**, facilities obtain data that they can rely on.
- **VEGABAR 38** pressure sensors can be utilised to measure levels on tanks and chemical feed and fill systems, making it easier for system operators to view the pressure status thanks to the sensor's configurable colour LED light ring and on-site operation with its VDMA menu structure. This sensor offers easy integration into control systems through IO-Link communication.
- The **VEGABAR 82** pressure transmitters measure at the inlets and outlets on vaults. This unique sensor offers an abrasion-resistant ceramic measuring cell, ensuring reliable operation in the toughest process conditions. It provides reliable measurement down to the last drop through the smallest measuring ranges with high accuracy. This in turn can enable massive cost savings on maintenance costs.
- **VEGAWELL 51** is suitable for continuous level measurement in deep wells or reservoirs and rivers, with a maximum cable length of 1000 m. The robust ceramic measuring cell offers maximum overload and vacuum resistance, making it a highly reliable addition to any water treatment and distribution facility's process automation arsenal.

THE HIDDEN COST OF green hydrogen

Africa has been earmarked as the next green hydrogen destination. But what does it mean for the continent's scarce water resources? **By Chris Ashmore, CEO, Watericon Group**



Green hydrogen is waving a giant flag across the sustainability sector as the winning candidate in the global energy transition. It involves using a renewable energy source, like wind or solar, to power the process of electrolysis to split water into hydrogen and oxygen. Hydrogen is then stored in fuel cells and transported long distances to be used to power industries, households, and motor vehicles.

The process involves two critical components:

1. A renewable form of either wind or solar energy to power the electrolyser.
2. Ultrapure water needs to be fed into the electrolyser so that it can be split into hydrogen and oxygen.

Africa's new opportunity

A report by Africa Green Hydrogen Alliance and McKinsey states that six member countries of the alliance

(Egypt, Kenya, Mauritania, Morocco, Namibia, and South Africa) are perfectly positioned to benefit from investments in green hydrogen production, which could create up to 4.2 million new jobs, leading to a US\$66–126 billion increase in GDP by 2050 (equivalent to 6–12% of the current GDP of these countries). If these six countries reach their full green hydrogen potential, it will help abate the combined CO₂ emissions of the United States and Europe.

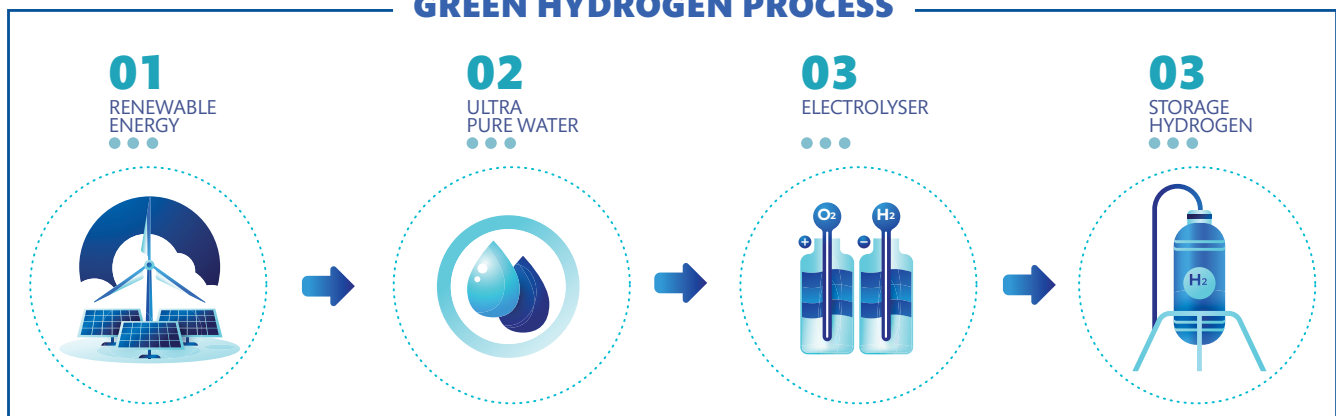
But how will a wave of new green hydrogen projects on the continent affect water supply?

Global water consumption has been increasing at over twice the rate of population growth over the past 100 years. In Africa, water scarcity affects 1 in 3 people.

If the production potential of these six countries is to be achieved, the report states they would be looking



GREEN HYDROGEN PROCESS



INTERESTING FACTS & FIGURES

When combined, in South Africa, coal mining and power generation consume 5% of South Africa's water



Across the world, it's estimated that coal plants use as much water as 1 billion people



A minimum of 9 kg of ultrapure, demineralised water produces 1 kg of green hydrogen



The water demand for the City of Johannesburg (with roughly 4.5 million people and excluding other municipalities such as Ekurhuleni) amounts to 1.6 billion litres per day



water per day. This is approximately the water demand of a city with a population between 5–10 million people. The water demand for the City of Johannesburg (with roughly 4.5 million people and excluding other municipalities such as Ekurhuleni), amounts to 1.6 billion litres per day (580 billion litres per year).

However, these estimates are only taking into account the amount of ultrapure water consumed during the actual electrolysis process, during which the elements are split.

Getting to that point requires a larger amount of water, as water from natural sources is not ultrapure. During the process of purifying water, excess water is lost. Water must first be cleaned, usually done through a reverse osmosis purification process, which removes suspended solids through a semi-permeable membrane, before being de-ionised to ensure the electrolyser receives water of suitably low electrical conductivity.

The electrolysis process also generates heat and needs to be cooled. If a wet cooling method is employed, using an open cooling water tower, this step could double the water requirements.

Solar farms also need water to run – all the big solar farms have ultrapure

systems for cleaning the panels and other utilities. However, this is a small amount compared to that needed to run a coal power plant, which requires water for cooling, cleaning, and treating waste. Water is also used in the process of mining the coal, coal-washing, cooling of drilling equipment, refining and hydraulic fracturing.

The importance of desalination

The sheer amount of water required for hydrogen production makes using ocean water the obvious choice. All six of the countries in the Africa Green Hydrogen Alliance have large coastlines where sea water desalination plants can provide ample water for electrolysis. But desalination also incurs wastewater, and produces brine as a by-product, which needs to be properly managed so it doesn't pollute the surrounding ecosystem.

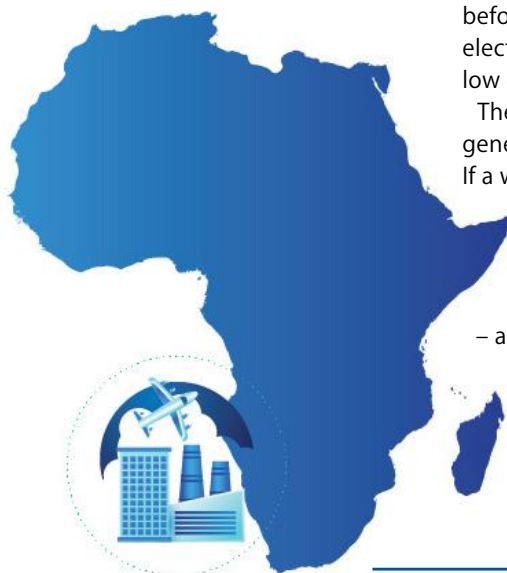
Brine shouldn't be dumped back into the sea because it will negatively affect corals and marine life, however it often is. At Watericon, we are looking at evaporation technologies, which have zero liquid waste. But the most common way at the moment is to use brine ponds, which allow for water evaporation over a long time period, leaving only salts behind, which can be reused by certain industries. The additional complexity of running desalination plants could put further strain on the costs associated with getting large green hydrogen projects off the ground.

And where does this leave landlocked countries in the energy

at a combined production volume of 60 million tonnes (Mt) of green hydrogen and its derivatives by 2050, requiring a total electrolyser capacity of 290 to 560 gigawatts (GW).

It is generally accepted across the industry that it requires a minimum of 9 kg of ultrapure, demineralised water to produce 1 kg of green hydrogen.

So, in order to produce 60 Mt of green hydrogen it would require roughly 1.64 billion litres of ultrapure



Water usage of Africa's projected green hydrogen projects by 2050 = 1.64 billion litres per day

race? Another option is to turn to large-scale wastewater reuse to meet the water demand for green hydrogen. Wastewater is one of the most readily available water sources and can be effectively treated to an ultrapure level suitable for electrolyzers.

Globally, there is 11 times as much wastewater as the amount of water needed to produce the projected amount of hydrogen a mature hydrogen economy would need.

Is water a constraint to the large-scale adoption of green hydrogen?

Although water is a considerable factor in green hydrogen production, it shouldn't be a constraint. The International Renewable Energy Agency (IRENA) suggests that water consumption for renewable hydrogen will be far less than that of other industries.

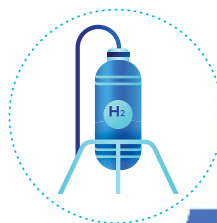
IRENA predicts that if the world were using over 70 EJ of electrolytic hydrogen by 2050, the water

consumption will be about 25 billion m³ – equivalent to a developed country with 62 million inhabitants. It sounds like a lot, but is still 33% less than current fossil fuel energy-related uses, and is minimal compared to other sectors such as agriculture (2 800 m³), which is currently responsible for 70% of the world's total freshwater withdrawals, industry (800 m³), and municipal (470 m³).

Conclusion

Increased investment in green hydrogen projects will help diminish reliance on fossil fuel energy, as well as reduce the planet's water footprint, carbon footprint, and environmental pollution, contributing to a greener future.

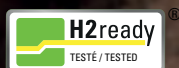
Producing demineralised, ultrapure water for green hydrogen production is a complex process that requires technological expertise and a steady,



Johannesburg uses 580 billion litres of water per year

treated supply of high-quality water. The cost and difficulty depend on the source water used, the location of the project, consumption and degradation levels. Smart wastewater reuse and brine management are vital to ensure that green hydrogen projects are in fact green for the immediate environment. Water, if properly managed, should not be a constraint to the development of green hydrogen, but should drive eco-transformation across the continent. ●

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A concrete reservoir should last at least 100 years – provided the concrete is durable and best practice has been followed in construction; quality control, structural design, and detailing.



HOW TO BUILD

an imperishable concrete reservoir

“When we design and build new reservoirs, it should be done so well that

they last as long as possible, which is at least a century. This is not unusual for an appropriately maintained concrete reservoir that has been delivered to the highest possible quality standard,” says Dr Rod Rankine, materials specialist and owner of Rod Rankine Engineering Solutions.

He adds that there is a rapid decline in the quality of the design and construction of concrete water retaining structures in municipal jurisdictions. “In some instances, concrete construction design and application can be so poor that these partially completed and final structures are often demolished and rebuilt entirely. Others require large concrete repairs which is costly and disruptive to service delivery. This places additional strain on already-stretched municipal resources, exacerbating the serious water crisis with which the country currently grapples.”

Appropriate concrete design and construction, which includes adequate measures to prevent concrete corrosion, can save asset owners significantly in major repairs further down the line.

According to De Sitter’s ‘Rule of Fives’, R1.00 invested during the

design and construction of reservoirs is equivalent to:

- R5.00 after the structure has been built, but corrosion is not yet evident
- R25.00 when corrosion has started at some areas
- R125.00 when corrosion has become widespread, and rehabilitation is required.

“For example, a concrete reservoir that has been built with reinforcing steel that has been hot dip galvanised according to the SANS 121 specification will last three times longer than a similar water-retaining structure that has been constructed with black rebars. This justifies the additional expenditure in hot dip galvanising. There is currently no other method that safeguards against reinforcement corrosion, the leading cause of failure of reinforced concrete structures, than hot-dip galvanising,” states Dr Rankine.

Despite the availability of such state-of-the-art technologies that improve the performance of concrete and the already many proven benefits of concrete, defective reservoirs are still being constructed on behalf of South Africa’s municipalities.

Joins

Reservoirs mainly leak through cold-joint lifts, which is the weakest link in concrete water-retaining infrastructure

and where reinforcing bar starts to corrode first.

Cold-joint lifts are a necessity, but they are inevitably a weak point because the concrete at the top of the previous lift is of inferior quality as a result of bleeding. Honeycombing at the bottom of walls, adjacent to joints between form panels, and at cold joints is a problem and a common cause of inherent weakness and deficiency that continues to bedevil this industry. It can all be attributed to a poor understanding of concrete technology and poor site practice.

Appearing as cracks, honeycombing, and areas with exposed aggregate and reinforcing, cold-joint lifts prevent a strong, water-tight bond from forming between the layers in the reservoir wall



Many of the vertical cold joints that were analysed by Dr Rankine were as result of working in one direction on closed-circuit structures. The best practice is to place concrete by starting with two teams at one position and then working in opposite directions so that when they meet, they can join fresh concrete to fresh concrete, when constructing a reservoir wall to avoid this problem.

Compaction

Appearing as cracks, honeycombing and areas with exposed aggregate and reinforcing of various sizes, they prevent a strong, water-tight bond between the two layers in the reservoir wall.

The large areas of honeycombing that Dr Ranken have observed time and again are as a result of poor compaction practices and incomplete placement of concrete in formwork.

Sound concrete compaction practice is often largely ignored by contractors appointed to work on these projects. However, onus also lies with resident engineers supervising the works.

"There are some inconvenient truths when it comes to proper concrete placement that need to be heard by the companies that were appointed to build these reservoirs. Firstly, there is no such thing as self-levelling concrete and pumped concrete is certainly not self-compacting. Secondly, there are limits to the amount of concrete that a single concrete vibrator can vibrate

in an hour and at least three workers are required to operate a single poker vibrator (one to hold the poker, one to manage the engine while the third is sitting on the toilet)," adds Dr Ranken.

"Because the natural packing density is interrupted by the flat floor and struck-off top, porosity near the top and bottom of the reservoir walls that I have surveyed are 0.30 pu. Near the surface, porosity is less than 0.48 pu due to interruption of the natural packing density by the flat shutter. In the centre portion of the reservoir walls where natural packing density is optimal, porosity is 0.26 pu. Thus, the paste requirement near defined edges is always higher. This would not have occurred if greater care had been practiced when placing the pumped concrete in the deep forms by using an elephant truck or hydrovalve," he continues.

Another cause of honeycombing is grout loss between adjacent shutters. A lot of grout can be lost due to a lot of grout was being lost due to 'leaky formwork'. Contractors can ensure tight joints and sometimes use self-adhesive compressible foam gaskets to successfully retain the grout between the adjacent shutters.

Other causes of failures

"Considering the very large part that concrete cover plays in concrete durability, it is concerning that there are high incidences of inadequate concrete cover," noted Dr Rankine.

He adds that the incorrect application of and, in some instances, over reliance on hydrophilic waterstops as a recurring problem. "Installed across concrete joints, they also often become misaligned and are damaged when casting adjacent concrete panels. For a hydrophilic waterstop to work as intended, it has to be coaxially confined. Many contractors have been coerced into using these just because they exist, whereas an excellent watertight joint can be achieved without a hydrophilic strip."

Failures can also occur due to the incorrect design and installation of bearing pads, which play a critical role in transferring loads to the foundation of the structure and facilitating movement. A case in point was the severe load- and movement-related cracking of a reservoir wall founded on a Kilcher-type polytetrafluoroethylene bearing with bandage seal between the inside wall and floor.

"The Romans used lime concrete that has stood for centuries and is doubtless better today than when it was first made. However, concrete made with hydraulic lime, or Roman cement, was not nearly as strong and serviceable as Portland cement concrete. We refer to it merely because it shows the remarkable resistance and life possessed by concrete. If lime concrete has stood unharmed throughout the ages, Portland cement concrete, which is infinitely superior, must be imperishable," Dr Rankine concludes. ●

There has been a rapid decline in the quality of the design and construction of reservoirs in municipal jurisdictions



Appropriate concrete design and construction, including adequate measures to prevent concrete corrosion, will save significant repair costs for asset owners down the line



The large areas of honeycombing are usually as a result of poor compaction practices and incomplete placement of concrete in formwork



PRECAST CONCRETE: A GAME-CHANGER IN WATER INFRASTRUCTURE

The real potential of precast concrete is yet to be fully harnessed in South Africa to significantly fast-track the construction of quality water infrastructure.



However, with sound upfront planning of the execution of these construction projects, more quality prefabricated reservoirs, water towers and water and wastewater treatment facilities could be built to alleviate the serious water and sanitation crisis.

"To successfully execute a large precast concrete project requires

sound upfront planning. Engineering designs and drawings, as well as the coordination of services need to be finalised before manufacture of the various precast concrete elements can start. This requires input from all members of the professional team, including the project engineer, mechanical consultant, main contractor, and the precast concrete specialist. Bear in mind that there is

very little scope for variations in the works programme once a precast concrete construction project is underway. This is considering that the precast-concrete elements are manufactured to exacting specifications during the preliminary stages, such as earthworks, site terracing and foundation work," says Willie de Jager, MD of Corestruc.

Barriers to entry

These projects also rely on extensive skills and experience across the entire precast-concrete value chain. This includes design, manufacture, transport and rigging capabilities to integrate the various prefabricated concrete elements that constitute the structure. He noted that each function had a critical role to play, and a weak link anywhere in the value chain would jeopardise the project. Corestruc's systems have been set up specifically for the construction of reservoirs and water towers, among other structures. To do so requires a sizeable capital investment, restricting many more participants from entering the market to help drive greater uptake of the technology.

Furthermore, there is a long lead time between the research and development phases and commercialisation of precast-concrete systems. For example, it took about four years for Corestruc to perfect its prefabricated concrete water towers, which are 35 m in height and have a storage capacity of between 1.5 Mℓ and 5 Mℓ. The company is currently constructing two of these water towers.

They complement the many precast-concrete reservoirs and prefabricated roof structures for cast-in-place reservoirs that the company has already built for municipalities. It took the contractor significantly longer to take this system to market. "Each time, it has



been an extensive process of trial and error, returning from site to further refine the design and our processes until it works,” adds De Jager.

However, the effort has been worth it. Already, Corestruc has helped to fast-track the construction of about 500 Mℓ of water storage capacity, with many more reservoir projects already underway. This includes an open-top water retaining tank with a wall height of 8.5 m and total diameter of 41.71 m for one of the country’s leading miners of platinum group metals.

Advantages

De Jager states that precast concrete reservoirs are significantly faster to construct. For example, the company has built 10 Mℓ and 30 Mℓ reservoirs in four and six months, respectively. However, concrete prefabrication may not always be much faster than traditional in-situ concrete construction. In these instances, precast concrete facilitates a sound project start considering that the various precast concrete elements that constitute the entire structure or sizeable portion thereof are already being manufactured during the earthworks, site terracing, and construction of the foundations. There are further benefits of precast concrete, not least of which are the high quality and durability of

the final precast concrete structure.

“The various precast concrete elements that are integrated on-site to complete the final structure are manufactured in controlled factory environments, ensuring consistent quality and reliability. The known durability traits of concrete are further enhanced with the use of high-strength concrete mixes, reinforcing or prestressed strand cover, and pre-tensioning.”

Considering the sound upfront planning required for these projects, precast concrete construction also saves in variation costs. Moreover, client bodies, engineers, and contractors benefit from a reduction in construction material costs due to the use of high-strength concrete mixes and post-tensioning deployed in concrete prefabrication. For example, precast-concrete reservoirs were up to 40% lighter than those built using conventional cast-in-place methods.

“Prefabrication ensures a very high-quality final build

at competitive rates. Taking all of these factors into consideration, the reservoirs that we’ve built have provided notable savings of between 10% and 30% savings in construction costs,” explains De Jager.

By building durable water infrastructure, municipalities also save in maintenance costs over the 100-year design life of precast concrete infrastructure.

Accurate manufacture in precast-concrete factories facilitates the optimal use of materials, reducing waste. Furthermore, prefabrication enables the use of more efficient design of concrete element shapes that would otherwise be too costly or complicated to execute with cast-in-place construction methods.

To remain competitive, precast-concrete factories must also use energy and water efficiently. In these ways, they further reduce the carbon footprint of the concrete elements that are integrated on-site. Considering increasing utility costs, precast companies had to continue finding ways of reducing their reliance on grid supplies.

“Just about everything built in other countries of the world is prefabricated because it is more efficient and cost-effective to construct quality infrastructure in this manner. As a country, we are still undergoing a very steep learning curve, in terms of the design and application of the technology. As our water crisis deepens, we will have no other choice but to find more innovative ways of accelerating the construction of top-notch infrastructure in a cost-effective manner. Precast concrete provides such potential,” concludes De Jager. ●



THE AFRICAN *smart metering experience*



There will never be a business case for water and sanitation services unless there are massive changes. These changes also need to be evidence-based, and advanced metering infrastructure provides an excellent means to holistically improve these services. **By Kirsten Kelly**

The SWAN Smart Metering Workshop in Cape Town provided insights from global and local experts about the benefits and challenges around smart water metering. An interesting panel discussion covered the African smart metering experience, with insights from Ghana, Namibia, and South Africa.



Ghana

As a fully owned state entity, the Ghana Water Company supplies water to over 30 million people and produces 320 million m³ of treated water per annum. Technology and innovation are being used to improve efficiencies.

Traditionally, the entity used turbine mechanical water meters that presented a multitude of issues. They were easily tampered with, causing a huge disparity in what the Ghana Water Company could bill versus what it would supply. Many of the mechanical meters were manufactured with brass components, which resulted in the theft of these meters and huge water leaks.

"This has a negative impact on the Ghana Water Company in terms of revenue collection, the cost to replace the meters, as well as the water leaks. We, therefore, decided to use meters that did not have any moving parts and relied on ultrasonic or magnetic technology. We found that the level of accuracy improved, and the lack of metal components reduced the level of theft. The new, smart meters also have an IP68 rating and are more robust, ensuring a likelier return on investment," explains

Richard Appiah Otoo, chief operations officer, Ghana Water Company Limited.

The accuracy of mechanical meters was adversely affected by subpar water quality. Ghana's high rainfall pattern and occasional floods, together with excessive dust particles (from the Sahara Desert), would also often break the mechanical meters.

The Ghana Water Company conducted a number of pilot projects and then later scaled the roll-out of smart meters. "With the roll-out, we found that the biggest obstacles to change were some of our own employees. The water meter readers were at times receiving bribes to record lower readings and then sowed discontent among water users by stating that the smart meters would record higher readings," adds Otoo.

However, the Ghana Water Company had sent all smart meters to the Ghana Standards Authority where its laboratory confirmed that all meters were compliant. This proved that the entity did not have an unfair advantage.

One smart water meter pilot project showed a 44% increase in water consumption figures. Readings were also taken at the district level to confirm the

volumes of water entering the district. This then assisted with non-revenue water calculations.

"Our adoption of smart water meters has been so successful that the regulator approved a line element within the tariff to be allocated towards the purchase of smart meters. Today, our billing system sits on the cloud and there is a seamless flow of data from meter to billing. This eliminates all meter reading inaccuracy, data handling errors, and incorrect data," states Otoo.

However, there are still areas where meter readings have to be taken manually (called the drive-by network). There are places that are difficult to reach, either due to difficult terrain and flooding or because residents threaten the meter readers. In these places, Ghana uses a drone to take meter readings.

The entity is also partnering with the World Bank on developing performance-based projects. These contracts involve specialised private companies in managing and reducing water loss.

"A decade ago, our non-revenue water was at 56%; we have reduced this to 20%. Most of this has been achieved internally, emphasising the importance of building internal capacity," says Otoo.

Namibia

A state-owned entity, Namibia Water Corporation is a bulk water supplier, with its customers ranging from local and regional authorities, to individual households, various industries (agriculture, mining, manufacturing), as well as government buildings like schools and clinics. Namibia Water Corporation supplies the entire country, which has an arid climate.

"We have been using mechanical meters for many years, but the increase in population and water demand have put them under excessive pressure. We have received inaccurate readings, and this has resulted in billing issues and unhappy customers. Our water meter readers have to cover a large area to obtain water readings; if they are absent from work for a few days, there is a huge backlog, causing us to estimate meter readings. We have also experienced theft and vandalism of water meters, and have noticed the impact that poor-quality

water has on the meters. This is particularly true for groundwater, where calcium carbonate often clogs mechanical water meters. There were also customer complaints relating to broken air valves of the mechanical meters, whereby many of the meters would read the air going through the taps," states Dr Johannes Sirunda, acting chief scientific officer, Namibia Water Corporation.

Namibia Water Corporation is now using prepaid meters for their bulk water systems in order to prevent nonpayment. "This has been working very well, aside from some political interference. We have realised, though, that if we install prepaid meters on the bulk water side, improvements should also be made on the distribution side. If local and regional authorities have meters that have been tampered with, they are less likely to

pay us, and we therefore lose a lot of the advantages of upgrading our own meters," adds Sirunda.

Prepaid water meters have also been installed at the entity's individual customers; however, Sirunda notes that there was not sufficient consultation with these customers and there has been a high level of resistance to and vandalism of the new system.

The entity has recently completed a pilot project of using handheld meter readers to take readings of their mechanical meters. They collect data from water meters quickly and accurately without the need for manual readings. This eliminates any inaccuracies and the potential for



meter readers to take bribes and record lower readings.

Namibia has guidelines on handling unsolicited proposals in terms of its Procurement Act, which will help Namibia Water Corporation to drive innovation, especially with the adoption of advanced metering infrastructure (AMI).

Johannesburg Water

Johannesburg Water is a municipal entity, with the City of Johannesburg (CoJ) as its sole shareholder. It supplies 1.6 billion litres of potable water per day, procured from Rand Water. Johannesburg Water treats 909 Mℓ per day of sewage at its six wastewater treatment works (WWTW). With a population of 6 million people and close to 2 million households, CoJ has over 550 000 customers.

“We have piloted the roll-out of various smart meters. The problem is that this is done purely from a technology point of view and there is no consideration of the entire value chain, like contracting, the supply of these meters, as well as maintenance. While the data looks good, it often very difficult to do business with the supplier if the whole value chain is not considered,” says Zakhele Khuzwayo, manager: Innovation and Technology, Johannesburg Water.

He adds that there is a misalignment between the buyer and the seller, with the seller often doing very little background work. There needs to be a basic understanding around the Municipal Finance Act, the policies around contracting, and requests for information.

“Fundamentally, we can talk about AMI all day, but we need to prevent the vandalism and theft of these meters. Currently we are exploring tamperproof technologies. We need to make sure that we can secure the meters that we install.”

Salga

The South Africa Local Government Association (Salga) comprises over 257 municipalities, of which 144 are water services authorities (WSAs) that are responsible for ensuring water access.

The top six challenges that WSAs are facing in the country are:

- 1. Financial asset management
- 2. Infrastructure asset management
- 3. Wastewater treatment
- 4. Revenue collection
- 5. Operations management
- 6. Water conservation and water demand management

“A huge problem experienced by municipalities when trying to tackle these

challenges is a lack of budget. They are not collecting revenue from the water and sanitation services provided. It is difficult to provide a sustainable service when there is very little revenue collected,” explains Lubabalo Luyaba, specialist: Water and Sanitation, Salga.

There is, however, good news. Along with the tabling of the 2024 National Budget in Parliament, National Treasury announced a R2 billion grant that will be distributed over the next three years to fund the roll-out of smart prepaid meters by municipalities.

Luyaba reiterated Khuzwayo’s comment on the misalignment between the buyer and seller. “To add to the complexity, it is also sometimes difficult to benchmark with municipalities, as, while they are similar, they are often unique in terms of their needs, technical capabilities and budgets.”

He adds that, legislatively, a compliance culture has been created in South Africa where municipalities are fearful of being innovative, as there are a lot of criteria to meet and if one box is not ticked, they are accused of wasteful expenditure. Therefore, many municipalities prefer to play it safe. “There is a misconception that municipalities are resistant to change and innovation. This is not true.” ●



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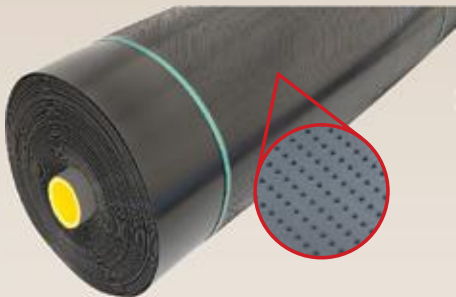
AECOM	21	KSB	12	Tintometer	24
AGRU Kunststofftechnik GmbH	41	Lebalelo Water User Association	OFC, 6	WEC Projects	10
AKS Linings	IBC	Rainbow Reservoirs	5	WISA	IFC
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