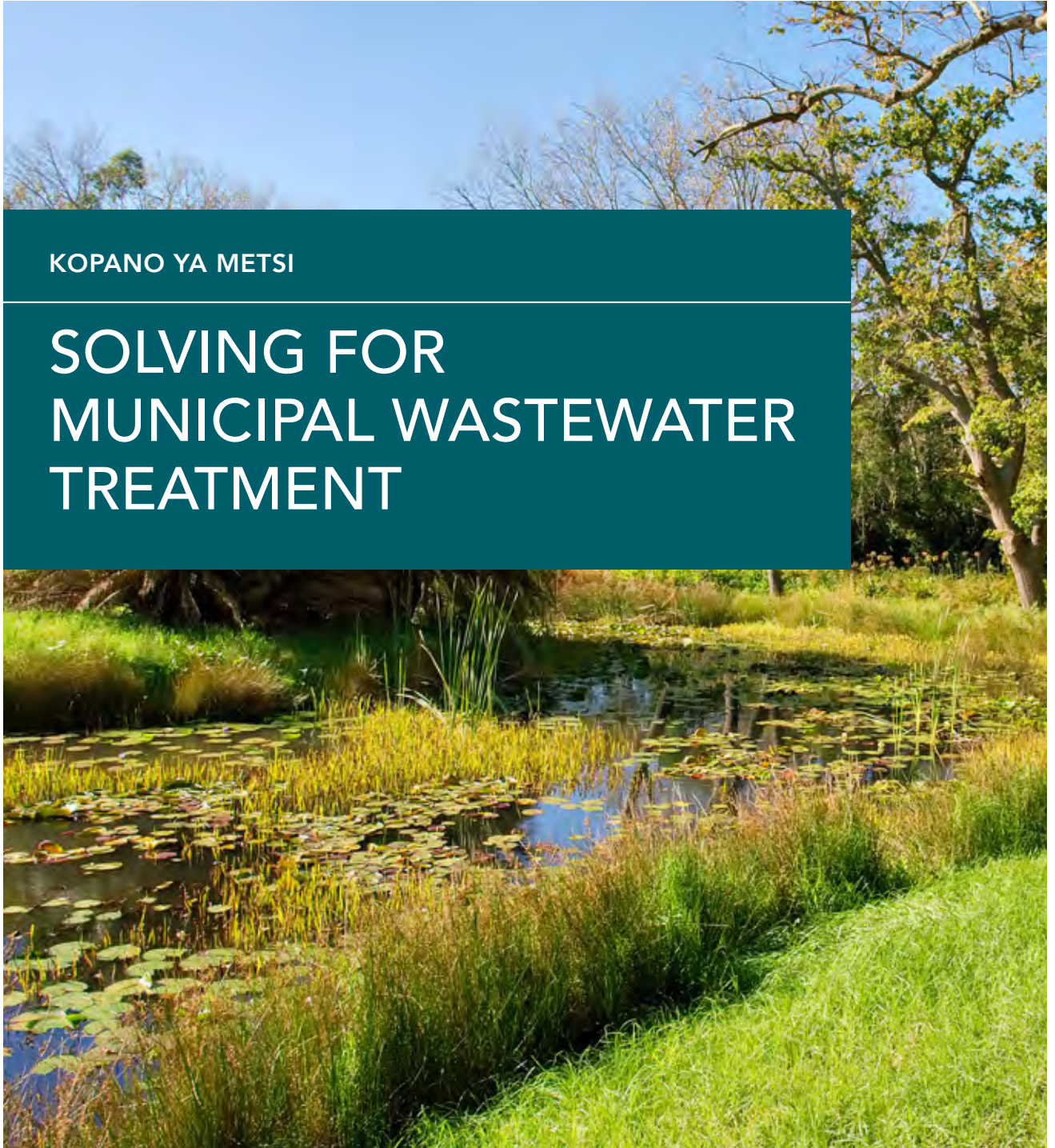


KOPANO YA METSI

SOLVING FOR MUNICIPAL WASTEWATER TREATMENT



SUPPORTED BY



**MINISTRY OF
FOREIGN AFFAIRS
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KOPANO YA METSI

“THE WATER AND SANITATION SECTOR IS CURRENTLY NOT FINANCIALLY SUSTAINABLE”
National Water and Sanitation Master Plan, 2018¹

WATER MANAGEMENT IN SOUTH AFRICA REQUIRES URGENT ACTION

Drought and poor water service delivery is already constraining economic growth and hampering livelihoods. The water sector funding gap is R330 billion over the next ten years, with major infrastructure refurbishment and improved maintenance required. At least a third of the municipalities delivering water services are considered to be dysfunctional. Many water institutions are not credit-worthy and accumulated municipal water debt is now over R13 billion.

The National Water and Sanitation Master Plan states that a ‘turn-around towards financial sustainability is not optional’ and calls for enhanced revenues, cost reductions, an analysis of alternative service delivery models and increased private sector investment.

Kopano ya Metsi (‘meeting for water’ in Sesotho) was initiated in 2017 by the National Business Initiative (NBI) in partnership with the Confederation of Danish Industry (DI) and Voluntas Advisory, to understand how water investment can be unlocked in South Africa.

Kopano ya Metsi speaks directly to the need to investigate alternative delivery models and ways to improve the sector’s financial viability, as outlined in the National Water and Sanitation Master Plan.

THROUGHOUT ITS DURATION KOPANO YA METSI HAS SOUGHT TO UNDERSTAND 4 ISSUES:

- **How can water finance be unlocked?**
- **What is the potential role of formal Public Private Partnerships?**
- **How can municipal water management be strengthened?**
- **How can we solve for a specific challenge, wastewater treatment?**

Over a period of 18 months, Kopano ya Metsi has engaged with hundreds of water experts in South Africa through 8 major roundtables, conferences and workshops held across 4 cities (Durban, Pretoria, Johannesburg and Cape Town), as well as a series of individual meetings. Participants have included civil society partners, national government, local government, industry bodies, local government associations, researchers, private sector implementers, development banks, commercial banks and investors. The findings of Kopano ya Metsi are a reflection of this consultation process.

www.yametsi.co.za

www.nbi.org.za

¹ DWS (2018) *National Water and Sanitation Master Plan, Volume I: Call to Action*. Version 10.1, October 2018, p48

KOPANO YA METSI REPORT SERIES

01

UNLOCKING WATER INVESTMENT IN SOUTH AFRICA

Paper 1 summarises the main challenges to be addressed in the water sector from a financing and investment perspective, outlines key solutions and charts a course for the future.

02

STRENGTHENING SOUTH AFRICA'S WATER SERVICES AUTHORITIES

Paper 2 provides recommendations on how municipal water management can be improved over time, with an emphasis on revenues, finance and institutional capacity.

03

AN INTRODUCTION TO PPPs IN SOUTH AFRICA

Paper 3 provides a primer on formal PPPs, introducing their main characteristics, potential benefits, key success factors and governing legal framework.

04

WATER PPP OPPORTUNITIES IN SOUTH AFRICA

Paper 4 assesses where the main opportunities for formal water PPPs are likely to be located at both a geographic and value chain level.

05

PUBLIC PERCEPTION OF WATER PROVISION THROUGH PPPs

Paper 5 considers the findings of a public perception survey conducted among urban households in 2017, including the implications for a PPP approach to water provision.

06

BARRIERS AND SOLUTIONS TO IMPLEMENTING MUNICIPAL WATER PPPs

Paper 6 identifies the key barriers to implementing water PPPs within local government and outlines relevant solutions to address these challenges.

07

SOLVING FOR MUNICIPAL WASTEWATER TREATMENT

The final paper applies the findings of Kopano ya Metsi to improving the state of municipal wastewater treatment in South Africa.



EXECUTIVE SUMMARY

The capacity of municipalities to operate and maintain wastewater infrastructure requires urgent attention in South Africa.

The majority of municipal wastewater plants are in a poor or critical state and require urgent rehabilitation.

The discharge of poorly treated or untreated municipal sewage into water bodies has further been identified as a key factor in declining national water quality, with significant impacts on both human and ecosystem health.

This report discusses the key obstacles faced in municipal wastewater management, current organisational roles and responsibilities, as well as the major initiatives underway to help alleviate this national challenge. A set of potential delivery models for improving wastewater treatment are further outlined.

Different approaches will be needed, depending on the municipal context in question.

In some cases, wastewater infrastructure is adequately maintained and does not require external intervention. In most cases, however,

some form of external assistance is required, whether this involves working in close partnership with a municipality to improve plant operation, or adopting more innovative approaches that include heightened roles for other organs of state or the private sector.

Properly addressed, significant revenue flows and investment can be unlocked in wastewater.

The opportunities presented by a well-functioning wastewater sector are significant, and include greater food and water security, as well as improved ecosystem and human health.

Wastewater remains a key untapped opportunity for economic development in South Africa.

KEY CHALLENGES IN MUNICIPAL WASTEWATER MANAGEMENT

The Wastewater Treatment Works (WWTWs) operated by **municipalities face a number of significant and inter-related challenges**. These key challenges can be summarised as follows:



01 INSUFFICIENT INFRASTRUCTURE

Many Wastewater Treatment (WWT) plants are operating above their design capacity. This leads to overloading and the resultant overflow of raw, untreated sewage into surface water resources. The majority of plants also lack emergency dams, hence the direct overflow of raw sewage into streams.



02 POOR OPERATIONS AND MAINTENANCE

Insufficient or poor maintenance is a key factor leading to the decline of wastewater infrastructure.

Leading causes of inadequate operations and maintenance (O&M) at the municipal level include:

- Lack of crucial equipment such as flow meters. This results in insufficient data to guide whether upgrades are needed
- Ageing infrastructure, which can make it more difficult to procure spare parts
- Inadequate problem reporting and response systems
- **Inadequate preventative maintenance and asset risk assessment, due to a lack of O&M plans**
- Insufficient municipal capacity to address blocked sewerage pipelines. Manhole sewerage spills are prevalent due to blockages caused by grease build up and inappropriate dumping by residents
- The absence of security guards at some WWTWs resulting in increased vandalism and theft of major components



03 SKILLS SHORTAGES

Wastewater plants require a range of skilled personnel to operate optimally.

Key challenges in terms of skills shortages include:

- **Lack of appropriate technical personnel**
- **High turnover of experienced staff and subsequent loss of skills, institutional memory and mentors**
- Lack of operator training and capacity building
- Use of untrained plant operators
- Inability to attract and retain suitably trained engineers
- Appointment of non-technical personnel to management positions that require technical experience
- Skilled personnel working outside their areas of expertise
- Over reliance on short-term appointments (i.e. contractors) without adequate skills transfer



04 BUDGETING AND FINANCIAL MANAGEMENT

The revenues derived from water services are not necessarily ring-fenced by municipalities. The equitable share received annually by local government is also an unconditional allocation. **As a result, sufficient budgeting for wastewater is often not prioritised relative to other municipal services.**

Key finance related challenges include:

- Insufficient budgeting for wastewater infrastructure operations and maintenance
- Lack of accurate expenditure records, which leads to challenges in unit costing and tariff setting
- Low revenue collection rates that undermine the financial stability of municipalities
- **Inadequate asset management and financial planning**



05 LEGAL COMPLIANCE

Compliance challenges include:

- **Inadequate development or enforcement of by-laws to ensure that industry effluent is of a sufficient standard**
- A lack of municipal water use authorisations for their discharge of wastewater effluent
- Poor enforcement at municipal plants of guidelines on effluent nutrient levels, prior to discharge



06 CORRUPTION AND POOR MANAGEMENT

As the National Water and Sanitation Master Plan indicates 'high levels of corruption have impacted on service delivery in several municipalities' (DWS, 2018 p61). At the same time, poor management practices can further hinder effective planning and implementation at the municipal level.

Key challenges include:

- Political interference in WWT related decision making
- Political appointments to certain top positions, who may lack the requisite skills
- **Poor staff management, including employees not performing their functions due to a lack of training or motivation**
- Inadequate capacity building of Ward Councillors regarding the technical aspects of wastewater, which hinders their effective committee participation and oversight of community feedback



07 INTER-GOVERNMENTAL ALIGNMENT

Cooperative governance between the three spheres of government (national, provincial and local) and amongst different state entities is critical to ensure effective water services delivery. **Strong wastewater management requires the involvement of various government entities from health, water, sanitation, energy, agriculture and environmental affairs.**

Key challenges include:

- Duplication of efforts through overlapping mandates
- **Inadequate engagement, alignment and regulatory interfaces between government departments, municipalities and other key WWT role-players, which impacts service delivery and reduces project efficiencies**

ORGANISATIONAL ROLES AND RESPONSIBILITIES

Various institutions play different roles in the delivery of wastewater treatment in South Africa. A summary of key wastewater role-players and their relevant responsibilities is provided in Table 1 below:

TABLE 1: ROLES AND RESPONSIBILITIES OF MAJOR WASTEWATER RELATED ORGANISATIONS

Organisation	Roles & Responsibilities
Department of Water and Sanitation (DWS)	<ul style="list-style-type: none"> The sanitation mandate was returned to DWS in 2014 and entails the regulation of the sanitation sector in the country, macro planning, regional bulk services and monitoring DWS oversees the 144 Water Services Authorities (WSAs) that are responsible for municipal wastewater infrastructure
National Treasury	<ul style="list-style-type: none"> National Treasury disburses grants for water and sanitation and provides oversight of municipal finances The Cities Support Programme provides implementation support to Metropolitan Municipalities ('Metros')
Government Technical Advisory Centre (GTAC)	<ul style="list-style-type: none"> As an agency of National Treasury, GTAC provides advisory services, programme management and development finance support to improve public finance management, as well as to strengthen infrastructure planning and delivery
Water Boards	<ul style="list-style-type: none"> Water Boards are responsible for bulk water and sanitation infrastructure provision to municipalities within their respective service areas
Municipalities	<ul style="list-style-type: none"> 144 municipalities in South Africa are designated as WSAs, responsible for the constitutionally mandated task of supplying potable water and sanitation services, either as water service providers (WSPs) themselves, or externally through third party WSPs
South African Local Government Association (SALGA)	<ul style="list-style-type: none"> SALGA is an association of municipalities that serves as the representative voice of all 257 municipalities in South Africa
Municipal Infrastructure Support Agent (MISA)	<ul style="list-style-type: none"> MISA is housed within the Department of Cooperative Governance and Traditional Affairs (COGTA) MISA is mandated to provide technical capacity support and to assist municipalities to build their internal capacity, with the goal to improve service delivery and infrastructure management
Development Bank of Southern Africa (DBSA)	<ul style="list-style-type: none"> The DBSA supports the development of water and sanitation infrastructure by providing financing to municipalities and regional water boards

CURRENT WASTEWATER ACTIVITIES AND INITIATIVES

A number of priority actions and activities have been put in place to improve municipal wastewater management in South Africa. Table 2 summarises the major recent initiatives in this regard.

TABLE 2: CURRENT WASTEWATER MANAGEMENT INITIATIVES IN SOUTH AFRICA

Organisation	Key Activities
Department of Water and Sanitation (DWS)	<p>Actions detailed in the National Water and Sanitation Master Plan include:</p> <ul style="list-style-type: none"> • Establish a specialised Municipal Intervention Unit for Water and Sanitation (MIUWS). The unit's work would include providing targeted assistance to municipalities in infrastructure management and water reuse • Revitalise the Green Drop programme for wastewater management (with the release of the 2017/18 report aimed for 2019) • Develop and implement a strategic action plan for the rehabilitation and upgrade of prioritised WWTWs • Implement the Waste Discharge Charge System (WDCS) in priority catchments • Develop and implement municipal bylaws to protect water quality • Allow conditional grants to be used for operational costs by municipalities • Establish regulations on required qualifications and experience for senior and technical positions in municipal services institutions • Develop regulations in terms of Section 139 (8) of the Constitution that allow a national entity to take over the water service functions (including revenue and billing) in a municipality if service delivery criteria are not met
National Treasury	<ul style="list-style-type: none"> • Announced a new Infrastructure Fund in the 2019/20 Budget Speech, which includes water as a key focus area
Government Technical Advisory Centre (GTAC)	<ul style="list-style-type: none"> • Providing support to local government to optimise infrastructure grant performance under their Infrastructure Development Support Programme • GTAC has recently supported the inception phase of a number of municipal WWT projects, including for the City of uMhlathuze, Polokwane Municipality and eThekweni Municipality
Water Boards	<ul style="list-style-type: none"> • Upgrades to WWTWs have been implemented by Umgeni Water, Rand Water and Bloem Water • Water Boards support the operation of WWTWs in certain instances

South African Local
Government Association
(SALGA)

- The Municipal Benchmarking Initiative (MBI) was undertaken in 2015 to assess municipal progress in water service delivery and to support ongoing improvement
- Hosts the Municipal Managers Forum to facilitate debates on key issues facing the municipal water sector
- Implemented a municipal biogas to energy partnership with GIZ. An assessment of biogas potential was undertaken at selected WWTWs and a toolkit developed for assessing biogas potential at individual plants

Municipal Infrastructure
Support Agent
(MISA)

- Has deployed District Technical Support Teams to support 55 of the 87 priority distressed/dysfunctional municipalities in South Africa. Each District Support Team includes engineers, construction and project managers, financial accountants, town and regional planners and governance and administration experts, as required
- Putting in place a range of framework contracts for the refurbishment or building of new water and wastewater treatment works. This is aimed at easing procurement challenges in municipalities. Municipalities will simply place orders against the relevant national framework contract with rates already negotiated and set
- Currently training 100 water and wastewater process controllers who are placed in various municipalities to support WWTWs
- Developing graduate engineers for professional registration and providing bursaries in requisite sectors

Development Bank
of Southern Africa
(DBSA)

- Serves as the Fund Manager for the Infrastructure Investment Programme for South Africa (IIPSA). IIPSA's eligible sectors include 'improved maintenance of water and wastewater infrastructure particularly at municipal level'. A number of water projects are already being funded. Further detail on IIPSA is available [here](#)
 - Providing capacity building and support to specific municipalities on wastewater reuse
-



BUILDING ON RELEVANT PROGRAMMES AND INITIATIVES

A number of programmes are in place nationally that could be enhanced to include a wastewater component. At the same time, existing wastewater activities can be strengthened or scaled up.

Table 3 below highlights a number of existing initiatives that could be made relevant to wastewater, as well as how current wastewater activities can be reinforced.

TABLE 3: STRENGTHENING OF WASTEWATER RELEVANT PROGRAMMES

Focus Area	Potential Activities
Skills and Technical Support	<ul style="list-style-type: none"> Plumbing is one of the selected trades included in the pilot phase for the Centres of Specialisation programme. This programme was commenced in 2019 by the Department of Higher Education and Training, in collaboration with Sector Education and Training Authorities (SETAs) and selected colleges. The extension of the programme to include trades such as process controllers and engineers could meaningfully support skills development requirements in wastewater treatment The NBI's Installation, Repair and Maintenance (IRM) programme could be geared specifically for municipalities, whereby Technical and Vocational Education and Training (TVET) college students are trained for entry level wastewater operator jobs, and supervised by artisans during their workplace-based learning Assistance by key partners could play an important role in the effective delivery of MISA's recently established District Support Teams
Water Reuse	<p>Potential water reuse projects can be channelled through current DBSA support measures. The DBSA water reuse support activities include:</p> <ul style="list-style-type: none"> Assisting municipalities with the scaling of their reuse projects and programmes Project preparation support to progress municipal reuse projects to a bankable stage A blended finance solution that will allow municipalities an alternative (and competitively priced) option to fund the implementation of reuse projects and programmes

Focus Area	Potential Activities
Decentralised Treatment	<ul style="list-style-type: none"> The deployment of decentralised treatment options can be enabled by linking their rollout to the cost of planned property developments. Once deployed these decentralised systems will reduce the load on already stretched municipal wastewater infrastructure
Planning, Guidelines and Standardised Documents	<ul style="list-style-type: none"> While extensive in nature, the implementation of the relevant actions in the National Water and Sanitation Master Plan would play a significant role in revitalising the wastewater sector The standardising of processes and procedures has been widely recommended as a possible option for increasing the know-how and efficiency amongst municipal employees. An example of this is the 'Guideline for the Inspection of Wastewater Treatment Works' published in 2009 (WRC Report No. TT 375)
Municipal Benchmarking and Performance Assessment	<ul style="list-style-type: none"> Revival of either the SALGA and WRC led Municipal Benchmarking Initiative (MBI) or DWS led Municipal Services Strategic Assessment (MuSSA) would be invaluable in data gathering, peer benchmarking and municipal prioritisation Revitalisation and annual publication of the DWS Green Drop report is key to the future management of wastewater infrastructure. Fortunately, the most recent Green Drop data is accessible through the DWS <i>My River</i> website, which can be accessed here

ADDRESSING THE MUNICIPAL WASTEWATER CHALLENGE

POTENTIAL DELIVERY MODELS FOR IMPROVED WASTEWATER TREATMENT

A number of different implementation models are needed to address municipal wastewater in South Africa, given that municipalities vary significantly in terms of their infrastructure, institutional capacity and revenues.

Table 4 below identifies five main approaches by which wastewater management can be tackled. Each approach has specific benefits and limitations, as highlighted below:

TABLE 4: POTENTIAL DELIVERY MODELS FOR IMPROVED WASTEWATER TREATMENT		
	Benefits	Limitations
01 Support municipalities to reach full functionality in WWT	<ul style="list-style-type: none"> Based on existing delivery model. No change or buy-in needed 	<ul style="list-style-type: none"> A long-term solution in many instances
02 Establish a municipally-owned WWT business/not for profit	<ul style="list-style-type: none"> Based on existing delivery model 	<ul style="list-style-type: none"> May only be implementable in Metros, at least initially
03 Manage a municipal WWTW via a well-functioning Water Board	<ul style="list-style-type: none"> Some precedent for this Procurement should be easier 	<ul style="list-style-type: none"> Well-functioning Water Boards are themselves heavily committed
04 Implement private sector O&M contracts in select municipalities	<ul style="list-style-type: none"> Pay on delivery Can raise external finance 	<ul style="list-style-type: none"> Risk of non-payment remains Most municipalities are not PPP ready
05 Adopt a blended finance approach, with implementation administered by a trusted third party	<ul style="list-style-type: none"> Raises additional funding by leveraging government grants 	<ul style="list-style-type: none"> Currently untested in South Africa Risk of non-payment not entirely addressed

SOURCE: NBI analysis (2019)

As illustrated in Table 4 above, **OPTION 1** is simply to strengthen municipalities to the point where they are above to provide an effective WWT service. However, given that almost 80% of South Africa's Water Services Authorities are severely constrained at present, this is a long-term solution when viewed nationally.

The recommendations of Paper 2 of *Kopano ya Metsi, Strengthening South Africa's Water Services Authorities*, will be critical to driving the improvement that is needed to realise this delivery model across a broad spectrum of municipalities.

OPTION 2 focuses on the development of a municipally-owned wastewater business. While this approach can certainly be beneficial, as seen, for example, in the case of the East Rand Water Care Company (ERWAT) in Ekurhuleni Municipality, it will be more difficult to implement in municipalities that have very limited capacity.

OPTION 3 envisages an expanded role for Water Boards, beyond their current focus on bulk water and sanitation provision to municipalities. While a potential solution, consultations with sector experts consistently highlighted a hesitation to expand the role of Water Boards to managing wastewater assets on behalf of municipalities for any extensive period of time.

OPTION 4 considers the role of long-term O&M contracts for wastewater implemented through Public Private Partnerships (PPPs). Both wastewater and water reuse represent areas of the water value chain where PPP potential is high. However, it is also the case that most municipalities in South Africa are not PPP suitable at present.

As such, the use of a PPP approach in wastewater treatment will need to give cognisance to the following:

- The key success factors for undertaking a PPP project (*Kopano ya Metsi Paper 3: An Introduction to PPPs in South Africa*)
- The municipalities that display the highest theoretical potential for water PPPs (*Kopano ya Metsi Paper 4: Water PPP Opportunities in South Africa*)
- The key barriers and solutions to implementing an effective PPP within the municipal context (*Kopano ya Metsi Paper 6: Barriers and Solutions to Implementing Municipal Water PPPs*)

Finally, **OPTION 5** focuses on the development of an innovative approach that is specifically targeted at municipalities that lack the resources to sustainably manage their wastewater infrastructure, and are unable to make effective use of government grants.

Under this approach, the water-related government grants due to a municipality would be managed and implemented on their behalf by another organ of state. In addition, these existing water grants would be used to raise additional funding from development banks and the private sector, under a 'blended finance' approach. This delivery model would include a strong focus on wastewater as a key area where intervention is required at the municipal level.

The primary challenge with this model is that it is currently untested in South Africa and would require extensive stakeholder engagement and pilot testing, before any wider implementation could be considered.

FINANCING AND INVESTMENT FOR IMPROVED WASTEWATER TREATMENT

Run correctly, wastewater is a business that has a number of revenue streams. Revenue options include treatment charges, the use of nutrients in fertilisers, the generation of biogas and opportunities for water reuse.

The challenge with addressing wastewater is thus not largely a financing issue. Rather, the key challenges are centred around infrastructure, governance and institutional capacity.

There are substantial opportunities to finance wastewater infrastructure through securing purchasing agreements with industrial and agricultural users for reuse water. There are also good cost savings and revenue flows to be found in improved energy efficiency and biogas production at wastewater plants.

The opportunities to attract financing through traditional methods (such as through municipal budgets and commercial loans) and more innovative approaches (such as municipal bonds, PPPs, project bonds and impact investing) are thus significant.

CONCLUSION

The municipal wastewater sector currently faces a number of inter-related challenges; however, these obstacles are by no means insurmountable.

A variety of key institutions are currently active in wastewater, and the strengthening of their relevant programmes and initiatives will play a meaningful role in reviving the municipal wastewater sector.

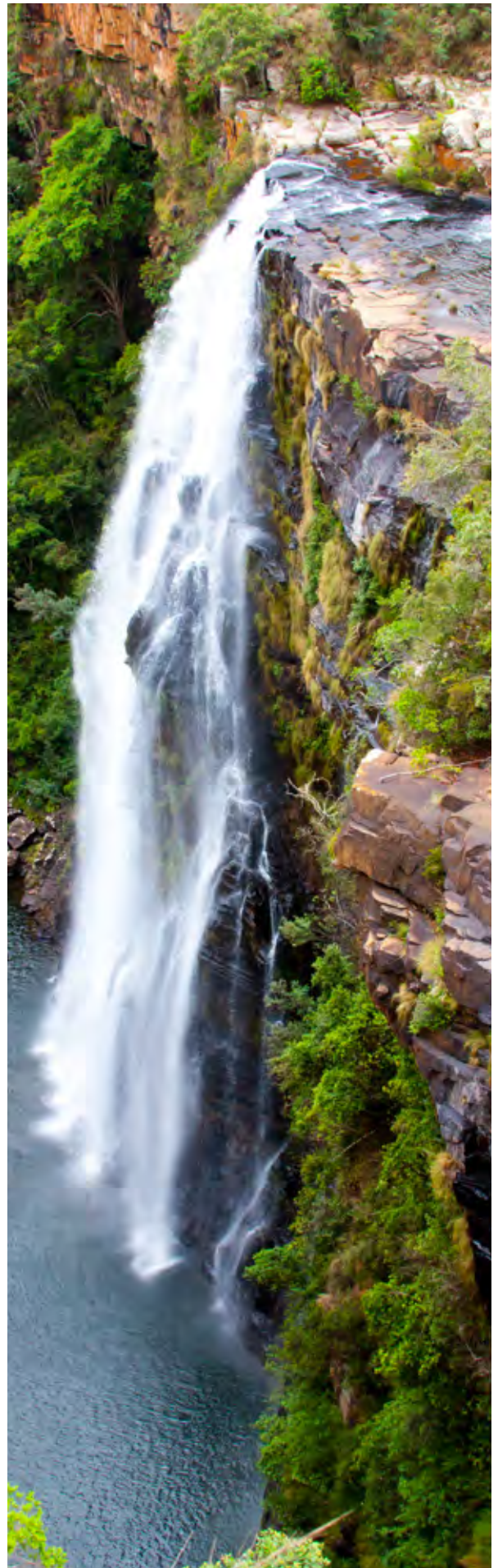
At the same time, different approaches and delivery models are needed to address wastewater treatment, in order to account for varying municipal contexts.

In some cases, wastewater infrastructure is adequately maintained and does not require external intervention. In most cases, however, some form of external assistance is required, whether this involves working in close partnership with a municipality to improve plant operation, or adopting more innovative approaches that include heightened roles for other organs of state or the private sector.

Properly addressed, significant cost savings, revenue flows and investment can be unlocked within wastewater management.

The opportunities presented by an effective wastewater sector are significant, and include improved ecosystem functioning and human health, as well as greater food and water security.

Wastewater remains a key untapped opportunity for economic development in South Africa.



APPENDIX I: REFERENCES

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The National Business Initiative (NBI) is an independent and voluntary coalition of South African and multinational businesses launched in 1995 by former President Nelson Mandela. Today we have over 100 member companies that work together towards sustainable growth and development in South Africa.

FOR MORE INFORMATION ON KOPANO YA METSI

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