Transcending Water Infrastructure Challenges by Going Beyond the Gap

Preliminary findings presentation to the WSSLG

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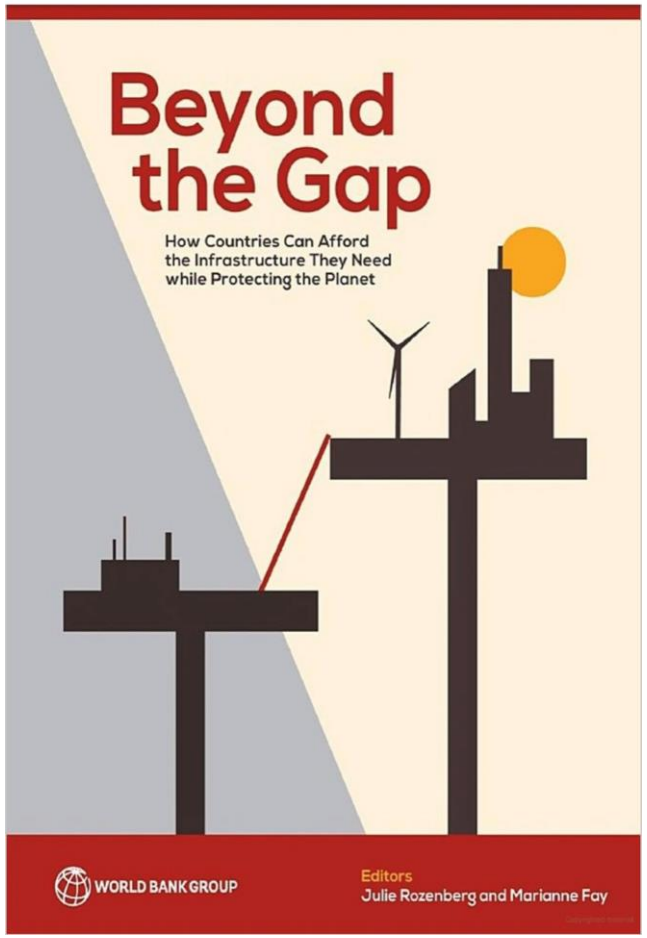
Project background



DBSA commissioned the World Bank to estimate infrastructure needs to achieve the SDGs in South Africa by 2030, drilling down on the World Bank's 2019 global 'Beyond the Gap' report

The BtG approach aims to shift focus from a focus on more spending to spending better on the "right objectives", using relevant metrics to:

- Quantify the funding gap to achieve infrastructure SDGs by 2030
- Highlight key cost drivers & their policy & service delivery implications
- Engage policy makers on the implications of policy choices, costs and service level targets, pathways and strategies

Analytical work started in 2020, and due to be completed in 2021

- Several consultations with DWS at WSSLG - SDG 6 TASK TEAM
- Palmer Development Group (PDG) commissioned to do core analysis
- World Bank to finalize water report in October, projected delivery of multi-sector report in December 2021

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Analytical framework

- **Sector objectives** – what is SA trying to achieve?
- **Performance metrics** – measuring objectives being achieved
- **Scenarios** – different ways to achieve these, and under what conditions would they do better/worse?
- **Modelling** – costs and impacts of scenarios
- **Policy choices** –trade offs needed in policy formulation

Performance metrics

Objective	Metric	Target (2030)
SDG 6.1 and 6.2: Universal access to safe and reliable water services	Proportion of population using safely managed drinking water services	100%
	Proportion of population using safely managed sanitation services	100%
	Proportion of population using a hand-washing facility with soap & water	100%
Universal basic services	Proportion of population with a basic water supply	100%
	Proportion of population with limited sanitation.	100%
Financially sustainable water services	Average annual total cost (capital and operating costs over 10 years) expressed as a percentage of GDP	Low as possible
Reduced demand on freshwater resources	System input volume divided by population	175 l/c/d
	NRW as a percentage of system input volume	15% reduction
Minimising environmental impact	Change in the annual tonnes of CO_2 equivalent emitted by the sector	<0% (vs 2020)

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Scenario parameters

24 water services scenarios

Four **technology** options

Three **socio-economic** scenarios

Two **service level** objectives

		Baseline	Urban	Rural
Objective 1: Basic servicing	Full conventional	1BF	1UF	1RF
	Low cost	1BL	1UL	1RL
	Alternative	1BA	1UA	1RA
	WCDM	1BW	1UW	1RW
Objective 2: Achieving the SDGs	Full conventional	2BF	2UF	2RF
	Low cost	2BL	2UL	2RL
	Alternative	2BA	2UA	2RA
	WCDM	2BW	2UW	2RW

9 water resources scenarios

Three **Invasive and alien plant** (IAP) clearing scenarios

Three **climate change** scenarios

	Allow IAP invasion	Maintain current IAP levels	Clear IAPs
10th Percentile MAR			
50th Percentile MAR			
90th Percentile MAR			

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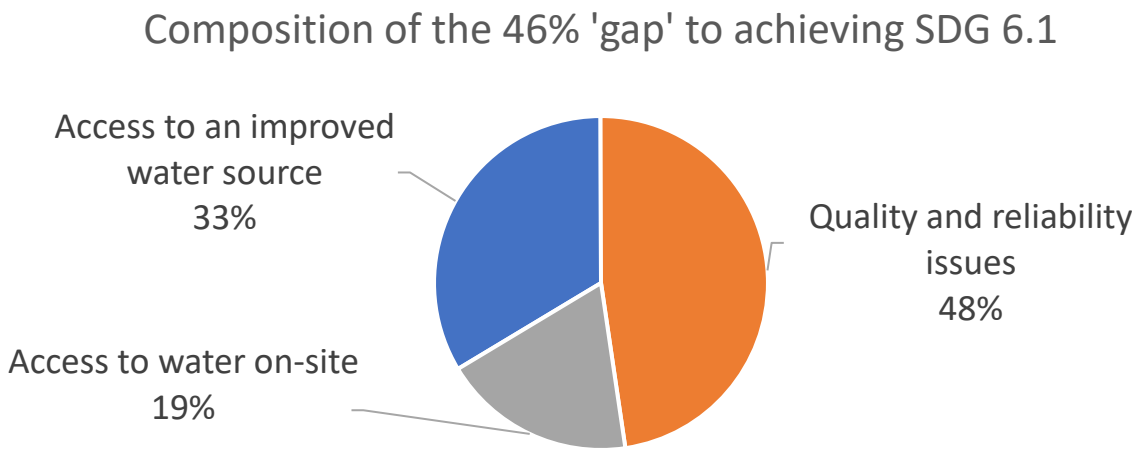
Access – water (SDG 6.1)

Data source:
StatsSA General Household Survey 2019, with interpretations following discussions with DWS

The UN definition of acceptable water access has four dimensions:

- Source — 95% of households have improved source (piped supply)
- Location of supply — 84% of households have improved source within 200m; 76% on-site
- Quality — 69% have on-site, improved access, which is not polluted (safe to drink)
- Reliability — 54% on-site, improved access, which is not polluted or interrupted



48% of the 'gap' to achieving SDG 6.1 is about resolving quality and reliability issues

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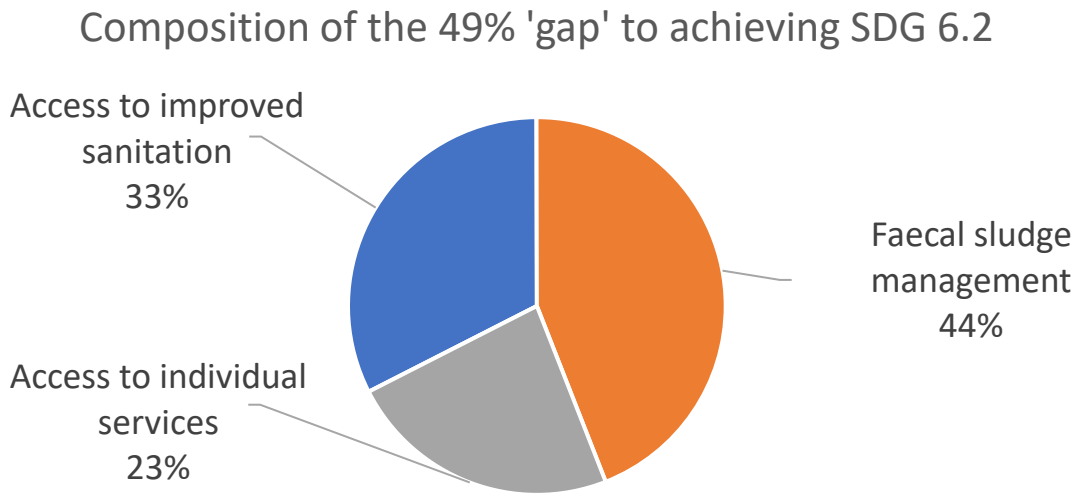
Access – sanitation (SDG 6.2)

Data source:
StatsSA General Household Survey 2019, with interpretations following discussions with DWS

The UN definition of acceptable sanitation access has three dimensions:

- Acceptability of technology — 84% improved
- Individual access — 72% improved, not shared
- Safe treatment of waste — 51% improved, not shared, with faecal sludge management



44% of the 'gap' to achieving SDG 6.2 is about addressing faecal sludge management

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Access – hygiene (SDG 6.2)

Data source:
StatsSA General Household Survey 2019, with interpretations following discussions with DWS

The UN definition of acceptable hygiene access has two dimensions:

- Availability of handwashing facility — 89% have access
- Availability of soap — 75% have limited access

Roll-out of hygiene facilities is closely tied to roll-out of water and sanitation facilities. Challenges relate mainly to logistics of reaching households without services and in sustaining a hygiene education programme, particularly in schools

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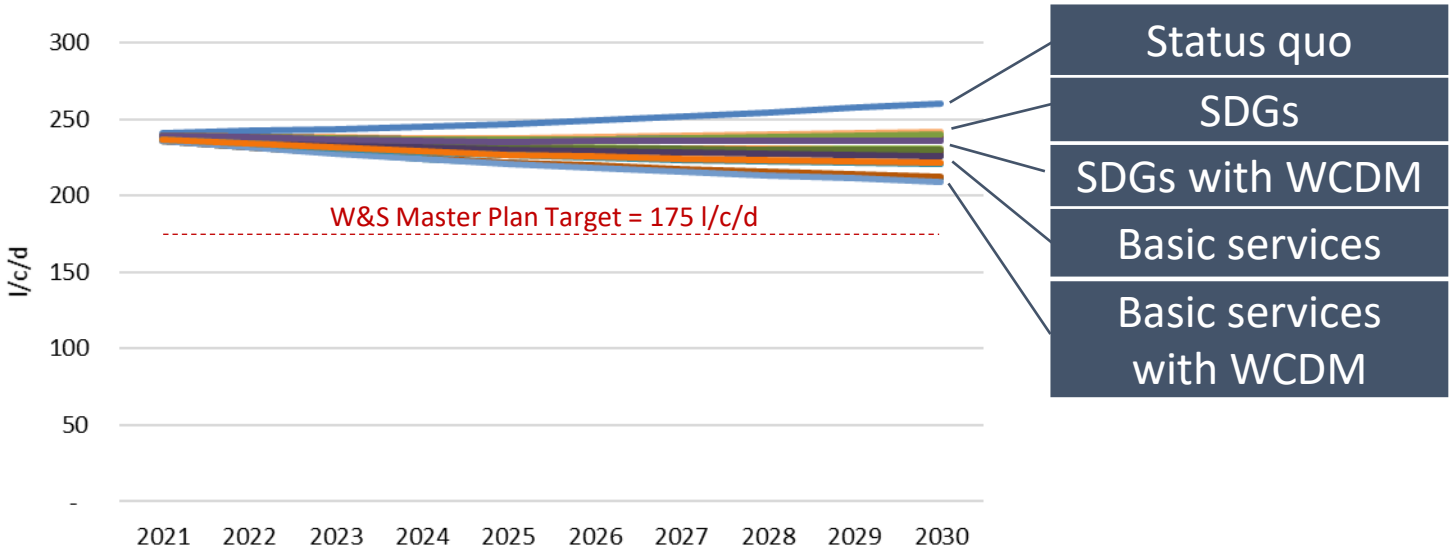
Potable water demand (res and non-res)



- Status quo means current service levels remain unchanged; no WCDM
- Water demand in 2030 varies by 1 273 million m^3, or 25% between highest and lowest scenarios
- This is total demand before water source is considered (i.e. surface, ground, desal or reuse)
- All scenarios other than Status Quo and 'WCDM' include the same basic WCDM programme

Water efficiency target of 175 l/c/d unlikely to be reached 2030 without radical behaviour change from all users

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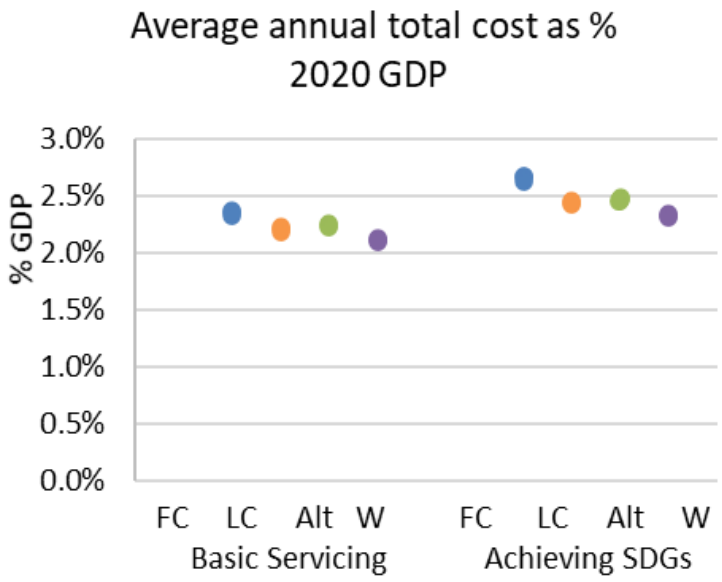
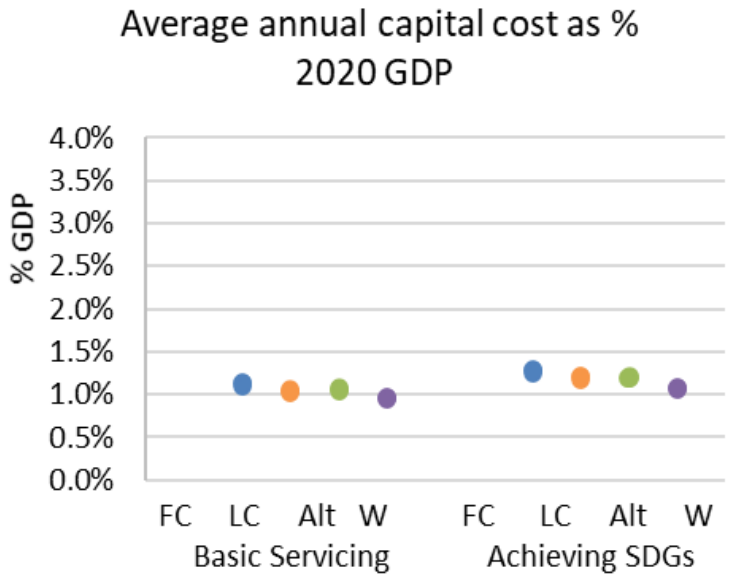
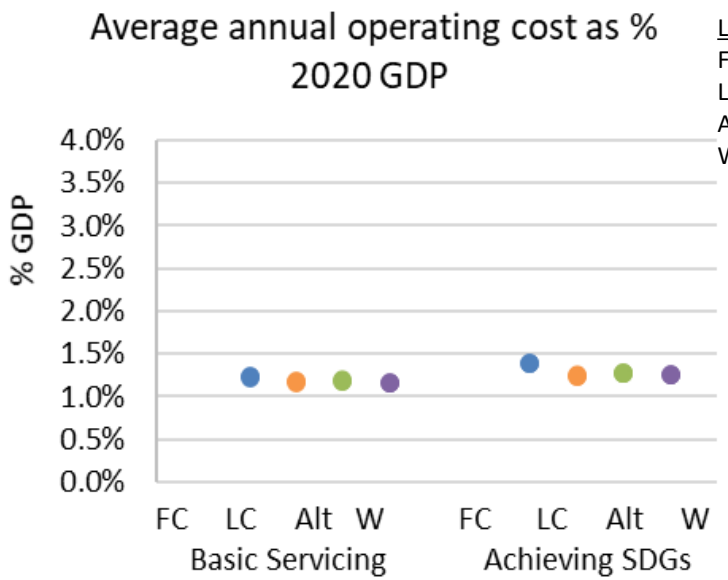
Costs as a proportion of 2020 GDP







Legend
FC = Full Conventional
LC = Low cost
Alt = Alternative
W = WCDM

The total cost to achieve the water and sanitation access targets varies between 2.1% and 2.7% of GDP (R104-R133 billion per annum over 10 years for water services, including water resources to service the potable demand and excluding financing costs).

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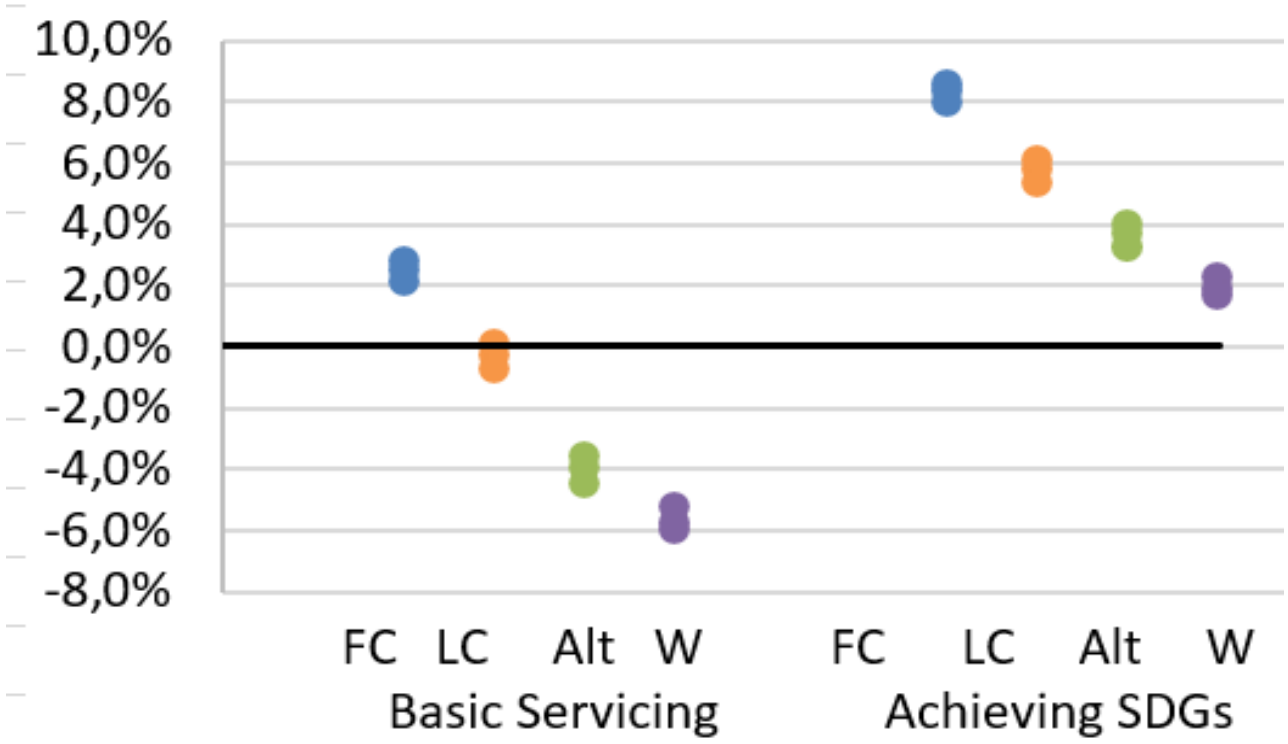
% Change in baseline emissions (2030 vs 2020)



- Full cost technologies have the highest increase in emissions due to greater volumes for treatment and pumping, followed by the low-cost options
- Alternative options have lower emissions, which are reduced further if WCDM is maximised, and can even result in emission levels up to 6% lower than current levels.
- Basic servicing has reduced emissions due to lower water and wastewater volumes

More expensive scenarios also have higher impact on GHG emissions

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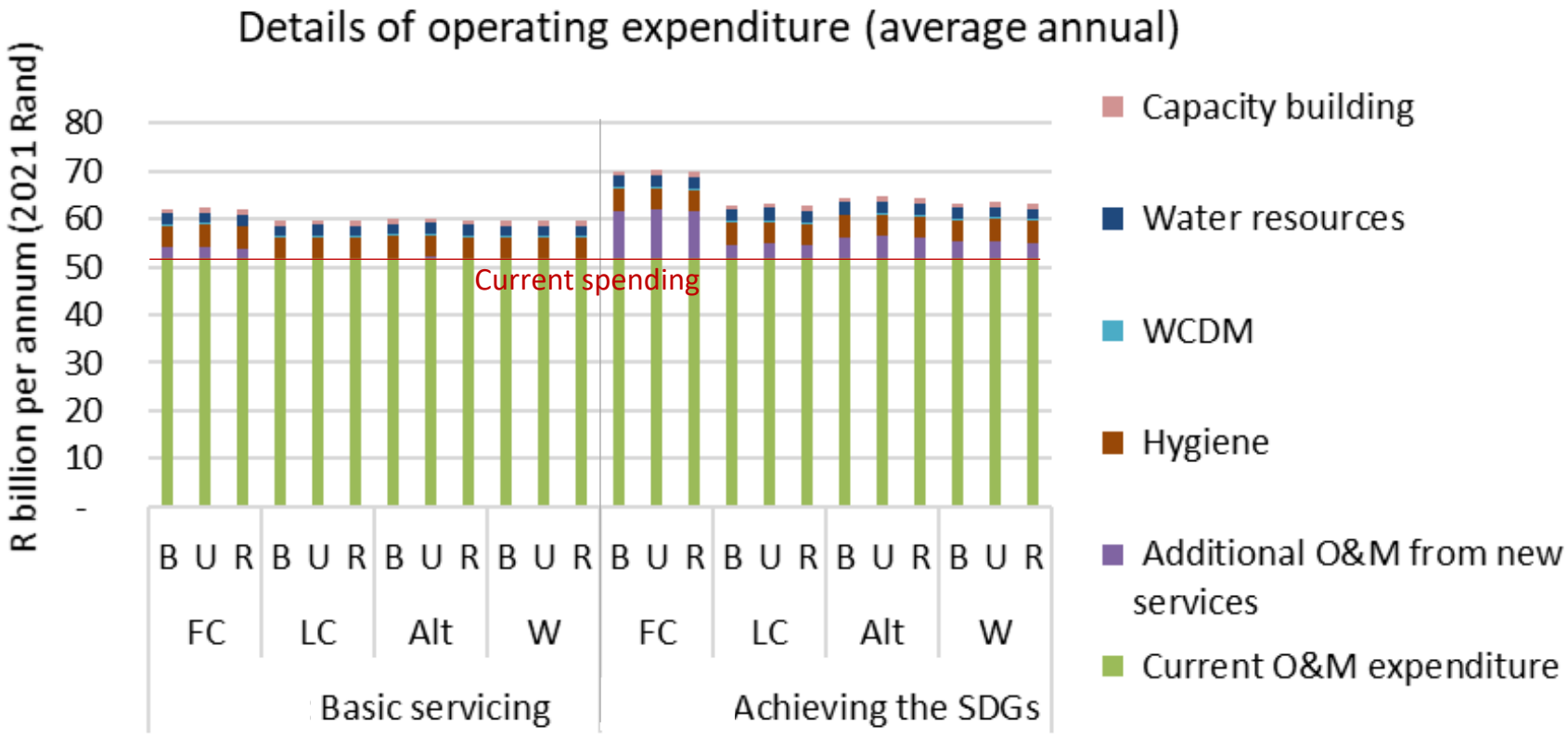
Operating cost breakdown



- Required average annual operating expenditure = R60-70 billion
- Operating costs dominated by O&M of current system
- O&M for new service varies by scenario
- WCDM and capacity building have very low relative operating costs

* Note that water resources expenditure is for new water resources only, pro rated for potable use only

Legend for 24 scenarios

FC = Full Conventional
LC = Low cost
Alt = Alternative
W = WCDM

B = Baseline
U = Urban
R = Rural

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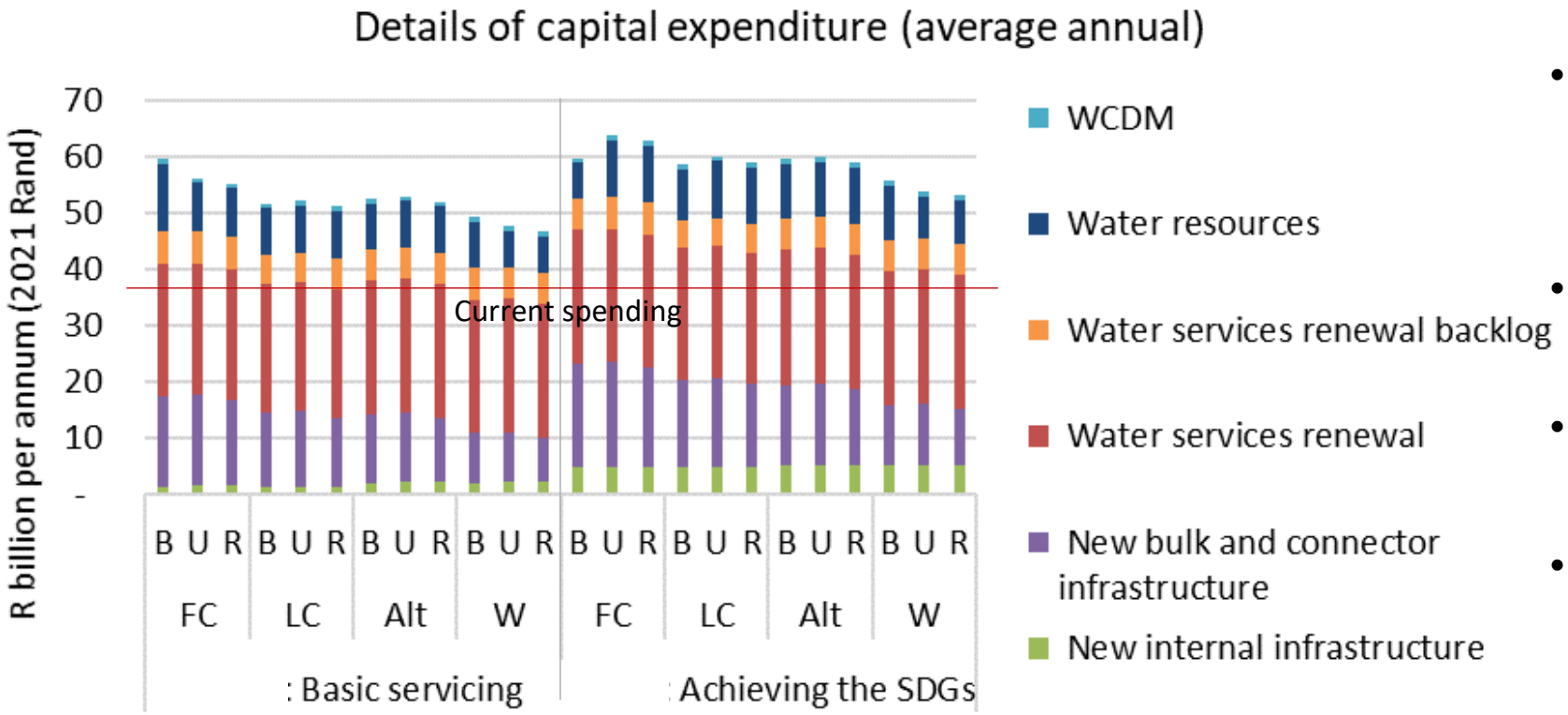
Capital cost breakdown



- Required average annual capital expenditure = R47-64 billion vs current spending of approx. R38 billion
- Expenditure dominated by renewal of existing assets
- Major variations on new bulk and connector infrastructure
- WCDM and water resources have very low relative capital costs

* Note that water resources expenditure is for new water resources only, pro rated for potable use only

Legend for 24 scenarios

FC = Full Conventional
LC = Low cost
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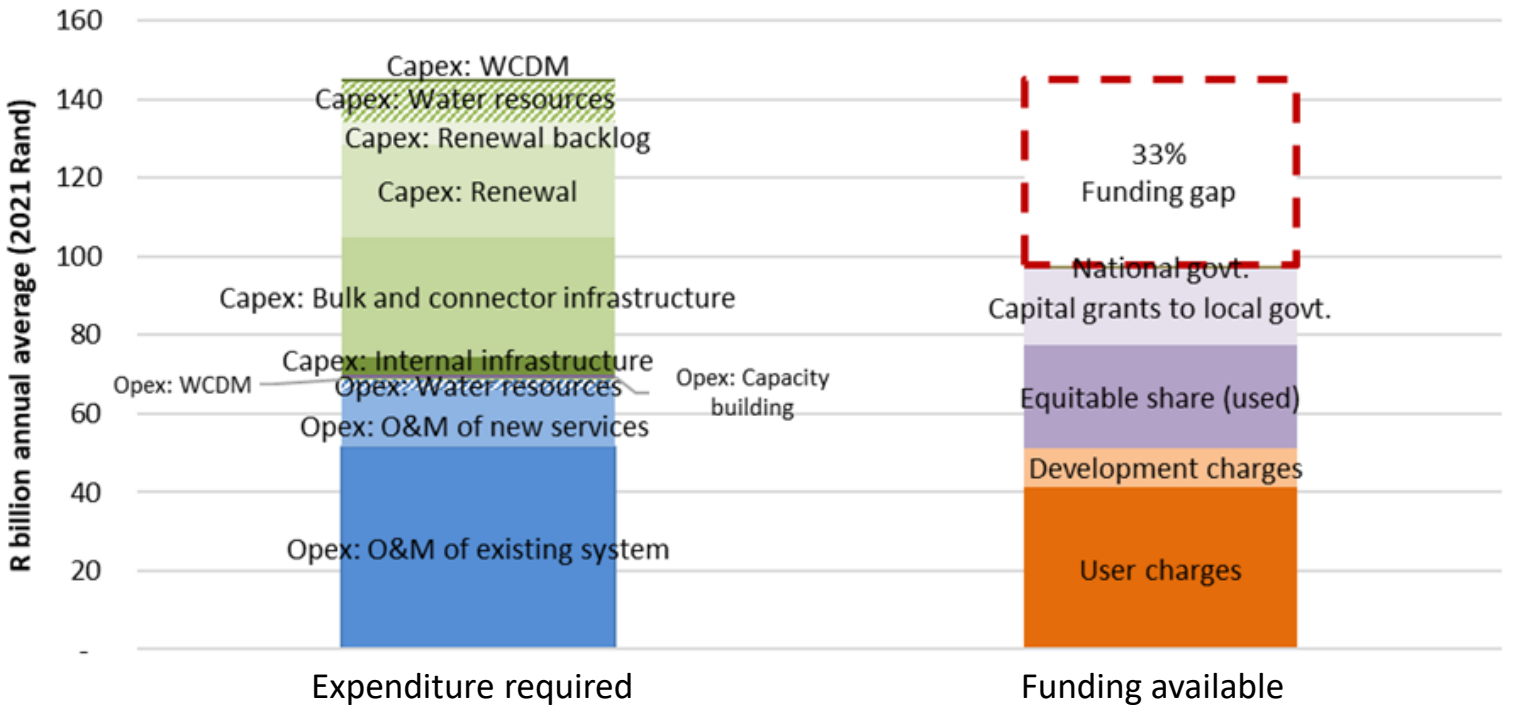
Quantifying the funding gap



- Funding gap = difference between the total costs to meet SDG6 and the available funding.
- The total cost varies between R110 billion and R147 billion (Real 2021 Rands) per annum over 10 years.
- **Remaining funding gap varies between 32% and 34% (R43-47 billion per annum)**
- Same % gap as calculated in the 2017 National Water Investment Framework (and NWSMP)

* The funding gap is shown for the Objective 2 (SDG) Baseline Full Conventional scenario. The percentage gap is similar for all scenarios

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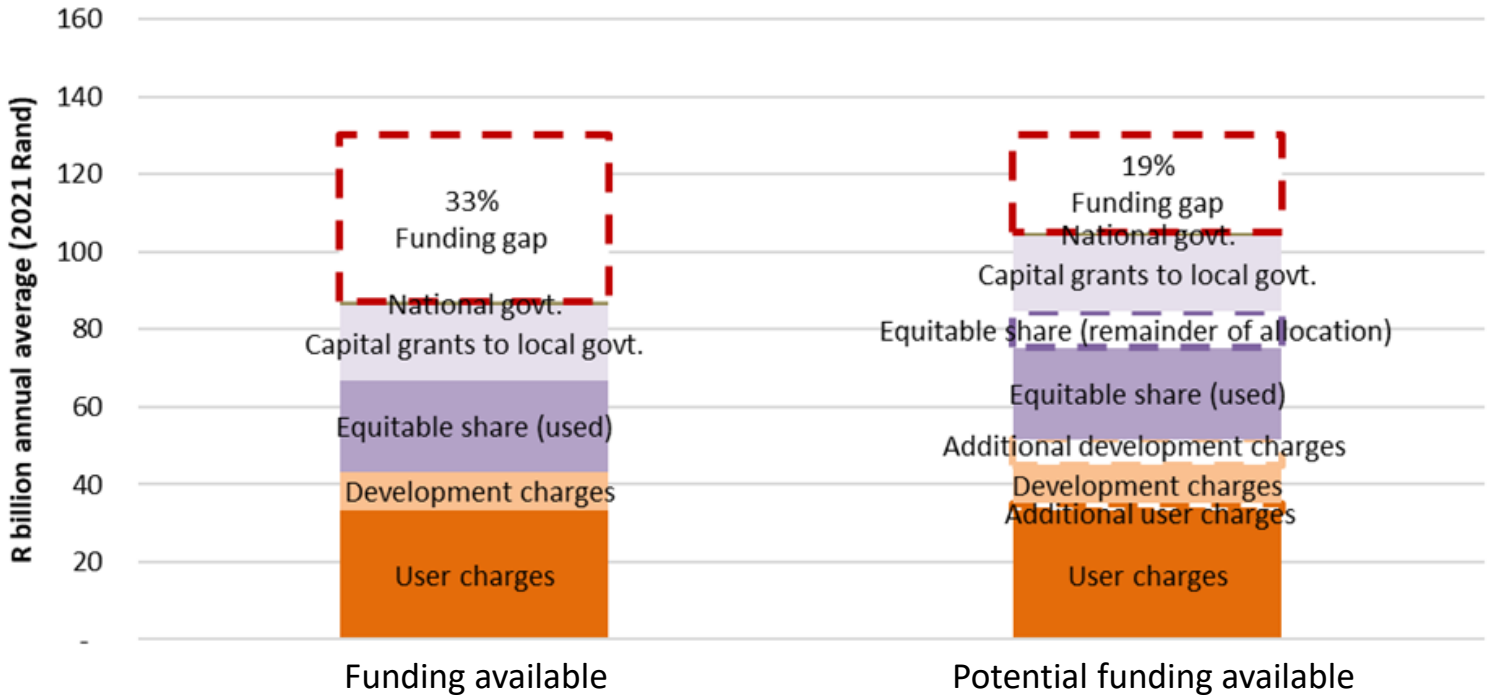
Closing the gap



- Funding can potentially be increased through municipalities dedicating more Equitable Share to water services (up to the formula allocation) and increasing development charges up to the full cost of services.
- **These increases have the potential to reduce the funding gap from 32-34% to between 19% and 22%,**

Without either an increase in the water tariff level, potentially impacting on affordability, or an increased allocation from the national fiscus, South Africa will be unable to afford to reach the SDG 6 goals by 2030.

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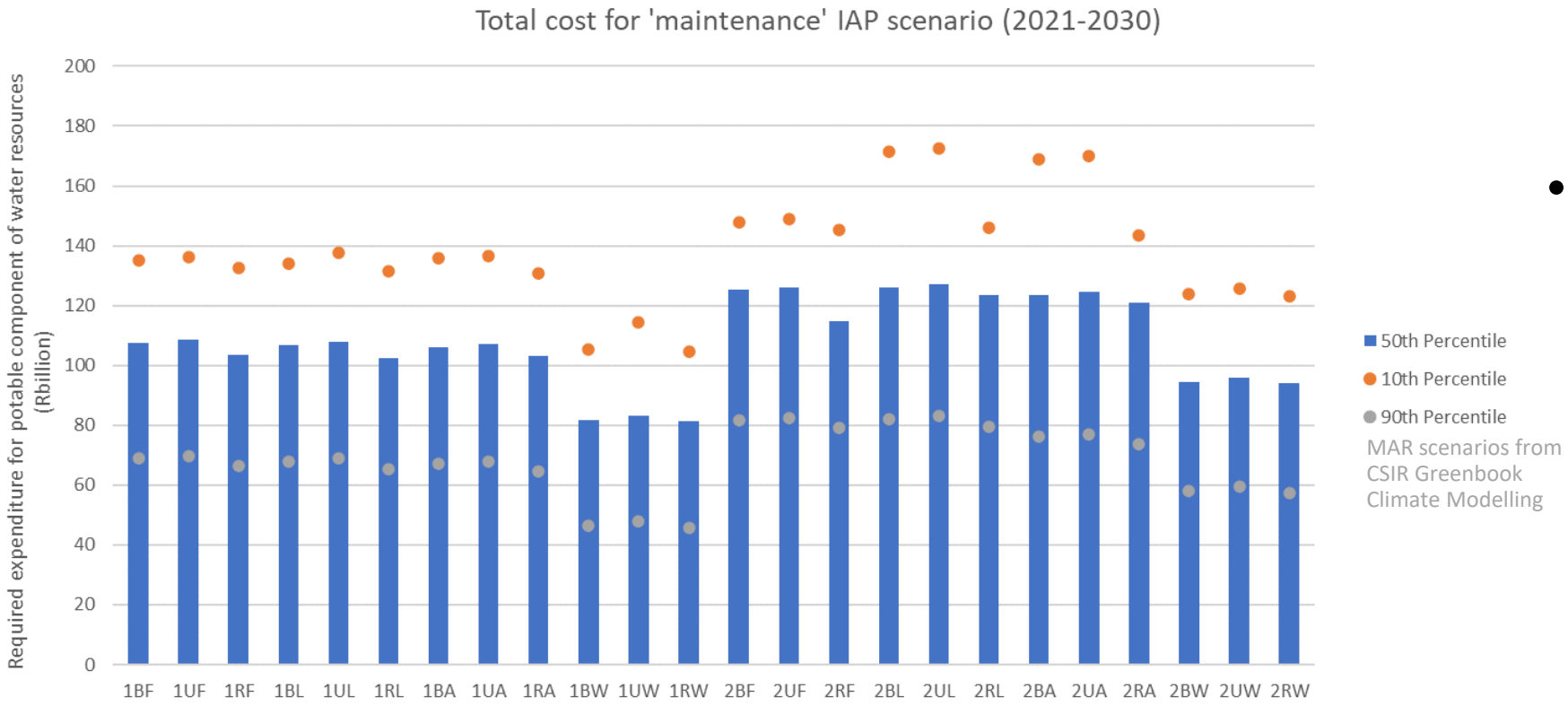
Water resources costing



- Cost of new water resource development varies with changing water demand per scenario, and declining yield due to climate change

Drier climate scenarios can increase the water resources cost by up to three times over the costs under wetter scenarios

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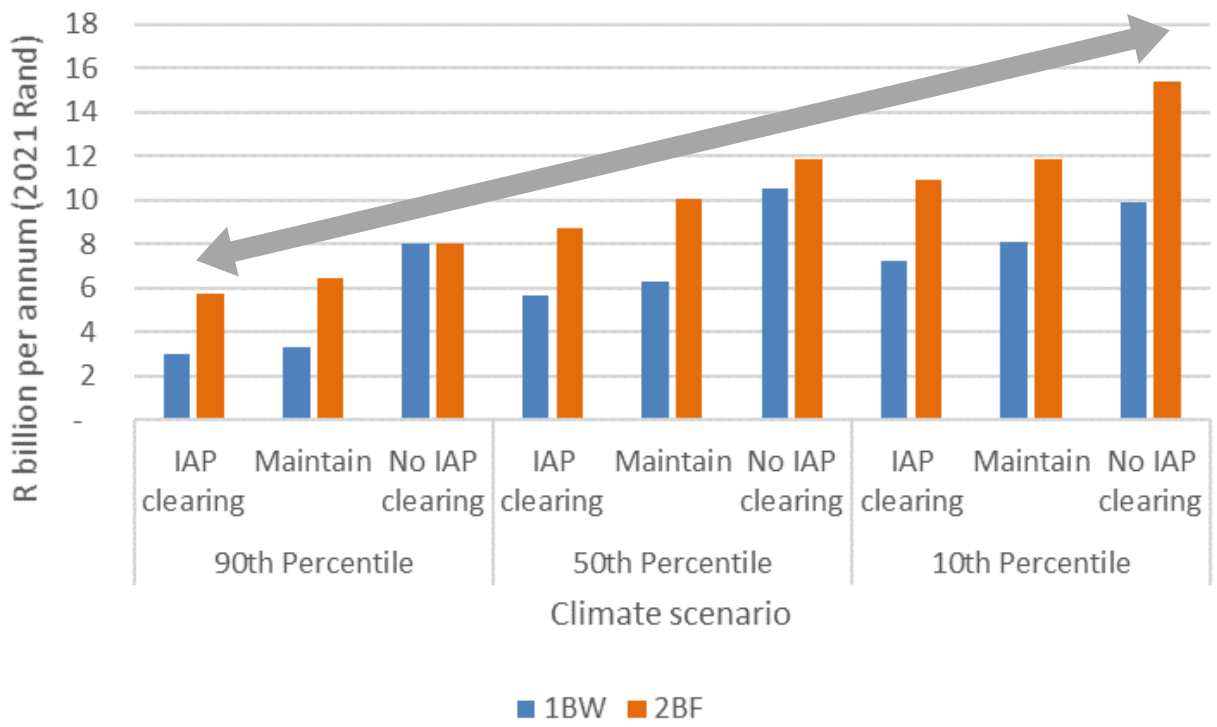
Effects of climate change & invasive alien plants (IAP)



- Additional expenditure required to augment the raw water supply to meet the potable water demand ranges from **R2.9bn per annum to R15.5bn per annum**
- Costs may be less due to potential system benefits and based on more detailed analysis of individual systems

Climate scenarios and the levels of IAP infestation have a major impact on water availability and thus on raw water costs, as well as the achievement of SDG 6.4 and 6.6

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Performance of scenarios against defined metrics

Not achieved by 2030

Fully achieved by 2030

		Objective 1: Basic Servicing												Objective 2: Achieving SDGs											
		Full conv.			Low cost			Alternative			WCDM			Full conv.			Low cost			Alternative			WCDM		
Objective	Metric	Baseline	Urban	Rural	Baseline	Urban	Rural	Baseline	Urban	Rural	Baseline	Urban	Rural	Baseline	Urban	Rural	Baseline	Urban	Rural	Baseline	Urban	Rural	Baseline	Urban	Rural
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None of the scenarios achieve all the objectives by 2030, indicating that trade offs need to be made

Policy considerations

- Full-service levels vs. affordability in the short-term
- Capital funding for renewal vs. new services
- Incentives for asset management
- Concerted drive to deal with NRW and water losses
- Differentiated sanitation options, including a fecal sludge mgt. program
- Address declining municipal capacity in extending and sustaining WSS delivery
- Blue & Green drop revitalization to incentivize & regulate asset management
- Better coordinate water resource planning between DWS, municipalities etc.
- Coordinate national efforts on Invasive Alien Plant (IAP) clearing
- Prioritise bulk water augmentation investments and O&M

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