CESA
Consulting Engineers South Africa
INFRASTRUCTURE Indaba 2025

Engineering the Future We Want:
Mobilising for Sustainable Development

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Presentation Title

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RAND WATER

1. INTRODUCTION

- **Legislation:**
  - Rand Water is established in terms of Section 84 of the Water Services Act No. 108 of 1997:
    - ✓ Governed by the legal framework for water management in South Africa.
  - It is an Organ of State and a Public Entity listed in Schedule 3B of the Public Finance Management Act No. 01 of 1999.
    - ✓ Subjected to a greater degree of financial oversight and control.

- **Rand Water's Vision:**
  - To provide sustainable, universally competitive water and sanitation solutions for Africa.

- ✓ How does it impact water security?
- ✓ The role of consulting engineers and other relevant stakeholders and opportunities in Rand Water's "delivery" of infrastructure

RAND WATER

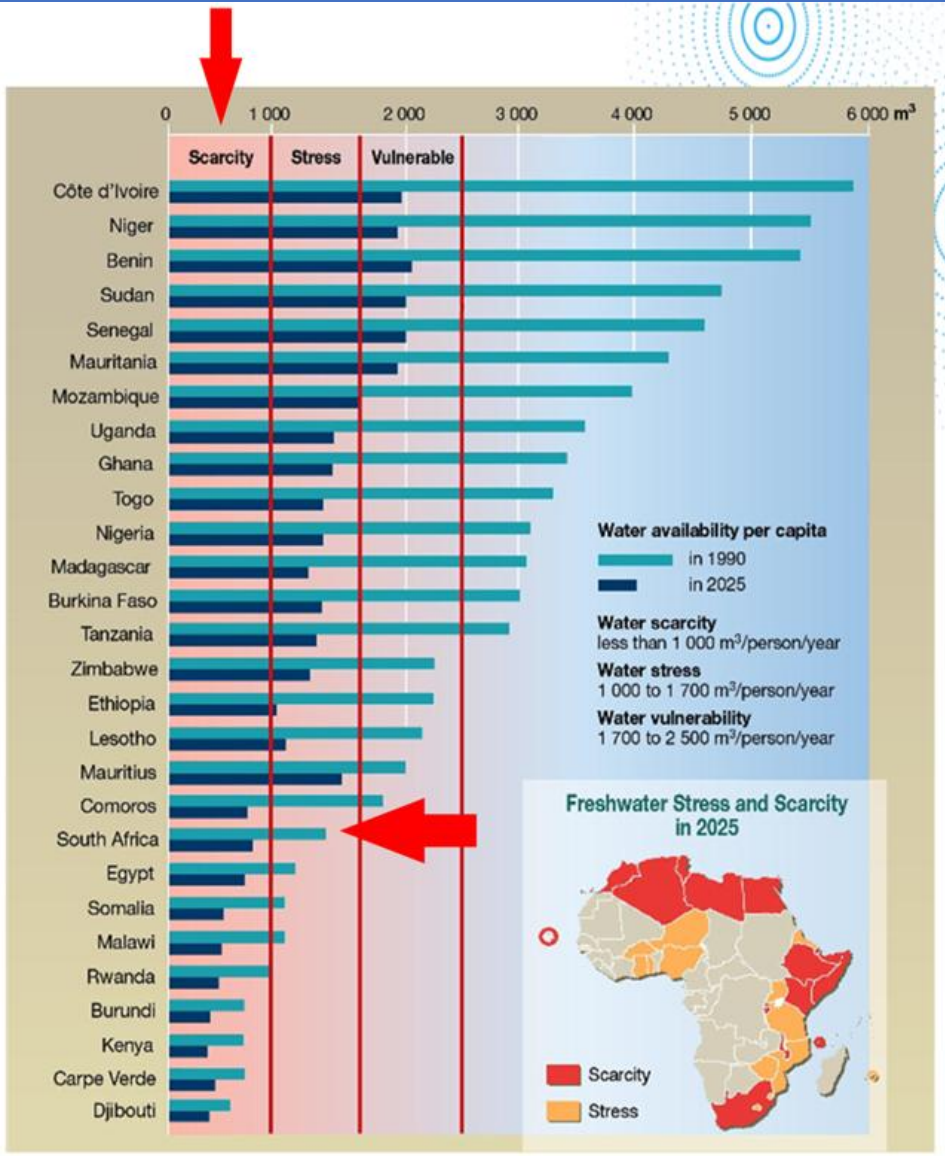
2. ENVIRONMENTAL SCAN: Threats To Water Security

- **Water Scarcity:** South Africa is a water-scarce country due to its semi-arid climate and uneven rainfall distribution.
- **Infrastructure Challenges:** Aging infrastructure, Vandalism and inefficient water management practices contribute to the challenges in South Africa.
- **Growing Demand:** The increasing population and industrial growth in South Africa are driving up the demand for water.
- **Catchment Pollution:** Pollution of water catchment compounds the water security issues.
- **Over-reliance on Surface Water:** The country's over-reliance on surface water and poor conservation practices increase the vulnerability of water systems

2.1. ENVIRONMENT

- Since 1990, South Africa has shifted from a **"water stressed"** country to being a country of **water scarcity**
- By 2025 the country will experience the **9th lowest levels of water availability per capita in Africa** – increasing reliance on foreign sources (Lesotho)

Source: United Nations Economic Commission for Africa

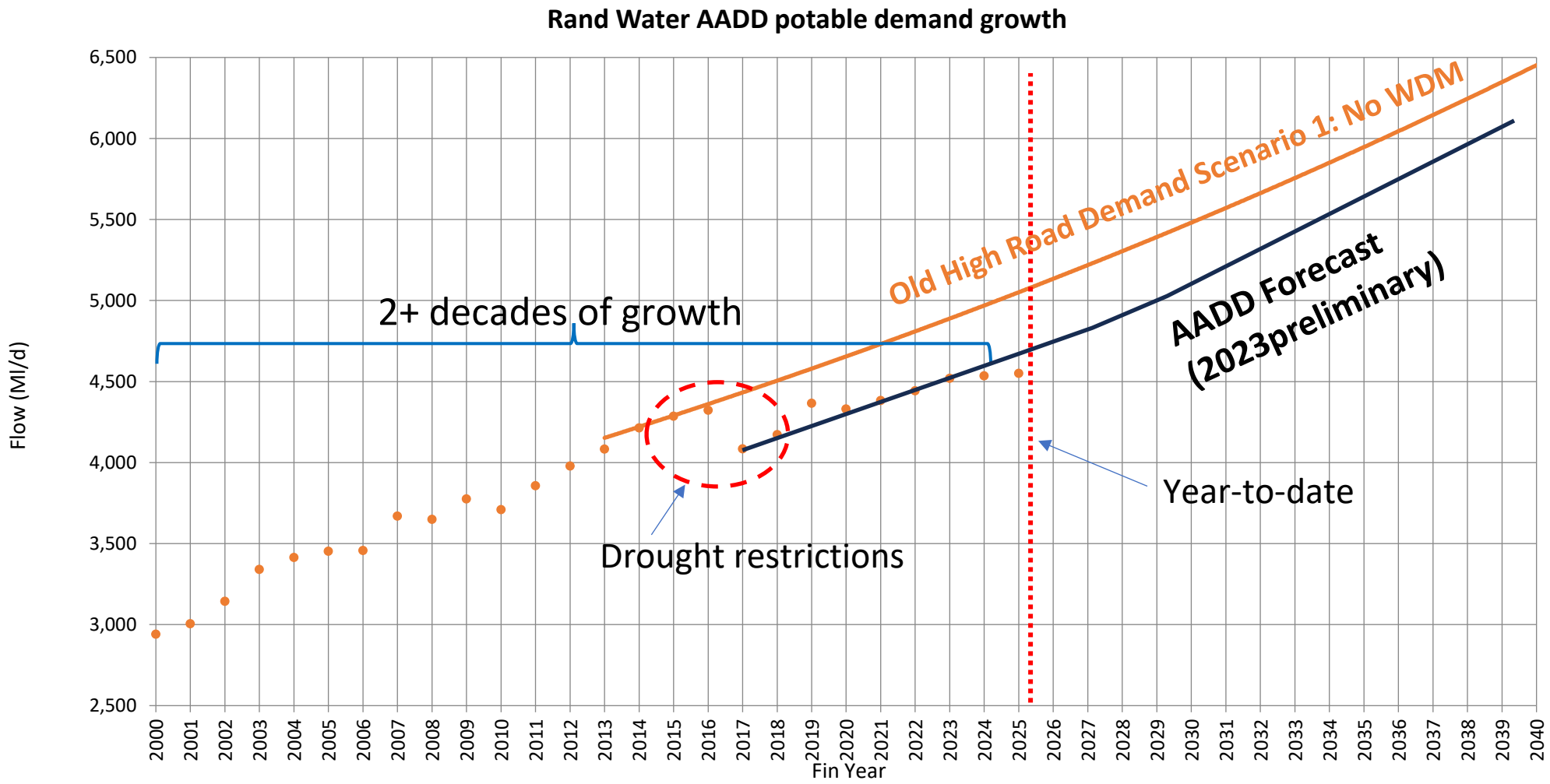


%Non-revenue water among Rand Water's municipal customers

	% NRW losses			
Customer	**2005**	**2011**	**2020**	**2021**
CoJ	20.6	38.2	43.2	44.2
CoE	23.8	39.8	31.7	35.5
CoT	14	26.5	36.3	34.6
Emfuleni LM	47.6	44.4	64.6	72.6
Mogale City	18.2	26	62.4	62.8
Midvaal	23	26.2	35.9	38.0
Merafong	25.9	26	27.4	32.4
Randfontein	12.5	21.9		
Westonaria	10.3	29.7	40.5	43.4
Lesedi	14.9	8.2	33.4	31

2.2. Extent of Vandalism

2.3. Demand Growth Projection



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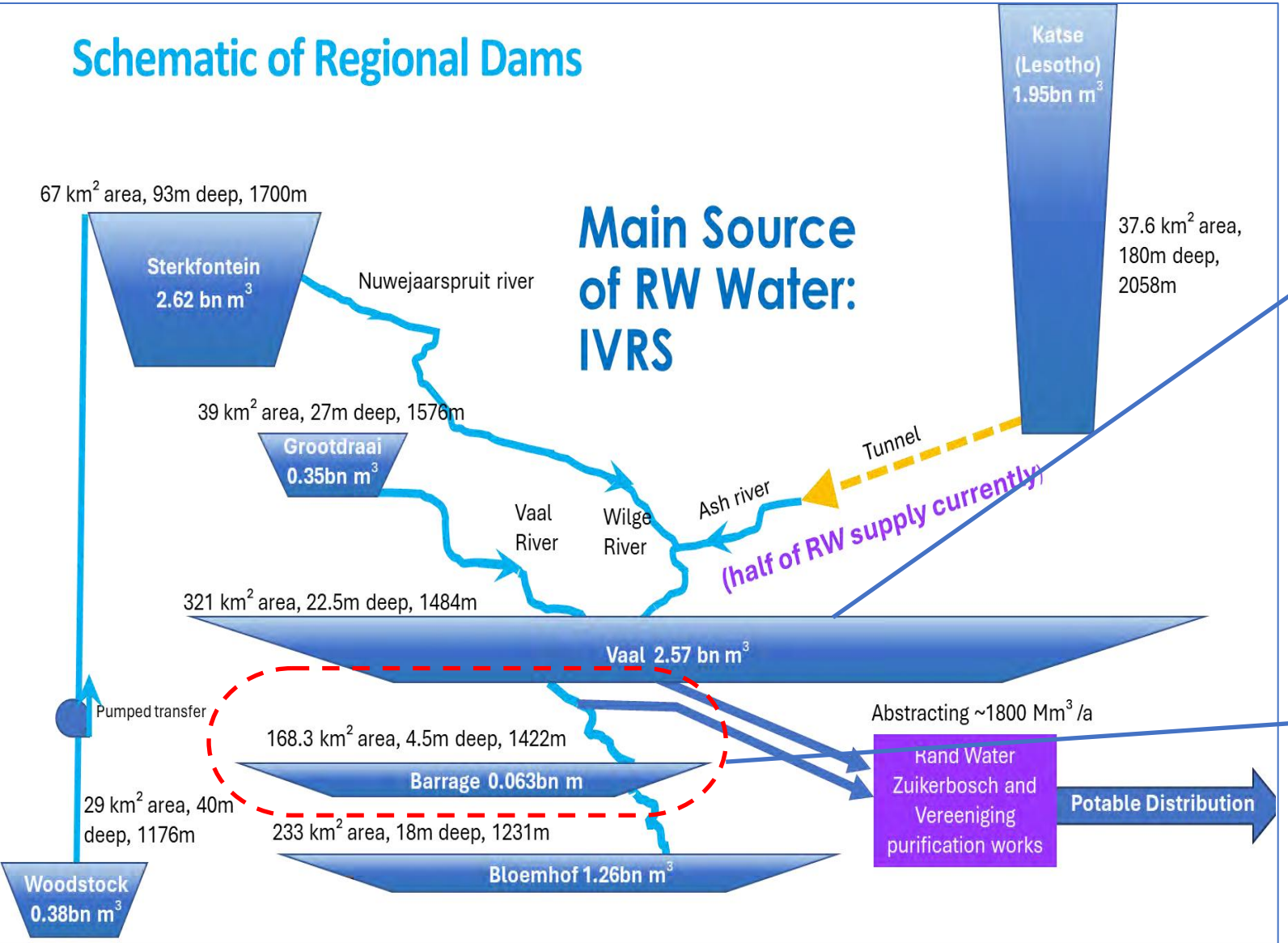
Schematic of Regional Dams



- ✓ Rand Water abstracts raw water from the Vaal dam
- ✓ RW's is over-abstracting at 1800Mm³/Ann (temporary license) vs authorized 1600Mm³/Annum
- ✓ Lesotho Highlands, delayed until 2028

- ✓ The total ammonia concentration in the raw water source has exceeded SAN 241 drinking water quality standards.

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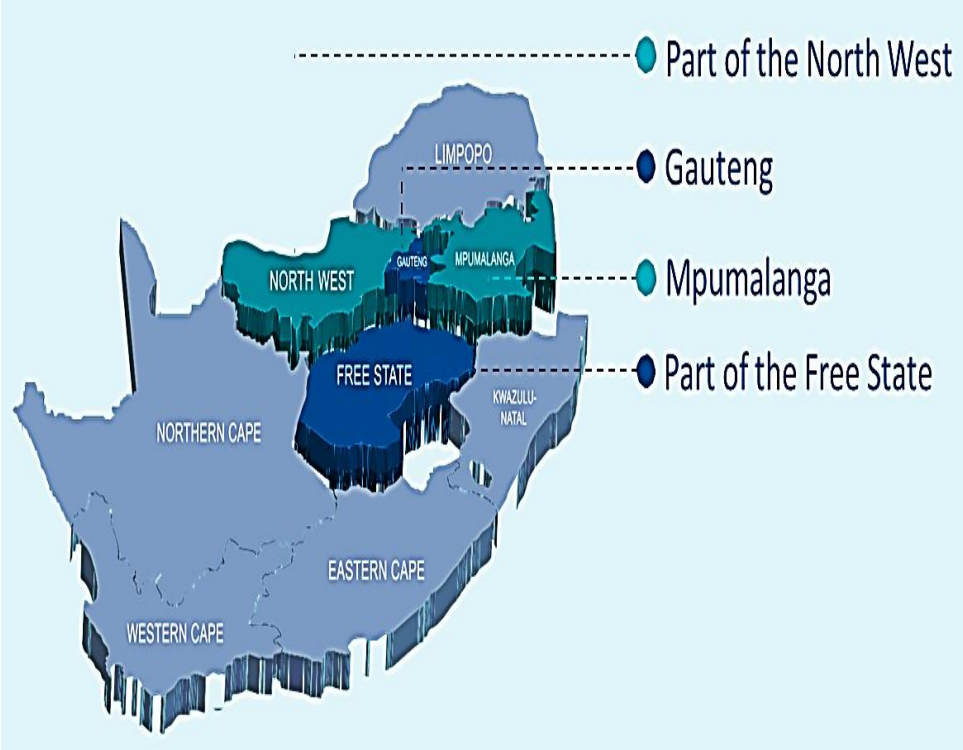
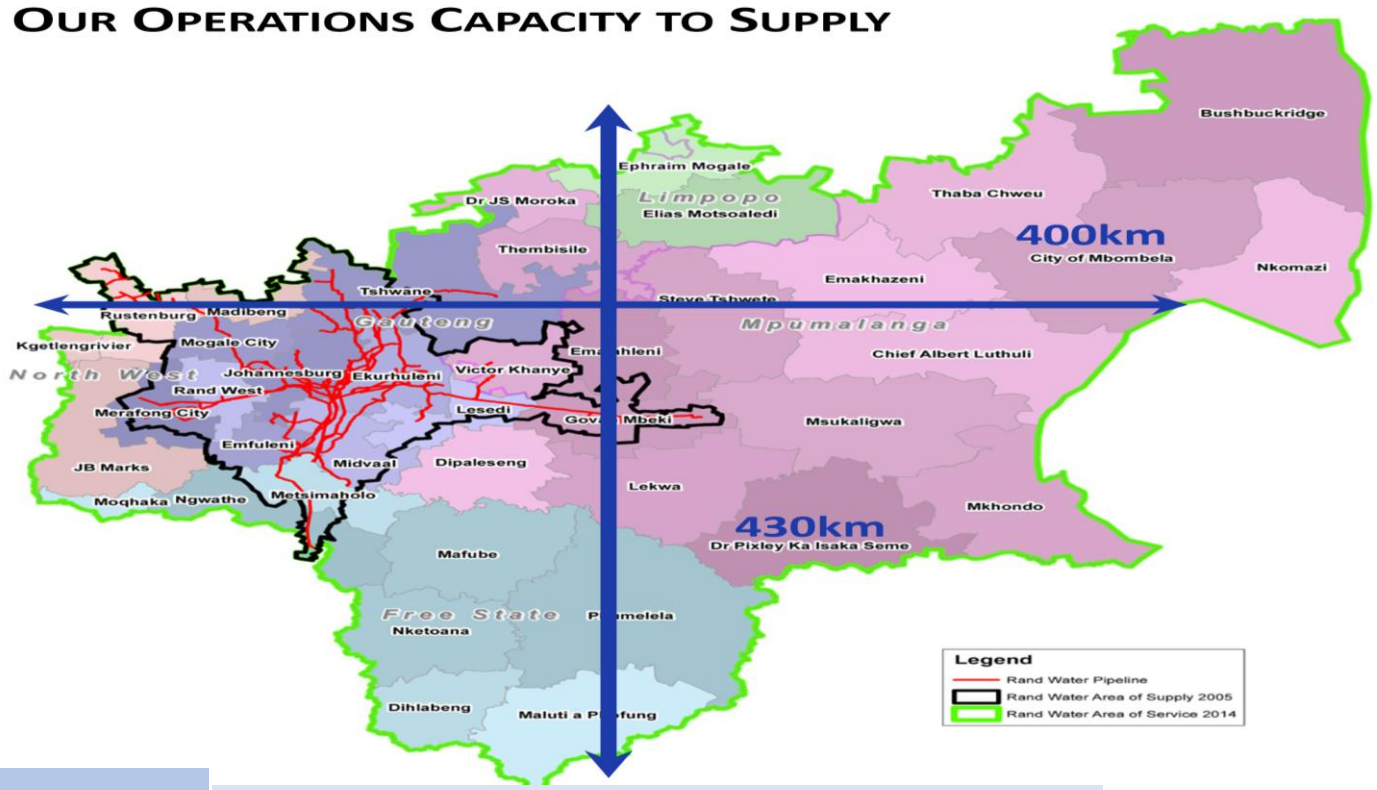
3. RAND WATER CAPEX PLANS





- Largest water utility in Africa existing for 121-years
- Distribution network over 3,460 km of large diameter pipeline
- Feeding 58 strategically located service reservoirs
- Average potable water Supplied 4550 Mℓ/d
- Peak Day Demand 5168 Mℓ/d
- Over 18 million consumers supplied

- Treatment of water to attain the highest quality standards of potable water
- Management of appropriate reservoir levels between 60% and 80% to avoid day 0.
- Distribution network to supply Municipalities (17), Mines (27), Industries and direct customers (952)

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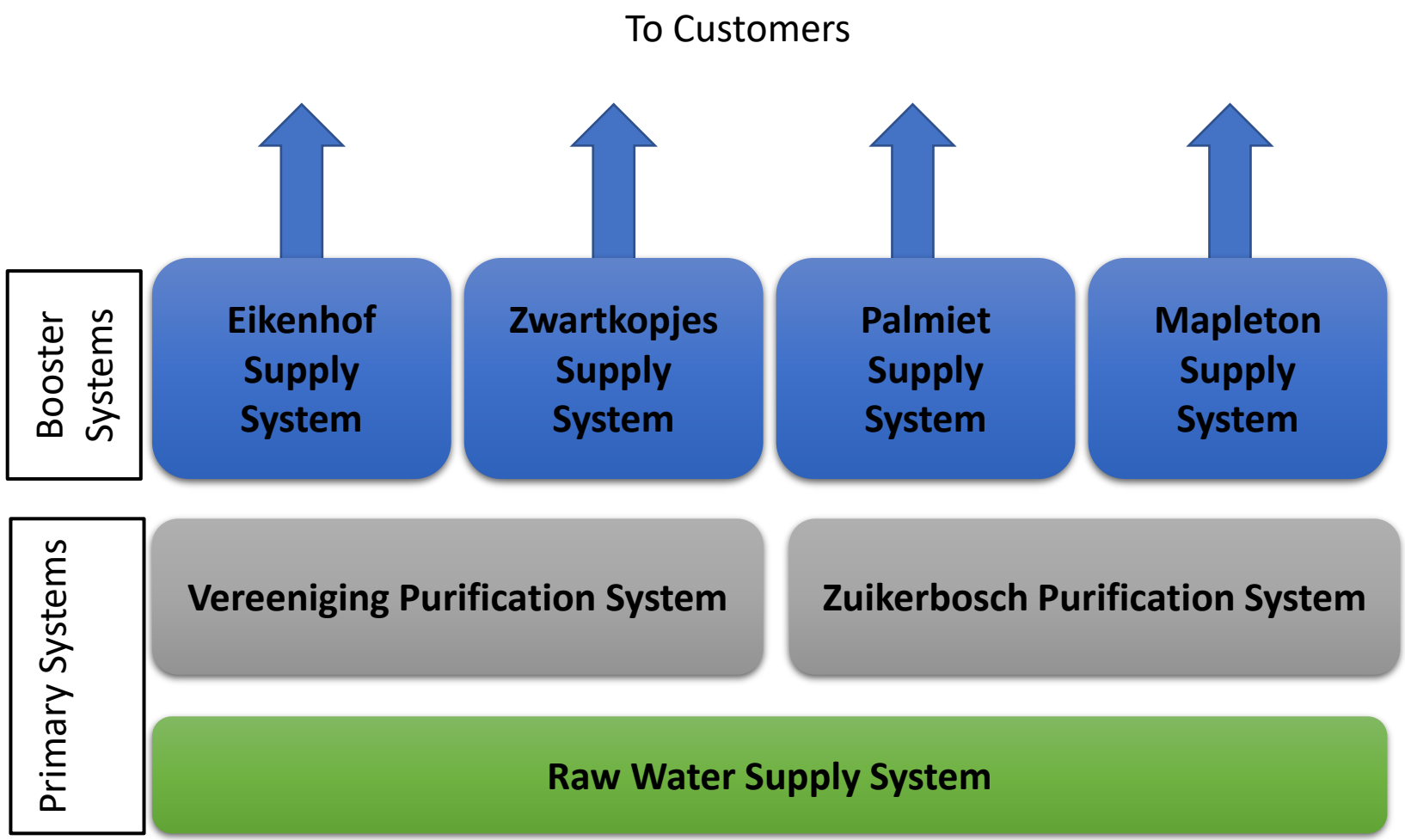
3.1. Corporate Supply Systems



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3.2. Infrastructure Development Programme

- Africa's largest bulk water utility with a board-approved capital expenditure for infrastructure augmentation and renewal program amounting to just over R27 billion.

  - ✓ This program is scheduled to run from the 2025 to 2029 fiscal years..

- The capital expenditure programme aims to provide sustainable water solutions throughout the Rand Water supply area.

  - ✓ It will focus on augmenting, replacing, and rehabilitating existing infrastructure.

- Additionally, the programme will implement alternative sources of raw water and electrical energy.

  - ✓ Reducing dependence on the Integrated Vaal River System (IVRS) and Eskom, respectively

RAND WATER

3.3. 5-year Capex: Looking Forward

	2025	2026	2027	2028	2029	Total 5yr
Augmentation	688	1 384	2 388	3 271	3 173	10 905
Renewals	815	930	2 667	3 524	4 248	12 183
Total Aug + Ren	1 503	2 314	5 055	6 795	7 421	23 088
Total for Augment + Renew + CSSO + Movable Assets + Growth	2 119	2 658	5 624	8 024	8 955	27 380

- **Incorporating:**

- **A dedicated scheme / civil works**, Station 5 (purification works reaching completion),
- **Bulk pipes** (47% of the 5yr Capex programme):
  - Augmentation and renewal of Palmiet and Mapleton arterial routes (pipes and pump stations)
  - A scattering of pipe renewals across the network, including significant work in the Zwartkopjes system,
- **A dedicated reservoir programme**: additional reservoir storage (where required).
- **Mechanical, Electrical, Process and Automation infrastructure** (Renewals and augmentation)
- **Additional focus Strategic growth projects:** Strategic projects (boreholes, WWTW, IPP, hydro, solar)

3.4. Alternative Water Being Explored

Project	Yield estimate (Ml/d)
Meyerton WW reclamation	20
Glen Douglas WW reclamation	150
Barrage WW reclamation	100
Northern Works WW reclamation	50
Boreholes and AMD	315
Regional WWTW	150
TOTAL	**785**

RAND WATER INSTITUTE - INNOVATION

Twenty-two pilot projects completed by end June 2024.

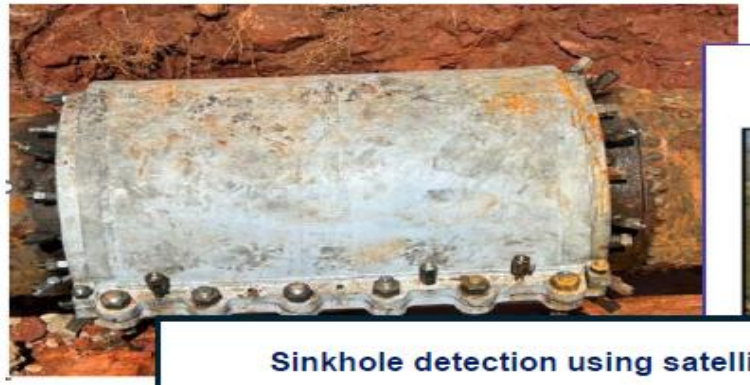
Six innovation solutions implemented at Rand Water to date and sixteen implementations in progress.

Estimated savings over 5 years when all adopted innovation solutions are implemented is approximately R1,226 billion.

Five pilot projects completed in 2023/24:

I. Water treatment residue beneficiation of ash from incinerated water treatment residue.
II. Accelerated dewatering of water treatment residue produced at Rand Water
III. Detecting sinkholes on Rand Water pipeline network using satellite technology.
IV. Asset tracking of moveable assets.
V. Non-interruptive leak repair of a sub-surface large diameter, pressurized buried potable water pipe at Rand Water

Non-interruptive leak repair



Circular Economy

Sinkhole detection using satellite

RAND WATER 121 YEARS OF FINDING NEW WAYS

4. CONCLUSIONS - Way forward

- Rand Water is implementing major upgrades and expansion programmes.
- This involves complex engineering challenges, from designing new pipelines and treatment plants to implementing innovative water and energy-saving technologies.
- Consulting engineers bring the specialized expertise to ensure these projects are executed efficiently and effectively.

- Focus on alternative raw water sources and clean energy requires innovative approaches and collaboration with experts in these fields.
- Rand Water relies on consulting engineers to bring forward-thinking solutions that align with our sustainability goals.

- Rand Water believes in building strong partnerships for effective project delivery.
- This includes collaboration with local communities, government agencies, and other organizations.

Thank You !!


LET'S BE
WATER WISE
DON'T WASTE
WATER
DON'T POLLUTE
WATER
PAY FOR
WATER SERVICES
RESPECT WATER
RESPECT LIFE
ENVIRONMENTAL
ACTION
CONSERVING WATER
CONSERVING THE ENVIRONMENT