



Siemens Digital Industries South Africa

Dawn of Digitalization and its impact in Africa

Water & Wastewater

Water & Wastewater



Partnerships between technology enablers and cross-functional participants are bringing in smart capabilities to water cycle management



Water Expenditure by Africa
(1.3% of total infrastructure investment) **is extremely low**



South Africa: **Invested ~R12 bn in the technology** upgrade and construction of three treatment plants



Last 4 years Siemens flow meters measured the flow of **~3.7 million megalitres of water**

Continue

Poor water utility management and inadequate water infrastructure investment results in greater need for water sector development

Digital Transformation

Smart and advanced technologies like leak detection and metering are being used to improve billing and efficiency.



Improved Quality

Preference is shifting away from cheaper products towards higher quality core products in the case of large water infrastructure projects, especially in the building services and industrial sectors.

Decentralisation

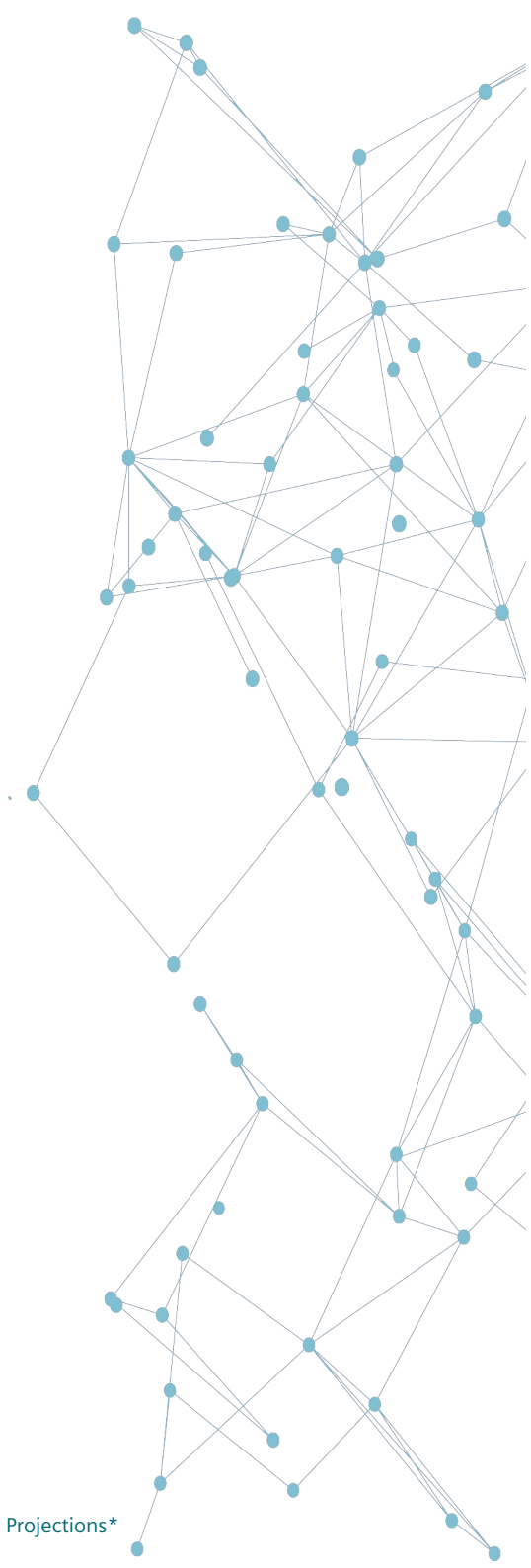
There is growth in the market for 'plug and play' treatment models owing to the development of industrial zones, gated communities and business parks. Under-sink treatment systems are growing in popularity retail will drive demand for FMCG products.

Sustainable Buildings

Buildings are constructed to be water efficient, reducing the amount of fresh water use, through wastewater reuse. This is driven by the increasing awareness of water scarcity.

Reuse

Deployment of technological solutions is becoming common-place in the industrial and residential segments. Policy enforcement regarding effluent discharge is becoming more stringent across the continent. There is reducing dependence on the public sector to provide water and wastewater services. Industrial and residential sectors are opting to install their own small-scale water treatment and, in the case of industrial sector, wastewater treatment facilities. This has opened the door to increased private sector participation.



Water sector overview: South Africa

Municipal Water Sector Challenges, South Africa, 2018

Climate variability has led to rising levels of water scarcity across the country creating a severe deficit in water availability. This has indirectly impacted the levels of municipal revenue generation from water sales.

There are a number of options being explored to increase water resources in the country, including wastewater treatment and desalination. The main barrier is the initial capital investment required.

South Africa loses approximately 1.58 billion kilolitres of water a year as non-revenue water. The water loss reportedly costs the country around R7.2bn a year.

Industrial Water Sector Challenges, South Africa, 2018

Water restrictions, fines and rising water tariffs resulting from low water availability in parts of the country have impacted water intensive industrial sectors.

Poor feed water quality is impacting industrial players as they need to invest in water treatment technologies to ensure feed water meets quality standards. This is especially the case in the food and beverage sector.

Acid mine drainage is one of the most significant water-related environmental challenges facing the mining industry caused by old abandoned mines and increasing illegal mining activities. This water is very difficult to treat.

Water Sector Initiatives, South Africa, 2018

Municipal

Pressure management, pipe replacement and demand-side management through digital capped water meters were the top 3 initiatives taken to rapidly reduce water consumption in the Western Cape in 2018.

More than 200 users were connected to be supplied with treated effluent for irrigation and various industrial applications not requiring potable water.

Industrial

Large industrial players have made changes or investments in their business to ensure reduction in their reliance on municipal water supply and ultimately use less water.














Government has invested ~R12 bn in the technology upgrade and construction of three treatment plants specifically designed to treat polluted water from old underground gold mines across Gauteng and mitigate further problems of acid mine drainage.



Digital awareness is significant but the actual investment is expected to be challenge specific and value driven



Appetite for Technology Adoption 2018

Sector	South Africa	Kenya	Ethiopia	Ghana
 Water				
 Wastewater				
 Early  Developing  Mature				

The water and wastewater sector in South Africa is mature in comparison to the rest of Africa, due to strong technical skills, and commercial and financial management of water resources.

There has been chronic underinvestment in water and wastewater infrastructure across Africa. Currently, there is an estimated USD 12 billion investment gap. All 3 countries face cheap labour as a road block to the adoption of advanced technologies.

In Ghana and Kenya there is increasing focus and adoption of ever more advanced technologies in the water and wastewater sector. Ethiopia is using slightly less advanced technologies to overcome their challenges.

“One of the biggest barriers to the development of the water and wastewater sector across Africa is the low investment this sector receives. However, its importance is being recognised and investment is picking up, but very slowly.”

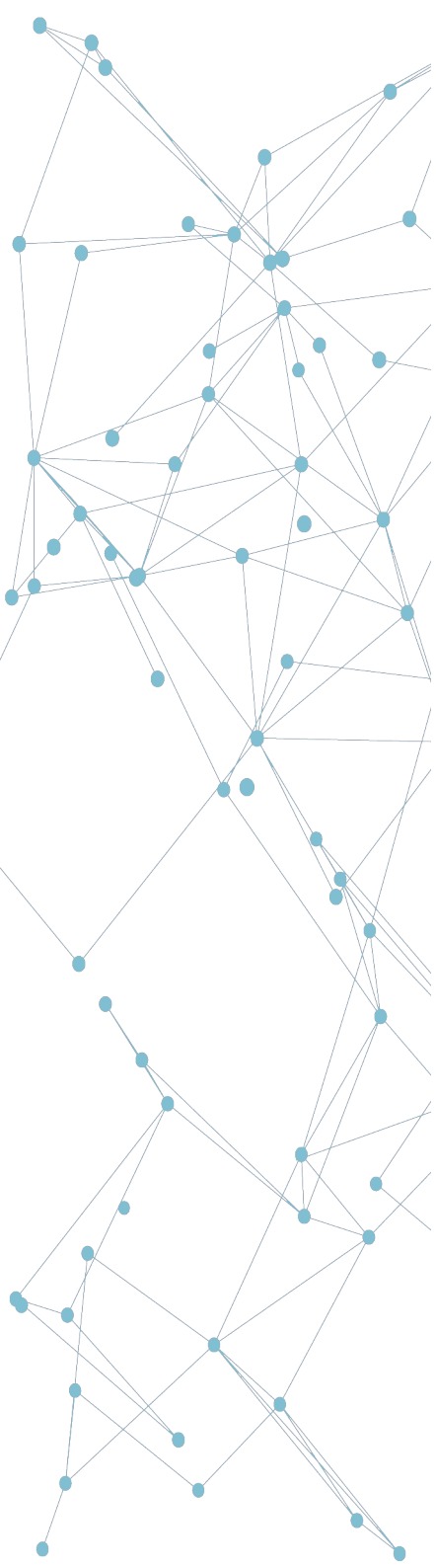
– A leading Solution Provider

“Water and wastewater in the F&B market is a real driver in most African countries at the moment. Government is getting stricter about water discharged from industries and the enforcement of existing effluent policies is picking up.”

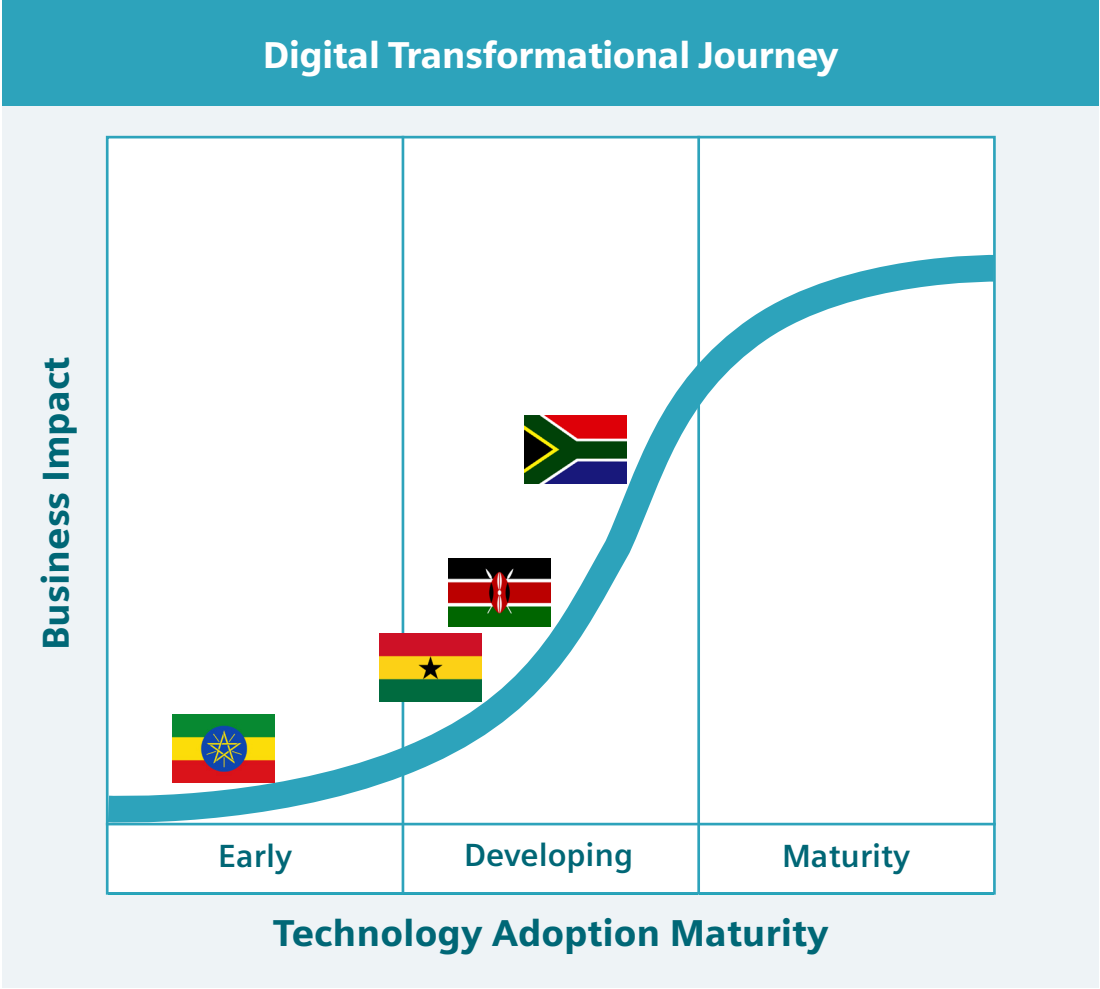
- An EPC

“There is increasing uptake of the small-scale plug and play/containerised water treatment modules for business parks and housing developments and underserved, rural areas. The benefit of these is that less skilled labour is needed.”

– A leading OEM



Technology adoption maturity: Wastewater sector



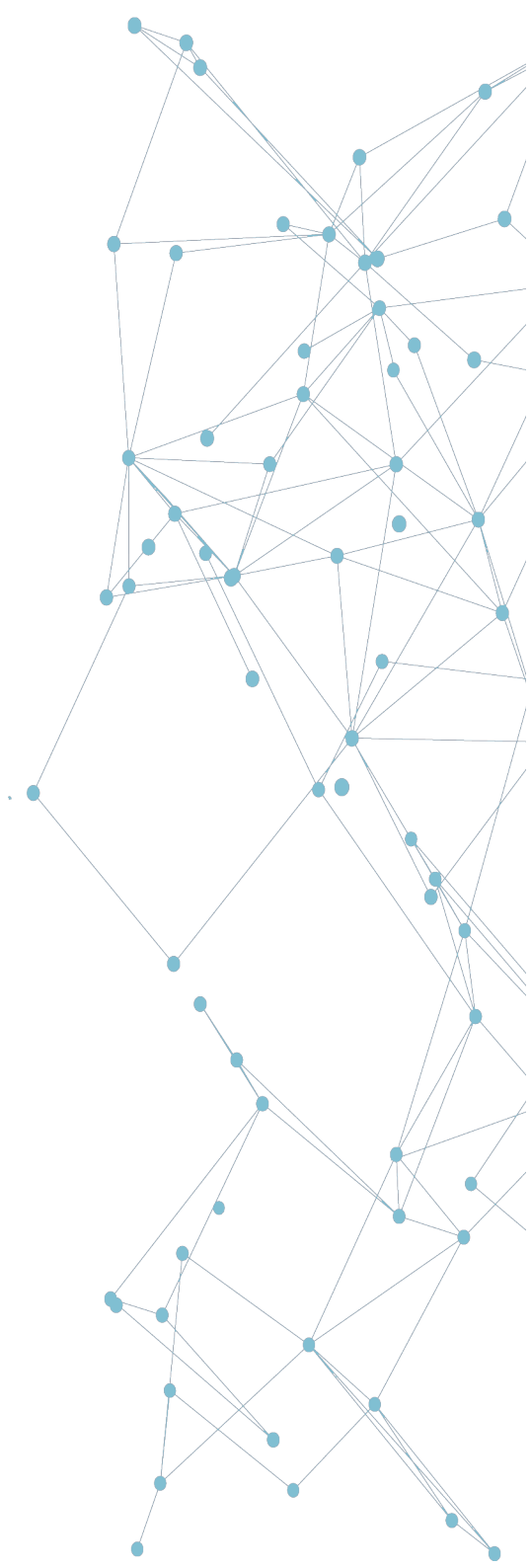
Current and Future State of Key Automation Product Adoption		
Technology	Current State	Future State
Mobile and decentralised treatment systems	Industrial Water Treatment	Enhanced Adoption
Web-based technologies and Cloud Computing	Better data acquisition and real-time control and management	Enhanced Adoption
IIoT and AI for fully automated treatment systems	Integration of industrial treatment with central facility	Water Treatment as a service



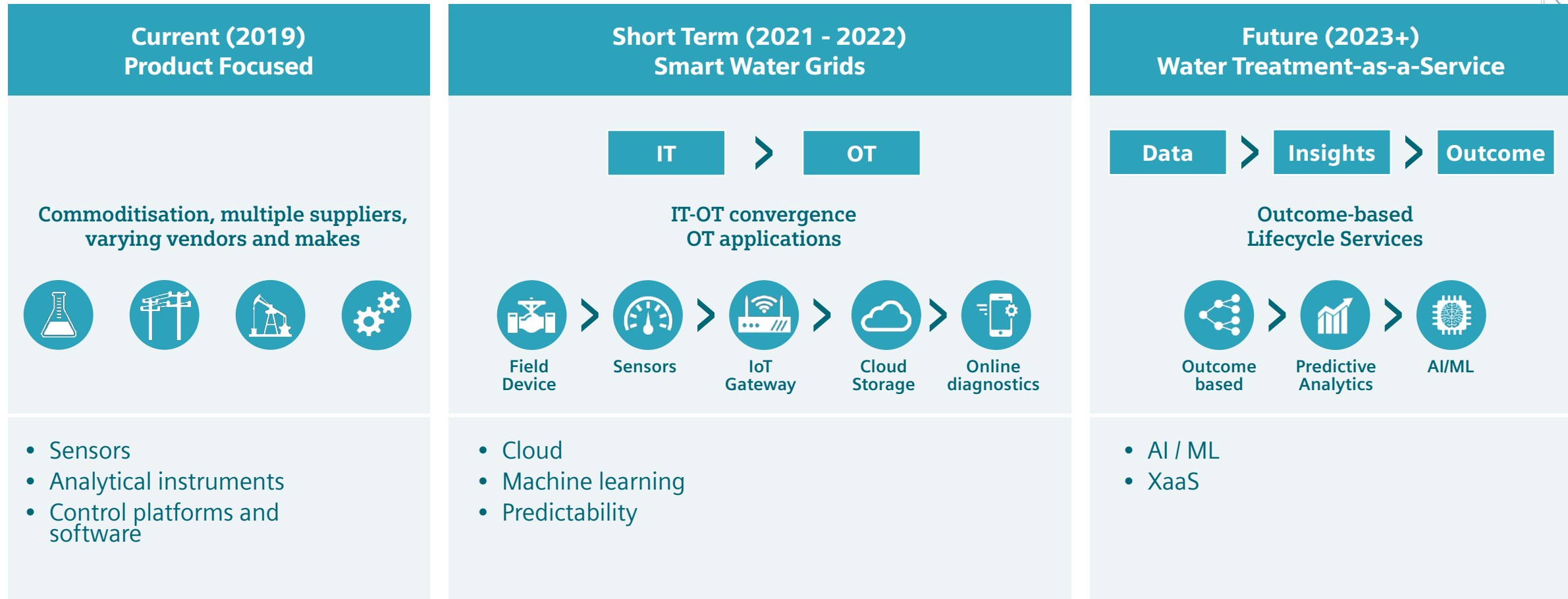
Automation is an ideal solution to tackle cost pressures and enhance asset performance leading to efficient CAPEX and reduced OPEX



Key Imperatives	Automation Implications
Capital Efficiency Plan, build and operate economically	Managing capital projects operations and process plant operations lifecycle.
Resource Efficiency Skills shortage	Knowledge retention and transfer, Managed services, Field workforce automation and productivity.
Asset Efficiency Optimise Connected assets	Shorter turnarounds/ longer run links, Schedule-based maintenance – Data-driven maintenance



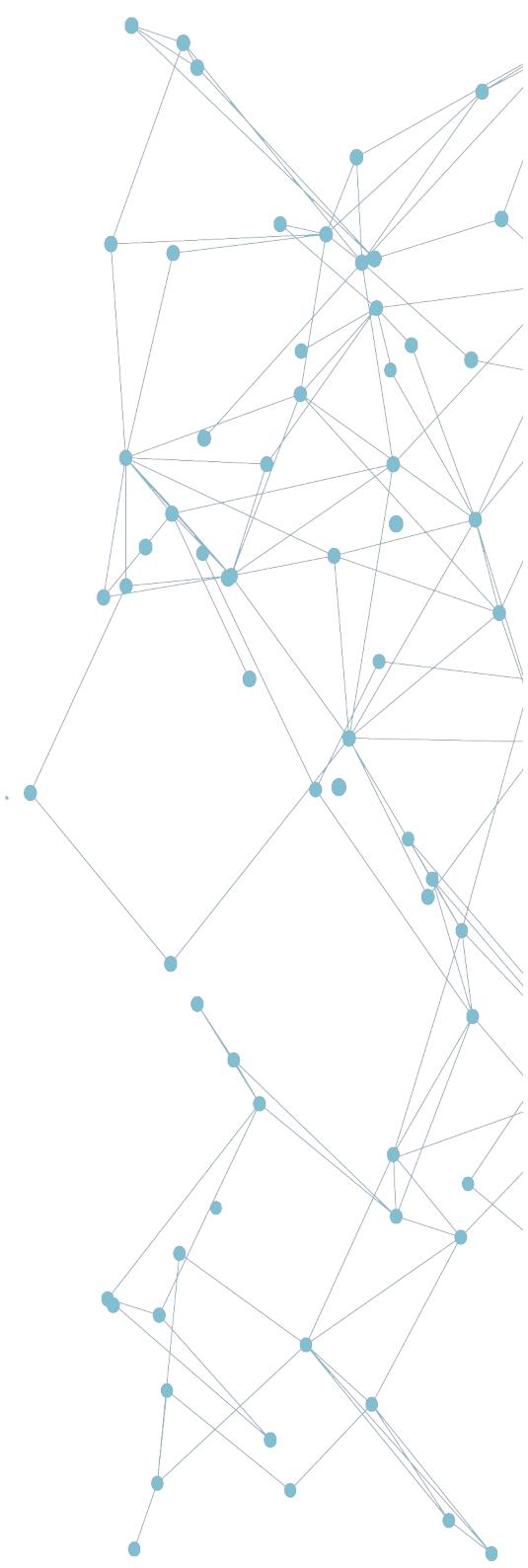
Expected transformation in the African water sector



Poor water utility management and inadequate water infrastructure investment results in greater need for water sector development

Challenges		
Weak policy implementation due to poor coordination	Limited availability of funding	Limited expertise and necessary skills in the water and wastewater sectors
<ul style="list-style-type: none">• SSA countries have various policies in place to prevent the release of untreated wastewater from industrial processes. The inherent fragmentation at different government levels responsible for water and wastewater management results in limited enforcement of these policies. As a result, industries are not penalised for releasing untreated wastewater.• Governments are becoming stricter with policy enforcement and the impact should decrease over the next 5 years.	<ul style="list-style-type: none">• Although the need for investment in water and wastewater infrastructure is being increasingly recognised, the availability of funding is a persisting issue.• Water is not a high revenue commodity and non-payment is fairly common, resulting in decreased municipal funds for water projects.• This is further compounded by the reliance on multi-lateral and bi-lateral organisations for funding of water related projects.	<ul style="list-style-type: none">• There are limited individuals with the necessary expertise and skills to implement and manage technologically advanced water and wastewater solutions. This results in low demand for non-legacy products and is further compounded by the lack of available in-country training.• Adding to this, the low cost of labour, compared to the high cost of advanced instrumentation, is a major restraint.

Industry Specific Challenges		
Sector	Approach to water and wastewater	Challenges
Mining	<ul style="list-style-type: none">• Water plays an integral role in the mineral processing stage of the mining operation.• Mine drainage and process water are the main types of water produced in the mining operation.	<ul style="list-style-type: none">• High environmental impact from effluent water.• Poor wastewater quality that requires rigorous treatment methods.• Remote locations far from water treatment plants.
Food & Beverage	<ul style="list-style-type: none">• The food & beverage industry requires an enormous amount of clean water.• The industry is focused on maximising wastewater reclamation in order to reduce the amount of fresh water needed.	<ul style="list-style-type: none">• Regulations around effluent and reclaimed water standards are becoming more stringent, resulting in the need for rigorous treatment methods and increasing demand for zero-liquid-discharge solutions
Oil & Gas	<ul style="list-style-type: none">• Oil & Gas production requires large volumes of water.	<ul style="list-style-type: none">• Stringent environmental regulations result in rigorous treatment methods for water effluent.• Remote locations far from water treatment plants.



Outlook: The African water / wastewater sector is expected to witness a gradual transformation with cost and skill implications of technology adoption emerging as key challenges for the sector

Siemens Flow Solutions:

Siemens has provided South Africa with simple, flexible flow solutions for more than 30 years. Some of these solutions are; standard electromagnetic flow meters with modular pulsed Direct Current (DC) technology, high-performance pulsed Alternating Current (AC) electromagnetic flow meters, external powered flow meters and battery-operated water meters with 3G information transmission.

In South Africa:

Siemens flow meters combine world-class performance with a low cost of ownership, tailored for the toughest water applications. Siemens assists the Water Boards in efficiently measuring water usage which improves productivity and ultimately the financial health of the Water Boards.

Siemens Future Focus:

Promote greater awareness, among customers and end-users, of the other uses of Siemens flow meters such as; water leakage detection, pipeline water management and irrigation flow measurement.

Siemens Smart Metering Solutions – Addressing Industry Requirements

- Siemens Smart Metering helps in Water Balancing
- Key Features: Designed for Water Industry Application
One battery driven water meter DN 25 – 600 (1" - 24"),
10 years battery operation & AC + battery backup

High Precision Flow meters usage across Water Boards

Siemens' high-precision volume measurement flow meters are used by various Water Boards across South Africa, such as Rand Water, East Rand Water Care Company (ERWAT), Lepelle Northern Water, Umgeni Water, Johannesburg Water.

